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Coordinadores

Interdisciplinary Congress of Renewable Energies - Industrial Maintenance - Mechatronics and Informatics

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Abstracts Collection

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Intitut National Polytechnique Toulouse

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Universidad Autónoma de Baja California

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Universidad Autónoma de Ciudad Juárez

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Universidad Popular Autónoma del Estado de Puebla

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Instituto Nacional de Astrofísica, Óptica y Electrónica

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Universidad Autónoma Metropolitana

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Universidad Internacional Iberoamericana

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Universidad Nacional Autónoma de México

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Instituto Nacional de Astrofísica, Óptica y Electrónica

FERNÁNDEZ - GÓMEZ, Tomás. PhD
Universidad Popular Autónoma del Estado de Puebla

MENDOZA - DUARTE, Olivia. PhD
Universidad Autónoma de Baja California

ARREDONDO - SOTO, Karina Cecilia. PhD
Instituto Tecnológico de Ciudad Juárez

NAKASIMA - LÓPEZ, Mydory Oyuky. PhD
Universidad Autónoma de Baja California

AYALA - FIGUEROA, Rafael. PhD
Instituto Tecnológico y de Estudios Superiores de Monterrey

ARCEO - OLAGUE, José Guadalupe. PhD
Instituto Politécnico Nacional

HERNÁNDEZ - MORALES, Daniel Eduardo. PhD
Centro de Investigación Científica y de Educación Superior de Ensenada

AMARO - ORTEGA, Vidblain. PhD
Universidad Autónoma de Baja California

ÁLVAREZ - GUZMÁN, Eduardo. PhD
Centro de Investigación Científica y Educación Superior de Ensenada

CASTILLO - BARRÓN, Allen Alexander. PhD
Instituto Tecnológico de Morelia

CASTILLO - QUIÑONES, Javier Emmanuel. PhD
Universidad Autónoma de Baja California

ROSALES - CISNEROS, Ricardo. PhD
Universidad Nacional Autónoma de México

GARCÍA - VALDEZ, José Mario. PhD
Universidad Autónoma de Baja California

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Instituto Politécnico Nacional

MÉRIDA - RUBIO, Jován Oseas. PhD
Centro de Investigación y Desarrollo de Tecnología Digital

INZUNZA - GONÁLEZ, Everardo. PhD
Universidad Autónoma de Baja California

VILLATORO - Tello, Esaú. PhD
Instituto Nacional de Astrofísica, Óptica y Electrónica

Volumen VII

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MARROQUÍN-DE JESÚS, Ángel
OLIVAREZ-RAMÍREZ, Juan Manuel
CRUZ-CARPIO, Luis Eduardo
GÓMEZ-VEGA, Paola

CIERMMI Coordinators

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Association of Renewable Energy Engineers of Querétaro A.C. October 26-28, 2022.

Preface

The Colegio de Ingenieros en Energías Renovables de Querétaro A.C. (CIER-QUERÉTARO), and its chapters of Renewable Energy, Industrial Maintenance, Mechatronics and Informatics, technical sponsors of the Interdisciplinary Congress of Renewable Energy, Maintenance, Mechatronics and Informatics, CIERMMI 2022, are pleased to invite you to the 4th, edition of this congress, which will be held on October 26, 27 and 28, 2022, in the city of San Juan del Río, Querétaro, Mexico.

The general objective is to establish a space for discussion and reflection on topics related to the areas of: renewable energy, industrial maintenance, mechatronics and computer science with the participation of students, professors, researchers and national and international speakers, promoting the formation and consolidation of research networks. Contributing to provide a space for dissemination and discussion of the presentations of students, graduates, academics and researchers, representatives of the various institutions of higher education and research centers in our country. Promoting the formation of research networks among different institutions. Offering a space for undergraduate, master's, doctoral and postdoctoral students, in which they can present the progress of the research they are carrying out as thesis or graduate work. Providing a space in which study groups and members of academic bodies, linked to the curricular program of renewable energy, industrial maintenance, mechatronics and computer science careers, can present the research work developed within their institution and in collaboration with other national or international educational institutions. Establishing a training space for the attendees, through the development of specific papers and conferences. This volume VII-2022 contains 207 refereed participations dealing with these issues in chosen from among the contributions, we gathered some researchers and graduate students, from 32 states of Mexico. We thank the anonymous reviewers for their feedback who contributed greatly in improving the articles for publication in these proceedings by reviewing the manuscripts that were submitted. Finally, we wish to express our gratitude to the Colegio de Ingenieros en Energías Renovables de Querétaro A.C. in the process of preparing this edition which can be consulted at http://ecorfan.org/ collections.php.

San Juan del Río, Qro
October 26-28, 2022.

Ángel Marroquín de Jesús
Juan Manuel Olivarez Ramírez
Luis Eduardo Cruz Carpio
Paola Gómez Vega

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Utilización de mallas no estructuradas para el análisis de altura de ola y desplazamiento horizontal de partículas en la zona central de Veracruz, México

AGUILERA-MENDEZ, José María, JUAREZ-TOLEDO, Carlos, MARTINEZ-CARRILLO, Irma and VERA-POPOCA, Roberto Ismael

Universidad Autónoma del Estado de México, Unidad Académica Profesional Tianguistenco.

ID 1st Author: *José María, Aguilera-Méndez* / **ORC ID:** 0000-0002-9826-421X, **CVU CONACYT ID:** 66670

ID 1st Coauthor: *Carlos, Juárez-Toledo* / **ORC ID:** 0000-0002-7440-3246, **Researcher ID Thomson:** C-1368-2016, **CVU CONACYT ID:** 39912

ID 2nd Coauthor: *Irma, Martínez-Carrillo* / **ORC ID:** 0000-0002-7952-4418, **Researcher ID Thomson:** B-9264-2016, **CVU CONACYT ID:** 39914

ID 3rd Coauthor: *Roberto Ismael, Vera-Popoca* / **ORC ID:** 0000-0003-2574-122X, **CVU CONACYT ID:** 1041051

Abstract

The objective research is the calculation of free-floating particle displacement trajectory using the Simulating Waves Nearshore (SWAN) software having as base unstructured meshes to get the diagram of the study area. Third-party tools and data were used, such as bathymetry, wave and tide data from the Global Ensemble Forecast System-Wave (GEFS-Wave) and data processing using SWAN. The modelling software and some local developments were used to generate valid Delaunay diagrams for the central zone of the Veracruz state, Mexico. For the configuration of the experiments, we worked with physics variables of the modelling software until achieving one that resembled the real conditions of the area; once the similarity was achieved, it was possible to run the experiments to obtain the wave height and frequency and replace the values in the horizontal displacement equation until obtaining the spaghetti diagrams that indicate the possible paths of the particles.

Wave Height, Particles Displacement, Unstructured Mesh

Photoluminescence comparison of CNTs-SRO and GO-SRO films deposited on silicon substrates

Comparación de la fotoluminiscencia de películas CNT-SRO y GO-SRO depositadas sobre sustratos de silicio

MENDOZA-CONDE, Gabriel Omar, LUNA-LÓPEZ, José Alberto, HERNÁNDEZ-SIMÓN, Zaira Jocelyn and HERNÁNDEZ-DE LA LUZ, José Álvaro David

Universidad Autónoma de Puebla

ID 1st Author: *Gabriel Omar, Mendoza-Conde* / **ORC ID:** 0000-0001-5451-9770, **CVU CONACYT ID:** 774931

ID 1st Coauthor: *José Alberto, Luna-López* / **ORC ID:** 0000-0002-7647-3184, **CVU CONACYT ID:** 200808

ID 2nd Coauthor: *Zaira Jocelyn, Hernández-Simón* / **ORC ID:** 0000-0003-4185-4101, **CVU CONACYT ID:** 774431

ID 3rd Coauthor: *José Alvaro David, Hernández-De la Luz* / **ORC ID:** 0000-0002-7913-0240, **CVU CONACYT ID:** 240901

Abstract

In this work, we make a comparative study of the photoluminescence (PL) obtained from the structures formed by carbon nanotubes (CNTs) and graphene oxide (GO) deposited by Spin Coating on silicon rich oxide (SRO) thin films which were obtained by hot filament chemical vapor deposition (HFCVD) technique. The objective of building these hybrid structures is to increase the photoluminescence response. The PL measurements show that the CNTs-SRO heterostructures exhibit a stronger photoluminescence when compared to that obtained from the GO-SRO heterostructure, similar behaviour exhibit the GO-CNTs/SRO ones when compared to the CNTs-GO/SRO ones. It is worthy to note that the CNTS-SRO structures PL displays blue light emission, while green light emission is present in the CNT-GO ones. By deconvolution of the PL spectra, we identify the emission mechanisms present in graphene oxide, carbon nanotubes layers and the silicon rich oxide films. Due to the good properties of PL exhibited by the CNTs-SRO and GO-CNTs/SRO structures, they are excellent candidates to be applied in the field of photonic and electroluminescent devices.

SRO, HFCVD, Photoluminescence

BFO films obtained by Spray Pyrolysis optical and structural analysis

Análisis óptico y estructural de películas de BFO obtenidas por Spray Pirólisis

HERNÁNDEZ-SIMÓN, Zaira Jocelyn, LUNA-LÓPEZ, José Alberto, HERNÁNDEZ-DE LA LUZ, Álvaro David and MENDOZA-CONDE, Gabriel Omar

Universidad Autónoma de Puebla (BUAP)

ID 1st Author: *Zaira Jocelyn, Hernández-Simón* / **ORC ID:** 0000-0003-4185-4101, **CVU CONACYT ID:** 774431

ID 1st Coauthor: *José Alberto, Luna-López* / **ORC ID:** 0000-0002-7647-3184, **CVU CONACYT ID:** 200808

ID 2nd Coauthor: *José Alvaro David, Hernández-de la Luz* / **ORC ID:** 0000-0002-7913-0240, **CVU CONACYT ID:** 240901

ID 3rd Coauthor: *Gabriel Omar, Mendoza-Conde* / **ORC ID:** 0000-0001-5451-9770, **CVU CONACYT ID:** 774931

Abstract

In the present research work, the obtaining of $BiFeO_3$ films using the ultrasonic Spray Pyrolysis technique is reported. The deposited films were characterized optically and structurally, showing interesting results, such as the formation of column-type microstructured arrangements with an average height of 805 nm, as well as the presence of 2 predominant phases in the material, the combination of rhombohedral $BiFeO_3$ with tetragonal Bi_2O_3, in addition to the tetragonal $Bi_{36}Fe_2O_{57}$ phase. From the diffraction patterns, the lattice parameters were also obtained, with which the crystalline structure of each phase was graphically represented, the average crystallite size was calculated using the Scherrer formula with an average size of 13 nm, which could benefit the Magnetic properties of $BiFeO_3$. The film also shows a band gap shift at lower energies, which is an improvement for future applications in the field of photovoltaics, furthermore these films were obtained with a simple and economical technique using a deposition temperature of only 100°C.

$BiFeO_3$, Structural characterization, Spray Pyrolysis

Rotational vibrations absorber analysis for damped oscillatory systems

Análisis de un absorbedor de vibraciones tipo rotacional para sistemas con amortiguamiento

VÁZQUEZ-GONZÁLEZ, Benjamín, JIMÉNEZ-RABIELA, Homero, RAMÍREZ-CRUZ, José Luis and GARCÍA-SEGURA, Pedro

Universidad Autónoma Metropolitana

ID 1st Author: *Benjamín, Vázquez-González* / **ORC ID:** 0000-0002-9030-5662, **Researcher ID Thomson:** S-2417-2018, **CVU CONACYT ID:** 25749

ID 1st Coauthor: *Homero, Jiménez-Rabiela* / **ORC ID**: 0000-0002-1549-0853, **Researcher ID Thomson**: S-2299-2018, **CVU CONACYT ID:** 123386

ID 2nd Coauthor: *José Luis, Ramírez-Cruz* / **ORC ID:** 0000-0003-0762-2630, **Researcher ID Thomson:** G-3405-2019, **CVU CONACYT ID:** 921268

ID 3rd Coauthor: *Pedro, García-Segura* / **ORC ID:** 0000-0003-4947-084X, **Researcher ID Thomson:** S-2360-2018, **CVU CONACYT ID:** 371233

Abstract

The phenomenon of vibration absorption is an energy exchange mechanism, which can be used in mechanical engineering applications to solve problems of attenuation or reduction of high amplitudes that a moving body or system can reach. There are basically two types of vibration absorbers; passive and active. Active vibrations absorbers are composed of servomechanisms that are capable of modifying structural conditions, to produce a specific required performance. Passive vibrations absorbers are not made up of elements that directly modify the structure of the mechanical system as a whole, thus a passive system is designed to operate under conditions that will not change over time, however, active systems will require the addition of some type of external energy, passive systems do not consume extra energy and this makes them attractive from the point of view of their accessibility. In this work, the performance of a rotational-type passive vibration absorber for a primary system with harmonic excitation and viscous-type damping is studied.

Vibrations, Passive Absorption, Viscous Damping

Fiber optic coiling system prototype

Prototipo de sistema enrollador de fibra óptica

RAMÍREZ-HERNÁNDEZ, Miguel Ángel, MEJÍA-BELTRÁN, Efraín, TALAVERA-VELAZQUEZ, Dimas and GUTIÉRREZ-VILLALOBOS, José Marcelino

Centro de Investigaciones en Óptica, A.C., CONACYT, León, Gto., México
Universidad Autónoma de Querétaro, Querétaro, Qro., México

ID 1st Author: *Miguel Ángel, Ramírez-Hernández* / **ORC ID:** 0000-0002-6093-090X, **CVU CONACYT ID:** 742457

ID 1st Coauthor: *Efraín, Mejía-Beltrán* / **ORC ID:** 0000-0001-8960-6604, **CVU CONACYT ID:** 20998

ID 2nd Coauthor: *Dimas, Talavera-Velazquez* / **ORC ID:** 0000-0002-8074-1647, **CVU CONACYT ID:** 85034

ID 3rd Coauthor: *José Marcelino, Gutiérrez-Villalobos* / **ORC ID:** 0000-0001-5947-1489, **CVU CONACYT ID:** 173461

Abstract

In this work, a completely automated fiber optic coiling machine for any fiber diameter is presented. This prototype is capable of measuring the length of the fiber while it is coiled, allowing not only to coil large fibers but also to take control of diverse parameters, such as operation speed, and fiber-to-fiber separation. Our own mathematical model was implanted to the brain of the prototype that is based on a pair of stepper motors coupled to spinning rods that control the coiling process. The operation control (brain) is performed by an Arduino microcontroller with its corresponding free software for programming. The mechanical and electrical components selection makes it a low-cost prototype whose functions can be customized depending on the properties of optical fibers through different coiling conditions. Furthermore, we believe it has a good future regarding commercial projection as our approach was conceived independently from any other already registered and/or patented highlighting once again the low cost that would have as a manufactured commercial machine.

Optical fiber coiling, Prototype, Programming Arduino

Decision management on optimal multi-objective maintenance of electrical distribution equipment

Toma de decisiones en el mantenimiento óptimo multi-objetivo a equipos eléctricos de distribución

MOLINA-GARCÍA, Moisés, MELCHOR-HERNANDEZ, César L. and LÓPEZ-LEÓN, Ali

Tecnológico Nacional de México, Instituto Tecnológico Superior de Huatusco

ID 1st Author: *Moisés, Molina-García* / **ORC ID**: 0000-0002-4213-9591, **CVU CONACYT ID**: 311075

ID 1st Coauthor: *César L, Melchor-Hernández* / **ORC ID**: 0000-0003-2154-6654, **Researcher Thomson ID:** AAU - 3494 - 2021, **CVU CONACYT ID:** 161766

ID 2nd Coauthor: *Ali, López-León* / **ORC ID**: 0000-0003-0809-2950, **CVU CONACYT ID:** 661438

Abstract

Maintenance objective in a power distribution equipment is to perform adequately its function, to guarantee the power energy supply in a reliable and security way. Companies have for its equipment overhaul interval maintenance scheduled, no matters its arrival times to failure. This article presents a proposal to help make optimal maintenance decisions, which must be given to a distribution equipment for its correct operation to guarantee its reliability. Based on its actually overhaul interval maintenance scheduled and the statistical arrival failure time of a distribution power equipment, the NSGA-II heuristic model is used to obtain a Pareto front, and help to make the best maintenance decision. Two objective functions are considered, minimize maintenance cost while maximize the reliability of a equipment.

Optimal, Reliability, Minimize, Maximize, Statistical

Analysis of bathymetric surfaces for the determination of sediments in the inner basin of the port of Salina Cruz, Oaxaca

Análisis de superficies batimétricas para la determinación de sedimentos en la dársena interior del puerto de Salina Cruz, Oaxaca

TREJOLIEVANO-DE LA ROSA, Carlo Saddam, AGUILAR-RAMIREZ, Ana María, DOMÍNGUEZ-GONZÁLEZ, Agustín and MOLINA-NAVARRO, Antonio

Instituto Oceanográfico del Golfo y Mar Caribe

ID 1st Author: *Carlo Saddam, Trejolievano-de la Rosa* / **ORC ID:** 0000-0002-8614-7091, **CVU CONACYT ID:** 1003850

ID 1st Coauthor: *Ana María, Aguilar-Ramírez* / **ORC ID:** 0000-0003-2867-8254, **CVU CONACYT ID:** 811392

ID 2nd Coauthor: *Agustín, Domínguez-González* / **ORC ID:** 0000-0002-3199-5771, **CVU CONACYT ID:** 811473

ID 3rd Coauthor: *Antonio, Molina-Navarro* / **ORC ID:** 0000-0001-7949-8371, **CVU CONACYT ID:** 811437

Abstract

The Bathymetric Surface is original data from a bathymetric survey, or a cloud of points resulting from a subsequent edition keeping the associated metadata, can be processed based on a reticulated structure representing the geometry of the seabed as faithfully as possible, for a area of sea, river, lake or other navigable water, the primary objective of this work is to analyze the bathymetric surfaces derived from hydrographic surveys, to determine how the dragging of sediments has affected the depth in the inner dock of the port of Salina Cruz , Oaxaca. Due to the above, bathymetric data were obtained from the surveys carried out in the years 2010, 2018 and 2021 with the CEEDUCER PRO and R2 Sonic 2024 echosounder, the Hypack and CARIS BASE Editor programs were used for the management and validation of bathymetric data and to obtain the surfaces bathymetric at each time from the surveys and compare the interpolation models that generate the aforementioned surfaces derived from each survey. The results indicate that there are areas with greater sediment deposition where a depth ranging from 10 cm to 1.20 m has been lost according to the last bathymetry carried out in 2021, in order to provide safety conditions for navigation in the area of smaller vessels, tugboats, pilot vessels and vessels in general.

Superficies Batimétricas, Profundidad, Sedimentación

Signal and biosignal acquisition system for teaching in education: Conditioning and analysis methods with embedded devices

Sistema de adquisición de señales y bioseñales para la enseñanza en educación superior: Métodos de acondicionamiento y análisis mediante dispositivos embebidos

SAMANO-FLORES, Yosafat Jetsemani, SERRANO-RAMIREZ, Tomás, LOPEZ-RODRIGUEZ, Pedro and MANDUJANO-NAVA, Arturo

Universidad Politécnica de Guanajuato, Ingeniería Automotriz

ID 1st Author: *Yosafat Jetsemaní, Sámano-Flores* / **ORC ID**: 0000-0003-4173-6236, **CVU CONACYT ID**: 444850

ID 1st Coauthor: *Tomás, Serrano-Ramírez* / **ORC ID**: 0000-0001-6118-3830, **Researcher ID Thomson:** G-6039-2018, **CVU CONACYT ID:** 493323

ID 2nd Coauthor: *Pedro, López-Rodriguez* / **ORC ID**: 0000-0003-2300-8083,**CVU CONACYT ID**: 495754

ID 3rd Coauthor: *Arturo, Mandujano-Nava* / **ORC ID**: 0000-0003-2022-4397, **CVU CONACYT ID**: 270254

Abstract

The use of signals of different types in engineering is important since technological development is based on the knowledge and treatment of these, such as EMG and ECG biopotentials in biomedicine or fuel mixture and air flow signals in the automotive industry. The objectives of these projects are to offer an integrated signal acquisition and visualization system that serves as a basis for the learning of higher education students in areas such as biomedical and automotive. Designing a low-cost digital system programmed in an embedded system with sensors and visualization software. This contributes to the development of students in the treatment of signals in different areas, signals such as biological and automotive

Biomedicine, Acquisition and Embedded systems

Diurnal variation and health risk of atmospheric aromatic hydrocarbons concentrations in an urban site located in Nuevo Leon, Mexico

Variación diurna y riesgo a la salud de las concentraciones atmosféricas de hidrocarburos aromáticos en un sitio urbano localizado en Nuevo León, México

CERÓN-BRETÓN, Julia Griselda, CERÓN-BRETÓN, Rosa María, LARA-SEVERINO, Reyna del Carmen and VICHIQUE-MORALES, Arely

Universidad Autónoma del Carmen, Facultad de Química.
Universidad Autónoma del Carmen. Facultad de Ciencias de la Salud.

ID 1st Author: *Julia Griselda, Ceron-Breton* / **ORC ID:** 0000-0003-1551-7988, **CVU CONACYT ID:** 122903

ID 1st Coauthor: *Rosa María, Ceron-Breton* / **ORC ID:** 0000-0001-8647-022X, **CVU CONACYT ID:** 30106

ID 2nd Coauthor: *Reyna del Carmen, Lara-Severino* / **ORC ID:** 0000-0001-6173-0187, **CVU CONACYT ID:** 357254

ID 3rd Coautor: *Arely, Vichique-Morales* / **ORC ID**: 0000-0002-1192-591X, **CVU CONACYT ID:** 1220579

Abstract

Diurnal variation of aromatic hydrocarbons (BTEX: benzene, toluene, ethylbenzene and p-xylene) in ambient air was determined in an urban site located in Monterrey, during North's season 2020. Samples were collected using active sampling by a vacuum pump at a controlled flow of 200 ml/min during 1.5 h, considering three sampling periods: morning (07:00 - 08:30 h), midday (14:00 - 15:30 h) and afternoon (17:30- 19:00 h). Samples were desorbed with carbon disulfide and the extracts were analyzed by gas chromatography with ionization flame detection. Ethylbenzene and p-xylene were the dominant hydrocarbons (mean concentration: 18.581 $\mu g/m^3$ and 18.039 $\mu g/m^3$, respectively). Mean values for benzene and toluene were 15.137 $\mu g/m^3$ and 15.503 $\mu g/m^3$, respectively. All BTEX showed a diurnal pattern with higher values during the afternoon. From a meteorological study (wind roses) and chimiometric analysis (principal component analysis) were identified relations among the measured variables and their possible emission sources (industrial and vehicular sources). It was carried out a health risk assessment, considering both, carcinogenic and non-carcinogenic (respiratory and cardiovascular diseases) related to BTEX inhalation founding that population in the study site could develop cancer in the lifetime by benzene inhalation.

Hydrocarbons, Chromatography, Carcinogenic, Aromatic, Benzene

A study of the Apollonian Gasket

Un estudio del Tamiz de Apolonio

CANO-CORDERO, Laura Angélica and DOMÍNGUEZ-SOTO, Patricia

Benemérita Universidad Autónoma de Puebla

ID 1st Author: *Laura, Cano-Cordero* / **ORC ID:** 0000-0002-2849-7616, **CVU CONACYT ID:** 218811

ID 1st Coauthor: *Patricia, Domínguez-Soto* / **ORC ID:** 000-0003-1297-9300, **CVU CONACYT ID:** 16010

Abstract

The present expository work sought to familiarize the reader with a well-known geometrical object obtained as the recursive application of the solution of the Apollonius' problem known as the Apollonian gasket. This object appears in Geometry, but also in other branches of mathematics such as Continuum Topology and Kleinian Groups. The work contains some properties of this object, the statement and partial solution of the famous Apollonius' problem.

Apollonius' Problem, Apollonian Gasket, Continuum

2 Biology, Chemistry and Life Sciences

Preparation advances of hydroxyapatite/ZnO composite using Egg-shell

Avances en la preparación de un compuesto de hidroxiapatita/ZnO utilizando cáscara de huevo

CONTRERAS-DE LA CRUZ, M.A., GARCÍA-GONZÁLEZ, N., ENRÍQUEZ-PÉREZ, Ma. Ángeles and CASTREJÓN-SÁNCHEZ, V.H.

Tecnológico de Estudios Superiores de Jocotitlán, Departamento de Ingeniería en Materiales, México.
Tecnológico de Estudios Superiores de Jocotitlán, Departamento de Ingeniería Química, México.

ID 1st Author: *M.A., Contreras-De La Cruz* / **ORC ID:** 0000-0001-6885-7826, **CVU CONACYT ID:** 1204988

ID 1st Coauthor: N. *García-González* / **ORC ID:** 0000-0001-8968-1233, **CVU CONACYT ID:** 240047

ID 2nd Coauthor: *Ma. Angeles, Enríquez-Pérez* / **ORC ID:** 0000-0002-2280-0661, **Researcher ID Thomson:** H-9399-2018, **CVU CONACYT ID:** 1T16E134

ID 3rd Coauthor: *V. H., Castrejón-Sánchez* / **ORC ID:** 0000-0002-0112-5388, **Researcher ID Thomson:** C-9077-2015, **CVU CONACYT ID:** 235470

Abstract

In the present work, synthesis and characterization of a Hydroxyapatite (HAp)/Zinc Oxide (ZnO)-based composite in proposed. The Egg-shell (ES) is used as Hydroxyapatite source. We pretend to take advantage of photocatalytic activity of both materials. This composite can be applied in mineralization of organic dyes in waste water. The methodology followed for the preparation of the composite was carry out a Sol-gel of precursor ZnO synthesis, after, it was mixed with the previously synthesized Hydroxyapatite and calcinated at 650 °C. Later, all materials were characterized using of Raman Spectroscopy and X-Ray Diffraction (XRD), to determine the crystalline phases present; Scanning Electron Microscopy (SEM) to obtain the morphology; Energy Dispersive Spectroscopy (EDS) in order to determine elemental composition. It was possible to synthesized a HAp/ZnO composite, the characterization showed that it was obtained a composite with carbonated hydroxyapatite Type B. It is important to highlight that the method of composite synthesis, it was not a homogeneous synthesis, it is proposed to look for another impregnation method.

Synthesis, Characterization, Impregnation

A comparative study between a system of commercial mixed oxide ceramic membranes and a system of mixed oxide ceramic membranes impregnated with porcine gelatin for the removal of emergent pollutants

Estudio comparativo entre un sistema de membranas cerámicas de óxidos mixtos comerciales y un sistema de membranas cerámicas de óxidos mixtos impregnadas con gelatina porcina para la remoción de contaminantes emergentes

ESTRADA-PÉREZ, Jeniffer Giovanna, PÉREZ-MORENO, Víctor, RAMOS-LÓPEZ, Miguel Ángel and RODRÍGUEZ-MORALES, José Alberto

Facultad de Química de la Universidad Autónoma de Querétaro.
Facultad de Ingeniería de la Universidad Autónoma de Querétaro

ID 1st Author: *Jeniffer Giovanna, Estrada-Pérez* / **ORC ID**: 0000-0001-7287-9876 **CVU CONACYT ID**: 963295

ID 1st Coauthor: *Víctor, Pérez-Moreno* / **ORC ID**: 0000-0001-5350-346X, **CVU CONACYT ID**: 2 5 0 1 7

ID 2nd Coauthor: *Miguel Ángel, Ramos-López*/ **ORC ID**: 0000-0002-7105-5039, **CVU CONACYT ID**: 8 6 8 2 6

ID 3rd Coauthor: *Jose Alberto, Rodriguez-Morales* / **ORC ID**: 0000 0002-4532-9665, **CVU CONACYT ID**: 200320

Abstract

A comparison was made between a tangential flow system with mixed oxide ceramic membranes and a tangential flow system with mixed oxide ceramic membranes impregnated with porcine gelatin for emerging contaminants such as tetracycline. For the impregnation of the ceramic membranes, a tangential flow system and a 1% porcine gelatin solution were improved. The surface of the membranes before and after impregnation was characterized by Scanning Electron Microscopy (SEM) to observe the deposition of porcine gelatin in the pores. For the removal tests, ceramic membranes of mixed oxides of 1 KD and 5 KD and a Tetracycline solution of 80 mg/L were used, taking samples at 10, 30 and 60 min, which were analyzed by means of UV-Vis spectroscopy. The objective of this work was to compare the removal capacity of emerging contaminants by means of a membrane system impregnated with porcine gelatin. A removal above 70% of Tetracycline was obtained in the 5KD membranes with impregnation.

Membranes, Porcine, Emerging, Impregnation, Removal

Design and automation of an electrospinning system to prepare micro and nanofibers. Case study: Elaboration of polymeric micro and nanofibers for vaginal drug delivery

Diseño y automatización de un sistema de electrohilado para la preparación de micro y nanofibras. Estudio de caso: Elaboración de micro y nanofibras poliméricas de administración vaginal

MARTÍNEZ-PÉREZ, Beatriz, OLIVANO-ESQUIVEL, Ana Daniela, FERNÁNDEZ-RETANA, Jorge and VIDAL-ROMERO, Gustavo

Universidad Politécnica del Valle de México. División de Ingeniería en Nanotecnología.

ID 1st Author: *Beatriz, Martínez-Pérez* / **ORC ID:** 0000-0003-0277-0028, **CVU CONACYT ID:** 214825

ID 1st Coauthor: *Ana Daniela, Olivano-Esquive* / **ORC ID:** 0000-0002-7306-5812

ID 2nd Coauthor: *Jorge, Fernández-Retana* / **ORC ID:** 0000-0002-8282-3865, **CVU CONACYT ID:** 104639

ID 3rd Coauthor: *Gustavo, Vidal-Romero* / **ORC ID:** 0000-0002-2706-3429, **CVU CONACYT ID:** 472862

Abstract

In the present investigation was optimized and automated a prototype of an electrospinning system. In addition, the methodology for preparing the polymeric film with polycaprolactone micro and nanofibers (PCL) loaded with Neem extract was optimized as a proposal for the treatment of cervical cancer. Also, a UV-VIS spectrophotometric method was developed for the quantification of Neem extract encapsulated in PCL polymeric nanofibers through the formation of a colorimetric complex with FeCl3. The wavelength used to quantify the Neem extract was 423 nm. The prototype built allowed the formation of nanofibers loaded with Neem extract with a diameter of 22-71 nm in diameter. The encapsulation efficiency of the Neem extract was 78.4%.

Electrospinning, Cervicouterine cancer, Polymeric membrane

A spectrophotometric method for the quantification of clotrimazole from polymeric nanoparticles to *Candida albicans* vaginal infections treatment

Método espectrofotométrico para la cuantificación de clotrimazol a partir de nanopartículas poliméricas para el tratamiento de infecciones vaginales originadas por *Candida albicans*

MARTÍNEZ-PÉREZ, Beatriz, MORALES-RODRIGUEZ, Miguel, CISNEROS-TAMAYO, Ricardo and PIÑÓN-SEGUNDO, Elizabeth

Universidad Politécnica del Valle de México. División de Ingeniería en Nanotecnología.

ID 1st Author: *Beatriz, Martínez-Pérez* / **ORC ID:** 0000-0003-0277-0028, **CVU CONACYT ID:** 214825

ID 1st Coauthor: *Miguel, Morales-Rodríguez* / **ORC ID:** 0000-0003-1600-4914, **CVU CONACYT ID:** 92676

ID 2nd Coauthor: *Ricardo, Cisneros-Tamayo* / **ORC ID:** 0000-0002-0195-8590, **CVU CONACYT ID:** 349435

ID 3rd Coauthor: *Elizabeth, Piñón-Segundo* / **ORC ID:** 0000-0002-4172-6233, **CVU CONACYT ID:** 37873

Abstract

In this study, a spectrophotometric method was developed in order to quantify CLT from polymeric nanoparticles of poly(lactic-glycolic acid) (PLGA) modified on the surface with chitosan (CTS) for vaginal administration in the treatment of vaginitis. The parameters of specificity, linearity, repeatability, quantification and detection limits were evaluated. The proposed dissolution medium was Simulated Vaginal Fluid solution pH= 4.2 with Sodium Lauryl Sulfate 0.5% (p/v). The wavelength used for CLT quantification was 265 nm. The results obtained meet the acceptance criteria specified in the Analytical Method Validation Guide (García et al., 2002). In addition, the spectrophotometric method developed allowed us to determine that the percentage of CLT encapsulated in the nanoparticles was 85.64% (w/w). Finally, it is concluded that the analytical method developed is reliable, low cost and easy to perform to quantify CLT from polymeric nanoparticles of PLGA and CTS.

Analytic Validation, Polymeric Nanoparticles, Clotrimazole

Study of Hox protein-protein interactions in living cells using novel fluorescent techniques

Estudio de interacciones proteína-proteína Hox en células vivas utilizando técnicas novedosas de fluorescencia

ALTAMIRANO-TORRES, Claudia, VILLARREAL-PUENTE, Alely, HERNÁNDEZ-BAUTISTA, Carolina and RESÉNDEZ-PÉREZ, Diana

Universidad Autónoma de Nuevo León

ID 1st Author: *Claudia, Altamirano-Torres* / **ORC ID:** 0000-0001-5919-0660, **CVU CONACYT ID:** 418086

ID 1st Coauthor: *Alely, Villarreal-Puente* / **ORC ID:** 0000-0003-1770-0778, **CVU CONACYT ID:** 745887

ID 2nd Coauthor: *Carolina, Hernández-Bautista* / **ORC ID:** 0000-0001-8576-4592, **CVU CONACYT ID:** 966599

ID 3rd Coauthor: *Diana, Reséndez-Pérez* / **ORC ID:** 0000-0002-4709-7677, **CVU CONACYT ID:** 51004

Abstract

Hox genes are master regulators of development that contain the homeobox, a highly conserved region of 180 base pairs. The homeobox codes for a 60-aminoacid domain called the homeodomain, which interacts with DNA to regulate gene expression with great specificity. How the homeodomain achieves this high level of specificity is one of the great questions in developmental biology. Besides interacting with DNA, the homeodomain also interacts with transcription factors, cofactors, and other proteins to regulate development. These protein-protein interactions are necessary to understand the functions and transcriptional regulation of homeoprotein target genes. In this review, we describe the different techniques used to study Hox protein-protein interactions. These novel fluorescent techniques can be used to verify these interactions in living cells and further analyze them in model organisms to elucidate functional implications of these interactions *in vivo*. As we discover more Hox interacting partners, these techniques will help us determine the essential role of protein-protein interactions within the interactome networks to control cellular functions and morphogenesis and organogenesis *in vivo*.

Protein-protein interactions, BiFC, FRET, Fluorescent techniques, Hox interactome, Cofactors, transcription regulation, Homeodomain, Development

Association between sleep quality and executive functions in a sample of first-semester medical students at a public university

Asociación entre la calidad del sueño y funciones ejecutivas de una muestra de alumnos del primer semestre de medicina de una universidad pública

MERAZ-MEDINA, Tzintli, HERNÁNDEZ-HERNÁNDEZ, Oscar Eduardo, GARCÍA-ORTIZ, Lidia and CÁRDENAS-VILLALVAZO, Asucena

Science Health Division, University Center of South, University of Guadalajara

ID 1st Author: *Tzintli, Meraz-Medina* / **ORC ID:** 0000-0002-2062-8618, **CVU CONACYT ID:** 131300

ID 1st Coauthor: *Lidia, García-Ortiz* / **ORC ID:** 0000-0002-4861-0989, **CVU CONACYT ID:** 260835

ID 2nd Coauthor: *Oscar Eduardo, Hernández Hernández* / **ORC ID:** 0000-0001-6245-0101, **CVU CONACYT ID:** 1008705

ID 3rd Coauthor: *Asucena, Cárdenas-Villavalzo* / **ORC ID:** 0000-0003-4910-5906, **CVU CONACYT ID:** 93618

Abstract

Poor sleep quality is common among medical students, it has been attributed to high demand of medicine careers; meanwhile sleep insufficiency has been associated with lower academic performance. Nevertheless, still not fully understood the processes that underlie such effect, like the alteration of executive functions that could occur due to sleep insufficiency. In this study, were assessed the sleep quality using the Pittsburgh Sleep Quality Index (PSQI) and executive functions using the WisconPC program, in 38 first-semester medical students, the instruments were applied at the beginning and at the end of school cycle and correlations were estimated. The results of PSQI evidenced a sleep quality worsened towards the end of the semester (start: 8.31±3.41, end: 10.92±1.81), a reduction in the average of sleep hours from 6 to 2.4 at the beginning and end of the semester respectively; however, overall score revealed low sleep quality since the initial evaluation in most of participants. On the other hand, we did not find significant changes in the components of the executive functions; except the correlation between the average reaction time per response and the average reaction time of hits, which indicates the development of cognitive flexibility at the end of semester. No correlation was found between sleep quality and executive functions, further studies are needed to understand the functional relations between sleep and cognitive processes, also to explain the mechanisms underlying the academic performance impairment, attributed to poor sleep. Besides, it is needed to research the etiology of the poor sleep quality that students inform from the beginning as university students, to implement interventions to improve the overall quality of life of medical students, that is reflected in their academic performance.

Quality Sleep, Executive Functions, Medical Students.

Molecular Biology: Tools for the Study of Re-emerging Diseases

Biología Molecular: Herramientas para el Estudio de Enfermedades Re-emergentes

GUTIERREZ-CEDILLO, Perla Mariana, CEDILLO-BARRÓN, Leticia and PERRUSQUÍA-LÓPEZ Verónica

Escuela Nacional de Ciencias Biológicas – Instituto Politécnico Nacional

ID 1st Author: *Perla Mariana, Gutierrez-Cedillo* / **ORC ID:** 0000-0003-3801-868X, **CVU CONACYT ID:** 1079086

ID 1st Coauthor: *Leticia, Cedillo-Barrón* / **ORC ID:** 0000-0003-2642-3872, **CVU CONACYYT ID:** 13822

ID 2nd Coauthor: *Verónica, Perrusquía-López* / **ORC ID:** 0000-0001-6107-6277

Abstract

Chikungunya fever is a disease caused by the chikungunya virus (CHIKV), which is transmitted by hematophagous female mosquitoes (Mohan, 2010). Chikungunya Fever is a re-emerging illness with a great global impact, causing severe public health problems (Mohan, 2010)(Gérardin, 2011)(Sebastian, 2009). CHIKV contains a single-stranded RNA genome (+) with two open reading frames (ORFs), one for nonstructural proteins and the other for structural proteins (Caglioti, 2013). Little is known about the specific role nonstructural proteins (NSPs) play during viral replication. Nevertheless, NSP1 is known to be involved in the induction of cytoskeleton and plasma membrane changes and cell prolongations such as filopodia (Laakkonen, 1998). Currently, there are no commercial antibodies to detect NSP1; hence, it is of utmost importance to design tools that would allow us to study the role of this protein during the viral cycle. In this study, primers for CHIKV NSP1 were designed and used to amplify cDNA, which was cloned into the pPROEX Htb expression vector. The optimal expression time for NSP1 was determined, and the expressed protein was purified. The recombinant NSP1 (rNSP1) protein obtained using this process was used to immunize rats to obtain polyclonal antibodies. These antibodies were tested in Vero cells infected with CHIKV and were observed using immunofluorescence assays, showing the recognition of viral proteins in their native form.

Chikungunya, NSP1, Antibody, Recombinant, Clonation, Purification

The omics era: protemics importance in cancer research

La era ómica: importancia de la proteómica en la investigación del cáncer

VALLEJO-CARDONA, Alba Adriana, ROJAS-CERVANTES, Karen Olivia, VERDUGO-MOLINARES, Maritza Guadalupe and LIMON-ROJAS, Areli

Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco A.C (CIATEJ-CONACYT).

ID 1st Author: *Alba Adriana, Vallejo-Cardona* / **ORC ID:** 0000-0002-45683787, **Researcher ID Thomson:** G-8039-2019 and **CVU CONACYT ID:** 50109

ID 1st Coauthor: *Karen Olivia, Rojas-Cervantes* / **ORC ID:** 0000-0002-6615-6310, **CVU CONACYT ID:** 1136621

ID 2nd Coauthor: *Maritza Guadalupe, Verdugo-Molinares* / **ORC ID:** 0000-0002-8413-0229, **CVU CONACYT ID:** 1124919

ID 3rd Coauthor: *Areli, Limon-Rojas* / **ORC ID:** 0000-0002-0280-0170, **CVU CONACYT ID:** 1023352

Abstract

Cancer is a pathology that leads the causes of death in the population worldwide also is reported its increase with enhancing of life expectancy. In addition, this pathology is multifactorial, including genetic mutations and environmental effectors such as germs or environmental compositional changes, considered as contaminating elements to the organism. For example, other direct factors are associated with chronic diseases that induced continue inflammation. Therefore, understanding cancer biology and its mechanism of action is a fundamental part of mitigating its effect on public health. As a heterogeneous disease, his study is a constant challenge, identifying metastasis in the early stages and the resistance to drugs are problems with an unmet need that could be solved through the study of the disease at the molecular level. Omics sciences have proven to be a promising option for the study of heterogeneous pathologies, due to their ability to analyze a biological system at the molecular level, quantify its composition, and group it according to its function. The study on which each science is based is by which it takes its name, genomics studies the genome, metabolomics the metabolome, proteomics the proteome, among others. In this chapter, we will limit ourselves to proteomics, the study of the set of proteins of a biological system, which from our point of view is the omics science with the widest understanding and from which satisfactory results have been used in clinical application. Especially, because it has been possible to identify biomarkers that may be useful during the diagnosis or prognosis of the disease or therapeutic targets for personalized medicine in patients and thus minimize the adverse effects caused by drugs on healthy cells. We expose different proteomics studies applied in different biological systems such as cell lines, xenografts, and patient tissues or fluids, to reveal the versatility of the technique and the functionality of the data that have been obtained with it.

Proteomics, Pathology, Inflammation, Mechanisms, Biomarkers

3 Medicine and Health Sciences

Effects of iron deficiency on the ovarian cycle. Experimental model

Efectos de la deficiencia de hierro en el ciclo ovárico. Modelo experimental

VIEYRA-REYES, Patricia, MARIEZCURRENA-BERASAIN, Maria Antonia, BARBABOSA-PLIEGO, Alberto and VÁZQUEZ-CHAGOYÁN Juan Carlos

Universidad Autónoma del Estado de México, Toluca, México.

ID 1st Author: *Patricia, Vieyra-Reyes* / **ORC ID:** 0000-0003-1762-3936, **CVU CONACYT ID:** 132206

ID 1st Coauthor: *Maria Antonia, Mariezcurrena-Berasain* / **ORC ID:** 0000-0002-7991-0175, **CVU CONACYT ID:** 111307

ID 2nd Coauthor: *Alberto, Barbabosa-Pliego* / **ORC ID: 0000-0002-7565-088X, CVU CONACYT ID: 348264**

ID 3rd Coauthor: *Juan Carlos, Vázquez-Chagoyán* / **ORC ID:** 0000-0001-8430-3778, **CVU CONACYT ID:** 19871

Abstract

Iron is a vital trace element involved in more than 400 chemical reactions and is a structural component of several proteins and enzymes. It is even an indispensable cofactor for hormone synthesis, forming the heme group of cytochromes necessary for the structure of steroid hormones. It has been experimentally demonstrated that iron deficiency anemia alters the ovarian cycle; however, it is not known whether iron deficiency can alter the ovarian cycle without reaching the anemia level. Aim: to determine the effects of iron deficiency on the ovarian cycle. Methods: a rat model of iron deficiency from gestation to adulthood (70 days postnatal) was used. Ten adult female rats with iron deficiency were used to obtain samples for vaginal cytology. Samples were analyzed microscopically to determine the phases of the ovarian cycle based on the most abundant cell type. Contribution: Iron deficiency leads to a shortening of the metestrus/diestrus phase and a lengthening of the proestrus; this could lead to fertility changes associated with variations in the duration of the phases of the ovarian cycle.

Iron, Ovarian Cycle, Female

Uses, effects and consequences of fluoride present in the consumption of drinking water. La Noria Community, Pinos Zacatecas

Usos, efectos y consecuencias del Flúor presente en el consumo de agua potable. Comunidad La Noria, Pinos Zacatecas

GONZALEZ-GARCIA, Arcelia, GONZÁLEZ-MARTÍNEZ, Lilia, MARTINEZ-ORTIZ, Rosa María and HERNÁNDEZ-SALAS, Claudia.

Universidad Autónoma de Zacatecas

ID 1st Author: *Arcelia, González-García* / **ORC ID:** 0000-0003-0674-1072

ID 1st Coauthor: *Lilia, González-Martínez* / **ORC ID:** 0000-0002-3679-0070

ID 2nd Coauthor: *Rosa María, Martínez-Ortiz* / **ORC ID:** 0000-0001-7811-169X

ID 3rd Coauthor: *Claudia, Hernández-Salas* / **ORC ID:** 0000-0001-7492-1310

Abstract

Fluorine is essential for human beings, since it has an essential function in the formation of bones and tooth enamel. Although it is also present in medicines, anesthetics, pesticides, industrial waste. Also in fertilizers and iron minerals, in drinking water and in high concentrations it is harmful. This research presents the case of the La Noria Community, Pinos Zacatecas in which drinking water containing fluoride is consumed, which produces effects on its in habitants, the consequences above all are on the enamel and dentin. Objectives: To investigate the use, effects and consequences of fluoride present in the intake of drinking water by the human being. Methodology: Retrospective research, a questionnaire was applied through a directed interview. Qualitative and quantitative analysis was carried out. Random sample for 80 people with an age range between 3 to 70 years of both genders. Contribution: Know the uses, effects and consequences of fluoride present in the consumption of drinking water. The Noria, Pinos Zacatecas.

Fluorine, Effects, Consequences

Occupational Health and Security about Covid-19 Contagions Risks Manual

Manual de Seguridad y Salud Ocupacional en materia de riesgos de contagios del Covid-19, en las empresas bananeras de Teapa, Tabasco

GARCÍA-VÁZQUEZ, María Del Rosario, AVENDAÑO-GÓMEZ, Verónica, MALDONADO-JIMÉNEZ, Jonathan and CASTILLO-XICOTÉNCATL, Jesús Guadalupe

Tecnológico Nacional de México Campus Región Sierra

ID 1st Author: *María Del Rosario, García-Vázquez* / **ORC ID:** 0000-0003-0489-6345

ID 1st Coauthor: *Verónica, Avendaño-Gómez* / **ORC ID:** 0000-0002-4697-4172

ID 2nd Coauthor: *Jonathan, Maldonado-Jiménez* / **ORC ID:** 0000-0003-1426-5360

ID 3rd Coauthor: *Jesús Guadalupe, Castillo-Xicoténcatl* / **ORC ID:** 0000-0002-2784-1665

Abstract

In December 2019 a pandemic called COVID-19 emerged in China, in February 2020 the first suspected case arrived in Mexico by a Mexican person who had traveled to Italy and had mild symptoms, and it was in March that the Mexican government declared emerging pandemic and implementing a series of prevention measures against COVID-19 to control the number of infections and a large number of mortality rate of 0.26 percent of inhabitants in the country. The objective of this study is to identify the possible causes that generate more contagion in the banana industry and achieve a reduction in contagion. When carrying out COVID-19 prevention studies in the Banana Companies of Teapa, Tabasco, we evaluated that many Companies do not comply with the measure of health safety guidelines in the environment of the banana industry. Given that through these collected data, a Safety and Health Manual in the Prevention of COVID-19 is proposed, in the Industrial processes of the Banana Companies due to the large number of COVID-19 infections and thus establish a safe return to the facilities with new prevention measures complying with the provisions of the manual. These results obtained allowed you to design new recommendations in relation to the banana companies evaluated through their workers.

Covid-19, Prevention, Security, Manual

Modeling of human polyglutamine neurological disorders in *Drosophila*

Modelado de enfermedades neurológicas por expansión de glutaminas en *Drosophila*

CARDENAS-TUEME, Marcela, ALTAMIRANO-TORRES, Claudia, ARREOLA-TRIANA, Alejandra E. and RESÉNDEZ-PÉREZ, Diana

Universidad Autónoma de Nuevo León

ID 1st Author: *Marcela, Cardenas-Tueme* / **ORC ID:** 0000-0003-4259-6781, **CVU CONACYT ID:** 650620

ID 1st Coauthor: *Claudia, Altamirano-Torres* / **ORC ID:** 0000-0001-5919-0660, **CVU CONACYT ID:** 418086

ID 2nd Coauthor: *Alejandra E., Arreola-Triana* / **ORC ID:** 0000-0002-8953-3828

ID 3rd Coauthor: *Diana, Reséndez-Pérez* / **ORC ID:** 0000-0002-4709-7677, **CVU CONACYT ID:** 51004

Abstract

Polyglutamine (PolyQ) expansion diseases are a family of autosomal dominant neurodegenerative disorders that includes Huntington's disease and spinocerebellar ataxias. These diseases are caused by an abnormal number of glutamine repeats in the affected proteins. Different in vitro and in vivo models have been developed to study these diseases; in this review, we will focus on the fruit fly, *Drosophila melanogaster*, as a model organism to study PolyQ diseases in humans, resulting in a better understanding of PolyQ pathologies and open avenues to potential therapeutical treatments.

Neurodegenerative Disorders, *Drosophila Melanogaster*, Animal Models, Autosomal Dominant Diseases, Polyglutamine Expansions

Association between triglycerides and insulin resistance as a predictor of cardiometabolic diseases in university students

Asociación de triglicéridos con resistencia a la insulina como predictor de enfermedades cardiometabólicas en universitarios

DÍAZ-BURKE, Yolanda, GONZÁLEZ-SANDOVAL, Claudia Elena, UVALLE-NAVARRO, Rosario Lizette and MEDEROS-TORRES, Claudia Verónica.

Universidad de Guadalajara

ID 1st Author: *Yolanda, Díaz-Burke* / **ORC ID:** 0000-0001-5142-1495, **CVU CONACYT ID:** 272319

ID 1st Coauthor: *Claudia Elena, González-Sandoval* / **ORC ID:** 0000-0001-8479-0828, **CVU CONACYT ID:** 44588

ID 2nd Coauthor: *Rosario Lizette, Uvalle-Navarro* / **ORC ID:** 0000-0002-3566-2579, **CVU CONACYT ID:** 660368

ID 3rd Coauthor: *Claudia Verónica, Mederos-Torres* / **ORC ID:** 0000-0002-6259-8904, **CVU CONACYT ID:** 663067

Abstract

Cardiometabolic diseases represents the main cause of death in the world and several risk factors influence in different way. On the other hand, those risk factors appear at younger ages each time. One common factor is the insulin resistance and dyslipidemia. Some studies have suggested that higher levels of triglycerides are an independent risk factor for insulin resistance and in the future the possible development of diabetes and cardiovascular diseases. We performed a cross sectional study. Obtaining data of 189 university students from the faculty of pharmacy. Which 30% presented insulin resistance and 17% hypertriglyceridemia. We obtained an OR of 3.890 (IC 1.711-8.45; $p<0.0004$). Identify at early stage the possible risk factors for cardiometabolic disease comes important for the prevention of the same disease.

Triglycerides, Cardiovascular, Resistance

Use of medicinal plants by dentists in the state of Guerrero, Mexico

Uso de plantas medicinales por odontólogos en el estado de Guerrero, México

REYES-RÍOS, Roxana, ROMERO-CASTRO, Norma Samanta, MIGUEL-ROMÁN, Karen Melani and FERNANDEZ-TILAPA, Gloria

Universidad Autónoma de Guerrero

ID 1st Author: *Roxana, Reyes-Ríos* / **ORC ID:** 0000-0003-4376-4687, **CVU CONACYT ID:** 175116

ID 1st Coauthor: *Norma Samanta, Romero-Castro* / **ORC ID:** 0000-0003-3468-6437, **CVU CONACYT ID:** 358238

ID 2nd Coauthor: *Karen Melani, Miguel-Román* / **ORC ID:** 0000-0003-0615-0993, **CVU CONACYT ID:** 1212341

ID 3rd Coauthor: *Gloria, Fernandez-Tilapa* / **ORC ID:** 0000-0002-3737-2399, **CVU CONACYT ID:** 90223

Abstract

Objective: To identify some medicinal plants used by dentists in their clinical practice for the treatment of oral diseases Methods: A survey was applied to identify the use of plants by dentists in the state Guerrero state, the oral pathologies in which they are applied, and frequency of use Results: 21% (22) of the dentists use medicinal plants in their clinical practice, 77% of the dentists who use plants, report having obtained knowledge by local tradition Contribution: 22 plants were identified for use in pathologies oral, the most used was the clove with 27% (6) and the paulillo with 18% (4). Conclusion: 21% of the dentists in the state of Guerrero who participated in the study use medicinal plants in their professional practice based mostly on the knowledge of traditional medicine. The sociodemographic characteristics of the dentists did not show differences between the use or not of medicinal plants.

Medicinal Plants, Dentistry, Oral Pathologies

4 Humanities and Behavioral Sciences

Strategy for sustainable urban revitalization in a heritage tourist city with a Sub-humid Temperate climate

Estrategia de revitalización Urbana sostenible en una ciudad turística patrimonial de clima templado subhúmedo

VÁZQUEZ-TORRES, Claudia Eréndira, DÍAZ-SALAZAR, Arlees Ysrael, CAMACHO-IXTA, Ixchel Astrid and ORDAZ-ZUBIA, Velia Yolanda

Universidad de Guanajuato, Facultad de Arquitectura y Diseño.

ID 1st Author: *Claudia Eréndira, Vázquez-Torres* / **ORC ID:** 0000-0002-5388-0780, **CVU CONACYT ID:** 181807

ID 1st Coauthor: *Arlees Ysrael, Díaz-Salazar* / **ORC ID:** 0000-0003-4278-0597, **CVU CONACYT ID:** 490740

ID 2nd Coauthor: *Ixchel Astrid, Camacho-Ixta* / **ORC ID:** 0000-0002-2985-6705, **CVU CONACYT ID:** 893810

ID 3rd Coauthor: *Velia Yolanda, Ordaz-Zubia* / **ORC ID:** 0000-0003-0703-5065, **CVU CONAYCT ID:** 104975

Abstract

The environmental quality of urban public and tourist spaces affect the development of the activities of the large number of users in heritage cities, where the concept of sustainability continues to be one of the main interests for researchers around the world. Nowadays, numerous indices have been developed to determine the liveability of urban spaces; however, there are localities that, due to their topographical characteristics, tourist and social activities require methods to generate revitalisation strategies according to their characteristics. In this study, an exploratory longitudinal method was used in a central street of a world heritage city with a temperate sub-humid climate as a case study, with the objective of favouring, by passive means, thermal habitability conditions in a heritage urban space focused on promoting pedestrian mobility. As a result, an urban revitalisation strategy for the benefit of society and tourists in heritage cities was obtained to strengthen sustainable urban mobility strategies.

Historic Centres, Urban Revitalisation, Sustainable Habitability, Urban Mobility, Touristic Centres

Experiential learning through the Small Business Development Center (SBDC) model in Faculty of Accounting and Administration

Aprendizaje experimental a través del modelo del Centro de Desarrollo de Pequeñas Empresas (SBDC) en la Facultad de Contaduría y Administración

GARIZURIETA-BERNABE, Jessica, GONZÁLEZ-BENÍTEZ, Rubén Álvaro, MÁRQUEZ-VELÁZQUEZ, Aurora and MORALES-TOXQUI, Jazmin.

Universidad Veracruzana, Mexico.

ID 1st Author: *Jessica, Garizurieta-Bernabe* / **ORC ID:** 0000-0002-1443-4737**, CVU CONACYT ID:** 273881

ID 1st Coauthor: *Rubén Álvaro, Gonzlález-Benítez* / **ORC ID:** 0000-0002-6396-0100

ID 2nd Coauthor: *Aurora, Márquez-Velázquez* / **ORC ID:** 0000-0003-0617-6472

ID 3rd Coauthor: *Jazmin, Morales-Toxqui* **/ ORC ID:** 0000-0001-5071-6013

Abstract

Although it is true that there is a great diversity of teaching-learning methods, it is important to identify that their didactic components comply with three main aspects: a) stimulate the exchange of ideas, findings and suggestions; b) prepare people for the working world as well as for assuming their personal responsibilities; and c) respond to the demands of today's society. Based on this context, exploratory-descriptive research was developed at the School of Accounting and Administration of the Universidad Veracruzana, with the objective of proposing a methodological system of experiential learning that allows the generation of applied knowledge for the benefit of society and to improve the training of future professionals. The design of the study is of an analytical-propositive type, since, from an orderly review of: the different sets of competencies that make up the thematic contents of the study programs, the knowledge applied to reality, the teaching strategies and their impact on learning and the resources provided to students to perform in the workplace; a methodological learning proposal oriented to the generation of knowledge through the Small Business Development Center (SBDC) model is constructed.

Strategies, Experiential, Learning, Administration, Competencies

Design of a mobile app as an emotional support tool for university students

Diseño de una app móvil como herramienta de apoyo emocional en estudiantes universitarios

OLVERA-MEJÍA, Yair Félix, GEA-PÉREZ, Mario Alberto, RESENDIZ-RAMÍREZ, Ivone Vidalia and VARGAS-RANGEL, José Amílcar

Universidad Politécnica Metropolitana de Hidalgo

ID 1st Author: *Yair Félix, Olvera-Mejía* / **ORC ID:** 0000-0003-4116-088X, **Researcher ID Thomson**: U-8258-2018, **CVU CONACYT ID:** 254526

ID 1st Coauthor: *Mario Alberto, Gea-Pérez* / **ORC ID:** 0000-0003-2929-7605, **Researcher ID Thomson:** U-8326-2018, **CVU CONACYT ID:** 651633

ID 2nd Coauthor: *Ivone Vidalia, Resendiz-Ramírez* / **ORC ID:** 0000-0003-3234-4986, **Researcher ID Thomson:** GLR-6080-2022, **CVU CONACYT ID:** 1219941

ID 3rd Coauthor: *José Amílcar, Vargas-Rangel* / **ORC ID:** 0000-0001-7355-3966**, Researcher ID Thomson:** GLR-5912-2022, **CVU CONACYT ID:** 651422

Abstract

Nowadays, it is normal for adolescents to be vulnerable to intense problems related to their mental health, which are reflected in their behavior inside and outside of school. Although there are various institutional campaigns to combat these problems, it is necessary to generate tools that are liked by adolescents and that are directed to a specific group for greater attention. Reason for which, the design and creation of a mobile app is proposed as an emotional support tool for students of the Metropolitan Polytechnic University of Hidalgo, which consists of mental activities, physical activities, support forums, videos, texts and booking appointments with the psychologist. The purpose is to raise awareness about the importance of emotional well-being. Students should know that mental disorders are normal, but they should not be taken lightly. The mental health of people depend not only on themselves, but also on those around them and the means of communication they use.

Emotional Support, Mental health, Mobile app

Tutorial Action Integrated to the Scientific Method for the Development of Engineering Projects

Acción Tutorial Integrada al Método Científico para el Desarrollo de Proyectos en Ingeniería

SOTOMAYOR-OLMEDO, Artemio, MARTÍNEZ-HERNÁNDEZ, Moisés Agustín and AVENDAÑO JUAREZ, José Luis

Universidad Autónoma de Querétaro, Facultad de Ingeniería

ID 1st Author: *Artemio Sotomayor-Olmedo*/ **ORC ID:** 0000-0001-8054-4654, **CVU CONACYT ID:** 341158

ID 1st Coauthor: *Moisés Agustín, Martínez-Hernández* / **ORC ID:** 0000-0001-5495-5185, **CVU CONACYT ID:** 370689

ID 2nd Coauthor: *José Luis, Avendaño-Juarez* / **ORC ID:** 0000-0003-3546-8570, **CVU CONACYT ID:** 169297

Abstract

Currently, the tutorial action is of vital importance to integrate in the processes of teacher training, as well as for the execution in practice of the students. However, the application in courses of scientific orientation is complicated, causing the tutorial action to be oriented to cases of attention in administrative, academic courses or exclusively for degree purposes. Thanks to University Educational Models and Institutional Tutoring Programs, it is possible to apply the tutorial action in scientifically oriented subjects to have a significant contribution in the training of students, promoting actions that place it in the place that, as a teaching practice, corresponds to it. In the present, a case study is exposed with the revision of a series of subjects of the automation career of the Faculty of Engineering of the Autonomous University of Querétaro, focused on the development of projects through the scientific method, an analysis and proposal to improve the conceptions and practices of university tutoring, in the application of knowledge and development of skills in students, likewise, offer the foundations and methods to achieve the objectives that the didactics of these subjects pursues in the training of students

Tutorial, Engineering, Projects

Comparative analysis of the Khan Academy virtual college course to improve new students' academic performance in Faculty of Engineering

Análisis comparativo del curso propedéutico virtual en Khan Academy para mejorar el desempeño académico en estudiantes de nuevo ingreso en Facultades de Ingeniería

SALAZAR-UITZ, Ricardo Rubén, CANTO-CANUL, Roberto Carlos, LEZAMA-ZARRAGA, Francisco Román and SHIH, Meng Yen

Universidad Autónoma De Campeche

ID 1st Author: *Ricardo Rubén, Salazar-Uitz* / **ORC ID:** 0000-0003-2307-737X, **CVU CONACYT ID:** 416277

ID 1st Coauthor: *Roberto Carlos, Canto-Canul* / **ORC ID:** 0000-0003-2420-043X, **CVU CONACYT ID:** 391401

ID 2nd Coauthor: *Francisco Román, Lezama-Zarraga* / **ORC ID:** 0000-0003-3397-7881, **Researcher ID Thomson:** U-1229-2018, **CVU CONACYT ID:** 205493

ID 3rd Coauthor: *Meng Yen, Shih* / **ORC ID:** 0000-0001-7475-6458, **CVU CONACYT ID:** 408617

Abstract

The low performance of the engineering student is an underlying problem in mathematics subjects, derived from the various situations that surround the student and for which he is exposed to school dropout. However, there are technological learning tools (Khan Academy), which, if well implemented and in a timely manner, at the beginning of their higher education, help to improve the understanding of mathematical and logical concepts in the field of basic sciences and mathematics. especially in the latter, because it contributes greatly to the formation of the Engineer. The comparative analysis of the Virtual College Preparatory Course implemented in the Khan Academy platform over a period of 4 years was carried out, which shows the evolution of the new student, as well as the results with the comparative analysis of the diagnostic and final exam obtained each year. It is notorious reservation of young new students to make use of the various educational platforms on the Internet, however, the comparison suggests a positive impact by the use of these, with the appropriate guidance and experience.

College preparatory course, Khan Academy, Mathematics, E-Learning

Analysis of thermal comfort by simulation for a house with poured concrete construction system for a hot-dry climate

Análisis de confort térmico por medio de simulación para una vivienda con sistema constructivo de concreto vaciado para un clima cálido-seco

CAMACHO-IXTA, Ixchel Astrid, DELGADO-RENDON, Rene, GONZÁLEZ-DURÁN, Mario and LÓPEZ-LAMBRAÑO, Álvaro Alberto

Universidad Autónoma de Baja California, Campus Valle de las palmas

ID 1st Author: *Ixchel Astrid, Camacho-Ixta* / **ORC ID:** 0000-0002-2985-6705, **Researcher ID Thomson:** G-31112-2018G, **CVU CONACYT ID:** 893810

ID 1st Coauthor: *René, Delgado Rendon* / **ORC ID:** 0000-0002-5504-3513, **Researcher IDThomson:** G-3111-2018, **CVU CONCYT ID:** 217938

ID 2nd Coauthor: *Mario, González Durán* / **ORC ID:** 0000-0003-0391-5313, **CVU CONACYT ID:** 44385

ID 3rd Coauthor: *Álvaro Alberto, López Lambraño* / **ORC ID:** 0000-0002-7899-7985, **CVU CONACYTID:** 291513

Abstract

The objective of this work is to analyze the behavior of internal thermal comfort of low income housing built with a cast concrete construction system, and determine the effects of strategies that promote the improvement of thermal comfort of the interior environment, specifically in climate environment. Hot-dry, particularly in the Tijuana, Baja California region, considering transitory periods that correspond to the period between hot-cold and cold-warm. Given the selection of the construction system in the region, it has been observed that the house does not meet the needs of thermal comfort inside, consequently in this work the alternatives are simulated to improve the thermal comfort inside the houses in the occupation hours. This simulation was carried out through the Design Builder program, which is based on a case study, which served as you know to validate the simulation model. Proposals for improvement in the home are made in order to analyze its effects on interior thermal comfort, covering from March to April and the month of November. Surface and indoor ambient temperatures were measured on the ceiling and indoor space, respectively.

Simulator, Climate, Thermal Comfort

Group cohesiveness measurement in college students as a tool to monitor dropout strategies

Medición de cohesión grupal en alumnos universitarios como herramienta para monitorear estrategias de deserción estudiantil

GARZA-MOYA, Luis Roberto, TOVAR-ROSAS, Claudia Rocio, ARREOLA-BURCIAGA, José Mizraim and RODRÍGUEZ-ALANIS, Francisco De Borja

Universidad Politécnica de Gómez Palacio

ID 1st Author: *Luis Roberto, Garza-Moya* / **ORC ID**: 0000-0002-5740-1476, **CVU CONACYT ID:** 68866

ID 1st Coauthor: *Claudia Rocio, Tovar-Rosas* / **ORC ID:** 0000-0002-8238-7493, **CVU CONACYT ID:** 745074

ID 2nd Coauthor: *José Mizraim, Arreola-Burciaga* / **ORC ID:** 0000-0002-2722-1386, **CVU CONACYT ID:** 769055

ID 3rd Coauthor: *Francisco De Borja, Rodríguez-Alanis* / **ORC ID:** 0000-0002-2949-1785, **CVU CONACYT ID:** 719064

Abstract

This article shows the design of a measurement instrument for group cohesion and the results of implementing it in a group of study, the analysis presented shows the level of cohesion before and after applying group cohesion techniques and based on the results, the appropriate interaction among students is reflected, correlating the cohesion with the school dropout rate. Likewise, strategies are presented to improve group cohesion based on monitoring through the proposed measurement instrument. The group activity and the adequate organization of work groups, facilitates the approach and fulfillment of objectives, promoting a harmonious interaction and distribution of responsibilities aligned to common interests. In this way, it promotes the cohesion, the sense of belonging and, consequently, the identity generation through recognition in a social sense among the classroom members. Additionally, it is considered if the lack of group cohesion in higher education students motivates them to make school drop-out decisions.

Group Cohesion, Terminal Efficiency, Student Retention

Instrument to evaluate teaching performance in class management (IEDDCC)

Instrumento para evaluar el desempeño docente en la conducción de clase (IEDDCC)

OCHOA-MARTÍNEZ, Oscar Luis, CHÁIDEZ-NEVÁREZ, Belia, CARRERA-HERNÁNDEZ, Celia and DIAZ-NERI, Nadia Melina

Universidad Pedagógica de Durango, Secretaría de Educación Pública

ID 1 st Author: *Oscar Luis Ochoa-Martínez* / **ORC ID:** 0000-0003-3330-9138, **CVU CONACYT ID:** 894568

ID 1 st Coauthor: *Belia Cháidez-Nevárez* / **ORC ID:** 0000-0002-1613-9934

ID 2 nd Coauthor: *Celia Carrera-Hernández* / **ORC ID:** 0000-0002-2444-2204, **CVU CONACYT ID:** 214347

ID 3 rd Coauthor: *Nadia Melina Diaz-Neri* / **ORC ID:** 0000-0002-5672-4652

Abstract

The objective of this work was to expose and validate the psychometric properties of a suitable instrument to evaluate teaching performance in classroom management (IEDDCC); the study was considered instrumental and a purposive sample of 108 academic figures in basic education was used for data collection. The results of the measurement of the psychometric properties of the instrument indicated a Cronbach's alpha reliability of 0.964 and, in the construct validity carried out through the "total domain" correlation test, a value of Spearman's Rho coefficient of 0.978 was obtained, values considered to be quite acceptable. With respect to the confirmatory validity test carried out through the linear regression test, information was also obtained that supports these results; among them, the fact that the independent variable explains 95.8% of the behavior of the dependent variable was highlighted. Finally, in measuring the level of teaching performance, the 108 teachers evaluated indicated that the IEDDCC objectively measures the construct for which it was designed.

Psychometric, Reliability, Validity, Measurement

Resilient personality and coping strategies in college athletes in times of pandemic

Personalidad resistente y estrategias de afrontamiento en deportistas universitarios en tiempos de pandemia

PONCE-CARBAJAL, Nancy, LUNA-VILLALOBOS, Brenda, JAENES-SÁNCHEZ, José Carlos and RAMÍREZ-NAVA, Rubén

Universidad Autónoma de Nuevo León, Facultad de Organización Deportiva, México.

ID 1st Author: *Nancy, Ponce-Carbajal* / **ORC ID:** 0000-0002-8370-9378, **CVU CONACYT ID:** 556867

ID 1 st Coauthor: *Brenda, Luna-Villalobos* / **ORC ID:** 0000-0001-7514-2626, **CVU CONACYT ID:** 563058

ID 2 nd Coauthor: *José Carlos, Jaenes-Sánchez* / **ORC ID:** 0000-0002-8700-130X

ID 3 rd Coauthor: *Rubén, Ramírez-Nava* / **ORC ID:** 0000-0002-3268-019X

Abstract

The objective of this investigation is identify the relationship between the variables of resistant personality and coping strategies in university athletes. Methods: The study design is non-experimental, cross-sectional and correlational, the sample is 34 athletes from the Autonomous University of Nuevo León, the age of the participants is in the range of 18 to 32 years, M = 23 SD = 3.37, 19 men (55.9%) and 15 women (44.1%). The instruments are 2, to measure Resistant Personality in Central American and Caribbean Athletes (PRDCC) by Ponce et al (2015) of 18 items. The second is the Spanish version of the Approach to Coping in Sport Questionnaire (ACSQ-1) (Kim et al., 2003). The questionnaire is made up of 28 items. The procedure was completely online, the link with the instruments was sent to the coaches of various sports since confinement was ordered in the pandemic and everyone had to train at home. The statistical analyzes carried out were descriptive, frequencies, in addition, the reliability of the applied instruments, the analysis of Spearman's correlations. Results: The instruments have adequate internal consistency for the sample, between a Cronbach's alpha of .70 to .86 in both instruments and also, relationships were found between the variables of resistant personality and approach to coping in sport, specifically, there are significant and positive correlations r =.593** between the total resistant personality and the emotional calm variable. Another positive and significant correlation was found r =.702** between total resistant personality and cognitive restructuring. A third relationship was found at r =.511* between control and risk behaviors.

Control, Sport, Coping

Burnout and satisfaction in high performance judo athletes

Burnout y satisfacción en deportistas de judo de alto rendimiento

PONCE-CARBAJAL, Nancy, RAMÍREZ-NAVA, Rubén, JAENES-SÁNCHEZ, José Carlos and TRISTÁN-RODRÍGUEZ, José Leandro

Universidad Autónoma de Nuevo León, Facultad de Organización Deportiva, México.

ID 1 st Author: *Nancy, Ponce-Carbajal* / **ORC ID:** 0000-0002-8370-9378, **CVU CONACYT ID:** 556867

ID 1 st Coauthor: *Rubén, Ramírez-Nava* / **ORC ID:** 0000-0002-3268-019X

ID 2 nd Coauthor: *José Carlos, Jaenes-Sánchez* / **ORC ID:** 000-0002-8700-130X

ID 3 rd Coauthor: *José Leandro, Tristán-Rodríguez* / **ORC ID:** 0000-0002-6828-5896, **CVU CONACYT ID:** 260481

Abstract

The objective of this research is to identify the relationship between burnout and satisfaction in high performance judo athletes, Method: The study design is non-experimental, cross-sectional and correlational, the sample is 53 athletes participating in the Judo Grand Prix 2018 who It was carried out in Cancún, Quintana Roo, Mexico, the age of the participants is in the range of 18 to 32 years, M = 23 SD = 3.37, 34 men (64%) and 19 women (35.8). There are 2 instruments, to measure the burnout syndrome is the Sports Burnout Questionnaire (Athlete Burnout Questionnaire; ABQ; Cantú, 2016) in the Mexican version, with 15 items and three variables: Reduced sense of achievement (RSL), Physical Exhaustion and Emotional (AFE) and Devaluation of Sports Practice (DPD). The second is the Satisfaction Scale by Castillo, Balaguer and Duda (2001), made up of 7 items and 2 variables, Satisfaction/Fun with 5 items and Boredom with 2 items. Results: Adequate internal consistency and correlations were found between the variables of burnout and satisfaction, specifically there are significant and positive correlations r =.622** between devaluation of sports practice and Boredom. Another positive and significant correlation was found r =.468** between reduced sense of achievement and boredom. A third relationship was found at r =.576** between physical and emotional exhaustion and boredom. Two significant but negative correlations r = -.403** were found between devaluation of sports practice and fun, and finally with a relationship of r = -.302*. Conclusion: The existing relationships between the variables of burnout and satisfaction are confirmed, the higher the satisfaction, the lower the risk of burnout, and vice versa.

Fun, Boredom, Sport, High performance

The human habitat in relation to the new paradigm of the social distancing by covid19

El hábitat humano en relación con el nuevo paradigma del distanciamiento social por covid19

MOLAR-OROZCO, María Eugenia

Facultad de Arquitectura de la Universidad Autónoma de Coahuila U.S.

ID 1st Autor: *María Eugenia, Molar-Orozco* / **ORC ID:** 0000-0001-5357-5893, **CVU CONACYT ID:** 369142

Abstract

Pandemics have always generated a change in all fields, in the social, cultural, habits, customs and even in the spaces, at the end of 2019 (COVID19) is declared a global pandemic by the World Health Organization. Due to this, changes in social habits and customs are required, including distancing, which has caused controversy, social and psychological problems and conflicts throughout the world. The objective of the work is to determine what changes have been generated regarding social distance in interior spaces and shopping habits in the Saltillo metropolitan area. The methodology is of a mixed approach, longitudinally; using a virtual survey and the traditional and virtual ethnography method to document its phases in 2020 and early 2021, as well as a bibliographic review of theories on social distancing. The results show that the biggest problem is inside the houses and that there is an increase and decrease in mobility in purchases and use of public spaces, faced with this contingency the answer is different, due to the culture and customs of each place. So, there is a lot to work on this topic.

Habitat, Pandemic, Social Isolation

The Influence of Manga and Taoism in the Mexican Comic *Hermanas (2021)*

La Influencia del Manga y el Taoísmo en la Historieta Mexicana *Hermanas* (2021)

CASTELLI-OLVERA, Sarahi Isuki and CASTELLI-OLVERA, Azul Kikey

Benemérita Universidad Autónoma de Puebla, Facultad de Comunicación

ID 1st Author: *Sarahi Isuki, Castelli-Olvera* / **ORC ID:** 0000-0001-5955-6781, **CVU CONACYT ID:** 386736

ID 1st Author: *Azul Kikey, Castelli-Olvera* / **ORC ID:** 0000-0002-5906-5912, **CVU CONACYT ID:** 224074

Abstract

This work states that the comic book *Hermanas (Sisters)* (2021), by Paulina Ramos González, is the result of a productive consumption that retakes Japanese manga elements: ways of creation, philosophy, and imageries, thus resulting in a hybrid that transposes references and imageries from similarities and conflict. We base our argument on a methodological proposal based on the paradigm of indexical inferences proposed from the microhistory of Carlo Ginzburg and Giovanni Levi; from which we analyze the details present in the comic's graphics and narrative, to make interpretative inferences about the context of creation, and the socio-cultural and historical processes present in the author's visual culture. Our primary sources are the *Hermanas* graphic novel, and a series of interviews made to the author. Secondary sources are the background resources used in this analysis.

Paradigm, Historical, Hybrid, Cultural, Indexical

Effects of a training program for fitness instructors based on STD and BPN on the attitude of users of a private university gym

Efectos de un programa de entrenamiento para instructores de fitness basado en la STD y la BPN en la actitud de los usuarios de un gimnasio privado

SALGADO-NÚÑEZ, María del Pilar, AGUILAR-ARROYO, Mabel, CRUZ-CASTRUITA, Rosa María and CÉLIS-RIVERA, Rubén

Universidad ITESO, Centro de Educación Física y Salud Integral.

ID 1st Author: *María Del Pilar, Salgado-Núñez* / **ORC ID:** 0000-0003-2524-7045, **CVU CONACYT ID:** 890933

ID 1st Coauthor: *Mabel, Aguilar-Arroyo* / **ORC ID:** 0000-0001-8339-4313, **CVU CONACYT ID:** 891115

ID 2nd Coauthor: *Rosa María, Cruz-Castruita* / **ORC ID:** 0000-0001-6013-7541, **Researcher ID Thomson:** A-9664-2019, **CVU CONACYT ID:** 50202

ID 3rd Coauthor: *Rubén, Célis-Rivera* / **ORC ID:** 0000-0003-3104-7605, **CVU CONACYT ID:** 1205804

Abstract

Self-determination theory SDT (Ryan & Deci, 2000) and the satisfaction of Basic Psychological Needs BPN are valuable approaches to promote improvements in the pedagogical forms used by fitness instructors. Both approaches positively influence practitioners' satisfaction and behaviors related to physical activity. Objective: assess the effects of a fitness instructor training program based on STD and BPN on attitudes of the users of a private university gym. Sample: 441 gym users. Method: Pre and post measurements of attitudes toward fitness instructors of group classes and strength area were performed. A training program based on SDT and BPN was implemented between both measurements and a comparative analysis of attitude was performed through the Student's t-test for related samples. Results and conclusions: The comparative analysis of attitudes showed a significance index of .565 and .000 for group classes and strength samples, respectively. The implementation of a training program for strength instructors based on SDT and BPN promotes changes in their interaction style that leads to a better attitude of the users of their services.

Self-Determination, Attitudes, Physical Activity, Fitness, Comparative-Analysis

Study of socioemotional disorders in university students during the COVID-19 pandemic

Estudio de padecimientos socioemocionales en estudiantes universitarios durante la pandemia de COVID-19

MARTÍNEZ-AGUILAR, Gloria Mónica, MOTA-BARRAGÁN, Martha Elba, MENDIOLA-GARCÍA, Yessica and RIVERA-PUENTES, Paula Cristina

Universidad Tecnológica de Torreón

ID 1st Author: *Gloria Mónica, Martínez-Aguilar* / **ORC ID:** 0000-0003-3834-4880, **CVU CONACYT ID:** 213558

ID 1st Coauthor: *Martha Elba, Mota-Barragán* / **ORC ID:** 0000-0002-7994-0841, **CVU CONACYT ID:** 973093

ID 2nd Coauthor: *Yessica, Mendiola-García* / **ORC ID:** 0000-0002-5387-5965**, CVU CONACYT ID:** 599221

ID 3rd Coauthor: *Paula Cristina, Rivera-Puentes* / **ORC ID:** 0000-0001-7026-4800

Abstract

Since the COVID-19 pandemic, changes have been reported in different psychosocial aspects that affect the family, work and social spheres in society around the world. In certain family groups, confinement during the pandemic brought family members closer together, in other homes the lack of work, stress, anxiety, and the loss of family members, among other things channeled changes in the levels of different psychosocial aspects. Therefore, it is necessary to have tools that allow these changes to be assessed, for this a study was designed and carried out with students from the Universidad Tecnológica de Torreón to elucidate the differences in psychosocial conditions and their impact, and at the same time provide suggestions to the different departments involved in their emotional and educational well-being.

COVID-19, Psychosocial Conditions, Stages Of The Pandemic

Mental health and family dynamics in university students from Tlaxcala after confinement

Salud mental y dinámica familiar en estudiantes universitarios de Tlaxcala posterior al confinamiento

QUITL-MELÉNDEZ, María Mónica Anastacia and JIMÉNEZ-CANSECO, Sacnité.

ID 1st Author: *María Mónica Anastacia, Quitl-Meléndez* / **ORC ID:** 0000-0002-1060-6896

ID 1st Coauthor: *Sacnité, Jiménez-Canseco* / **ORC ID:** 0000-0002-6082-4533

Abstract

The objective of the research was to analyze mental health and family dynamics in university students from Tlaxcala after confinement. Students with degrees in Family Sciences, Gerontological Pedagogy, Special Education, and a master's degree in Family Therapy were invited to participate through their personal emails and Google Forms. 51 students responded, 84% women and 16% men, whose ages ranged between 18 and 57 years. The instruments used to assess mental health were the Beck's Depression and Anxiety Inventories and the Family Adaptability and Cohesion Evaluation Scale (FACES III), to measure family dynamics. The results showed a significant relationship between depression and anxiety ($r = .581$ $^{**}p < .00$) and a negative and significant relationship between depression and family cohesion ($r = -.343$ $^{*}p < .05$). A significant relationship between family adaptation and depression and anxiety was not demonstrated; but with family cohesion ($r = .588$ $^{**}p < .00$). Greater family cohesion and less presence of depression was observed. Men presented greater depression than women, and students between 18 and 29 years old; and greater anxiety in those between 30 and 39 years of age. Greater family cohesion was observed when the head of the family is the mother, and greater family adaptation for those born in Puebla. The importance of analyzing mental health and family dynamics for the design of care strategies that provide people and their families with physical and psychosocial well-being is concluded.

Cohesion, Dynamics, Adaptation, Confinement, Mental Health

Public space and its heritage value, building the concept of place through collective memories in San Pedro Lagunillas, Nayarit

El espacio público y su valor patrimonial, construyendo el concepto de lugar a través de las memorias colectivas en San Pedro Lagunillas, Nayarit

CARVAJAL-HERMOSILLO, Wendy Guadalupe and ROBLES-ROSALES, Patricia

Autonomous University of Nayarit. Academic Unit of Tourism and Gastronomy.

ID 1st Author: *Wendy Guadalupe, Carvajal-Hermosillo* / **ORC ID:** 0000-0002-3029-3399, **CVU CONACYT ID:** 952495

ID 1st Coauthor: *Patricia, Robles-Rosales* / **ORC ID:** 0000-0002-3000-2213

Abstract

In the public space, a significant number of manifestations of the Intangible Cultural Heritage are experienced, which is why the present investigation is carried out with the purpose of relating the sense of place that is denoted in public spaces from the Intangible Cultural Heritage practice, the above through the documentation of collective memories; which are transmitted by generations and remain in force through time. Such is the case of the town of San Pedro Lagunillas, Nayarit, where the collective memories protected by the community refer to the sense of place that is given to public space. For this, ethnographic techniques were used, applying various semi-structured interviews to the elderly residents; in addition, participant research was carried out. Managing to document manifestations of the Intangible Cultural Heritage that have remained in force in the collective imagination for generations.

Public Space, Collective Memories, Place, Heritage

5 Social Sciences

Formative research, POL and the influence of the teacher-researcher in the production of science and technology: Integrative project cases

Investigación formativa, AOP y la influencia del docente-investigador en la producción de ciencia y tecnología: Casos proyecto integrador

VILLALOBOS-ALONZO, María de los Ángeles, ROMO-GONZÁLEZ, Ana Eugenia and CABRERA-VILLASEÑO, Héctor Ulises

Universidad Tecnológica de Jalisco

ID 1st Author: *María de los Ángeles, Villalobos-Alonzo* / **ORC ID:** 0000-0003-3052-8271, **CVU CONACYT ID:** 212718

ID 1st Coauthor: *Ana Eugenia, Romo-González* / **ORC ID:** 0000-0002-4653-2593, **CVU CONACYT ID:** 212291

ID 2nd Coauthor: *Hector Ulises, Cabrera-Villaseñor*

Abstract

In a context of active and constructive teaching, the role of the teacher-researcher takes on crucial meaning, as a mediator in the formalization and promotion of research skills in university students, as demonstrated in this research project. From didactics and pedagogy, the Project Oriented Learning (AOP) strategy was used to articulate scientific theoretical knowledge with practice, which provides solutions to needs and problems of various kinds. In this sense, a compilation of integrative projects is presented as a training strategy within the framework of the training research of the Technological University of Jalisco in the periods 2020 and 2021, where the students integrated theoretical, conceptual and methodological knowledge, as well as own skills of their discipline – Maintenance Industrial area, Mechatronics Automation area and Information Technologies Multiplatform Software Development area, which help to strengthen technical, scientific, communicative, teamwork and cognitive skills, which materialized in the construction of technological prototypes and reports scientists where the processes and results achieved are made explicit as evidence of their investigative skills and, in turn, allowed a better evaluation of the academic performance of the students.

Formative research, Project Oriented Learning (POL), Teacher-researcher, Scientific and technological productio

Impact of theoretical teaching, laboratory practice and the use of specialized software in the meaningful learning of university students

Impacto de la enseñanza teórica, la práctica de laboratorio y el uso de software especializado en el aprendizaje significativo de estudiantes universitarios

HUERTA-CHÁVEZ, Irma Alicia, GONZÁLEZ-QUEZADA, Esperanza, SOLTERO-SÁNCHEZ, Jazmín del Rocío and FIGUEROA-OCHOA, Edgar Benjamín.

Universidad de Guadalajara

ID 1st Author: *Irma Alicia, Huerta-Chávez* / **ORC ID**: 0000-0001-6741-1013, **Researcher ID Thomson**: W-3247-2019, **CVU CONACYT ID**: 960192

ID 1st Coauthor: *Esperanza, González-Quezada* / **ORC ID**: 0000-0003-2632-9608, **CVU CONACYT ID**: 1196441

ID 2nd Coauthor: *Jazmín del Rocío, Soltero-Sánchez* / **ORC ID**: 0000-0001-8926-5969, **CVU CONACYT ID**: 1048863

ID 3rd Coauthor: *Edgar Benjamín, Figueroa-Ochoa* / **ORC ID**: 0000-0003-4590-2393, **Researcher ID Thomson**: H-2941-2015, **CVU CONACYT ID**: 333239

Abstract

The teaching-learning process of university students in exact sciences must go beyond the traditional approach and incorporate new styles that have a positive impact on their academic training. This implies both the understanding of concepts, models and theories, as well as practice in the laboratory and the use of specialized software for the validity of the results and interpretation of the theory reflected in practice, in order to achieve meaningful learning considering the constructivist approach. In this sense, the present investigation was developed under a quantitative, experimental and longitudinal approach (Hernández et al., 2014; and Bernal, 2016), whose sampling used was non-probabilistic of the type of intact groups (McMillan & Schumacher, 2005). The main finding, after the application of an instrument to 91 undergraduate students, shows the level of impact on meaningful learning, the theoretical training given on the subject: "Determination of adiabatic compressibility coefficients and volumetric expansion of triblock copolymers, through experimental data of density and speed of sound", complemented with practices in the laboratory and the use of specialized software.

Constructivist Theory, Quantitative Analysis, Exact Sciences

The teaching of mathematics and the historical development of euclidean space

La enseñanza de las matemáticas y el desarrollo histórico del espacio euclidiano

ORTIZ-SANCHEZ, Pedro Alfonso Guadalupe, ORTIZ-Y OJEDA, Pedro Tomás, SÁNCHEZ-ITURBE, Patricia Guadalupe and BASAVE-TORRES, Rosy Ilda

Instituto Tecnológico de Mérida, TecNM

ID 1st Author: *Pedro Alfonso Guadalupe, Ortiz-Sanchez* / **ORC ID:** 0000-0002-2466-1837, **CVU CONACYT ID:** 803273

ID 1st Coauthor: *Pedro Tomás, Ortiz- Y Ojeda* / **ORC: ID:** 0000-0002-3796-8504, **CVU CONACYT ID:** 205520

ID 2nd Coauthor: *Patricia Guadalupe, Sánchez-Iturbe* / **ORC: ID:** 0000-0002-9245-3725, **CVU CONACYT ID:** 976780

ID 3rd Coauthor: *Rosy Ilda, Basave-Torres* / **ORC ID:** 0000-0002-7305-3897, **CVU CONACYT ID:** 720064

Abstract

The historical analysis of a concept allows us to understand its evolution and determine the processes of construction of that knowledge, in the case of the Euclidean space, the theoretical representation entails understanding difficulties during its teaching, which can be attributed to the epistemological obstacle as it will be examined in this article. The historical development of the concept of space is briefly analyzed, in documentary form, first within geometry and later in its generalization as a vector space. Finally, the historical perspective is contrasted, to succinctly examine a didactic proposal, which establishes the conclusion that it is necessary to build knowledge based on the elements that characterize epistemic development, which will possibly originate new pedagogical proposals.

Space, Geometry, Didactics

Study on the Manager's perception of the current training strategies used by the service window of banking companies in Ciudad Obregón, Sonora, to improve their individual performance

Estudio sobre la percepción del Gerente de las estrategias actuales de capacitación utilizadas por la ventanilla de servicio de las empresas bancarias de Ciudad Obregón, Sonora, para mejorar su desempeño individual

GÁMEZ-FLORES, Alba Daniela, VASQUEZ-TORRES, María de Carmen, CANO-CARRASCO, Adolfo and FORNÉS-RIVERA René Daniel.

Instituto Tecnológico de Sonora

ID 1st Author: *Alba Daniela, Gámez-Flores* / **ORC ID:** 0000-0002-9515-1404, **Researcher ID Thomson:** MQS4FO-4G7M68

ID 1st Coauthor: *María De Carmen, Vasquez-Torres* / **ORC ID:** 0000-0003-0938-4955**, Researcher ID Thomson** X-2104-2018, **CVU CONACYT ID:** 286266

ID 2nd Coauthor: *Adolfo, Cano-Carrasco* / **ORC ID:** 0000-0002-3392-3667, **Researcher ID Thomson:** G-5035-2018, **CVU CONACYT ID**: 266064

ID 3rd Coauthor: *René Daniel, Fornés-Rivera*. / **ORC ID:** 0000-0002-7438-0056, **Researcher ID Thomson:** G-3906-2018, **CVU CONACYT ID:** 280435

Abstract

Objective To identify, through the manager's perception, the different current training strategies used by the service window operations area in the banking service companies of Ciudad Obregón, Sonora, to improve individual performance. Methodology It is a non-participatory field research (Munch & Angles, 2009), descriptive, transversal and quantitative (Hernández Sampieri, Fernández Collado, & Baptista Lucio, 2006). A questionnaire was designed, with a five-point Likert scale response option; it was divided into sociodemographic characteristics, questions about training and current strategies, such as e-learning, e-training and cloud of the service window operations area. Cajeme has 23 banking institutions, so I decided to carry out a census, interviewing 21 managers, because one no longer exists and the other one did not agree to participate in the study. Contribution Nowadays the world is globalized; therefore, times, distances, and monetary resources can be optimized. It is evident if one works with current strategies, because through them, many people can be trained, from different places simultaneously, without the need to leave their work places.

Training, Individual performance and banking services

Creation of a distribution center to optimize the process of purchasing indirect materials in a company dedicated to the sale of consumer goods

Creación de un centro de distribución para optimizar el proceso de compra de materiales indirectos en una empresa dedicada a la venta de bienes de consumo

ZENTENO-BONOLA, Ana Luisa, CALDERÓN-RÍOS, Norma Otilia, CERVANTES-CARBAJAL, Ana Margarita and MARTÍNEZ-ESPINOSA, Gisela.

Tecnológico Nacional de México/Instituto Tecnológico de Toluca

ID 1st Author: *Ana Luisa, Zenteno-Bonola* / **ORC ID:** 0000-0003-3634-588X**, CVU CONACYT ID:** IT16B709

ID 1st Coauthor: *Norma Otilia, Calderón-Ríos* / **ORC ID:** 0000-0002-6292-4140, **CVU CONACYT ID:** IT16A893

ID 2nd Coauthor *Ana Margarita, Cervantes-Carbajal* / **ORC ID:** 0000-0002-0877-4145, **CVU CONACYT ID:** IT16E028

ID 3rd Coauthor: *Gisela, Martínez-Espinosa* / **ORC ID:** 0000-0003-3937-8580

Abstract

In the present investigation, it was possible, through the description of activities, to implement a distribution center that helped optimize the purchase of indirect materials from a store dedicated to the sale of consumer goods in the Municipality of Toluca, State of Mexico. A quantitative approach with transectional design was used. To achieve this, "the procedure for the purchase of indirect materials" was defined as the dependent variable and the "distribution center" acts as the independent variable. From this, the variables were operationalized in 14 dimensions that were evaluated through a 22-item questionnaire. The participating population was 80 employees who work in the company (object of study). The results showed that there were major gaps in the indirect materials purchasing process stemming from a poor warehouse system. For this reason, measures were implemented to create the distribution center, based on historical information and a general inventory survey. From this information it was possible to project annual sales; It was even possible to negotiate prices with suppliers, which resulted in savings of 15% in the amount of annual purchases.

Distribution, Optimization, Indirect Materials

Student satisfaction about the online teaching of the Engineering in Business Management program of the Technological Institute of Toluca

Satisfacción Estudiantil sobre la enseñanza en línea del programa académico de Ingeniería en Gestión Empresarial del Instituto Tecnológico de Toluca

AGUIRRE-BRITO, Dorian, PALOMAR-FUENTES, María del Pilar, ORDOÑEZ-HERNÁNDEZ, Lucía and ALVARADO-ALDAMA, Daniel

Tecnológico Nacional de México/Instituto Tecnológico de Toluca

ID 1st Author: *Dorian, Aguirre-Brito* / **ORC ID:** 0000-0002-3642-4767, **CVU CONACYT ID:** IT16B446

ID 1st Coauthor: *María Del Pilar, Palomar-Fuentes* **/ ORC ID:** 0000-0003-0809-2635, **CVU CONACYT ID:** IT19D 807

ID 2nd Coauthor: *Lucía, Ordoñez-Hernández* / **ORC ID:** 0000-0003-4357-7355, **CVU CONACYT ID:** IT16B526

ID 3rd Coauthor: *Daniel, Alvarado-Aldama* / **ORC ID:** 0000-0002-6891-3127

Abstract

In the year 2020, educational institutions worldwide found it necessary to modify the way of teaching in response to the recommendations of health agencies to maintain social distancing to reduce the circulation of SAR-COV 2 and the development of COVID 19. The traditional way of teaching in which a classroom was attended in person, became staying at home and connecting to an electronic device that allowed the transmission of classes online. Given this new modality, this research aims to collect information through a student satisfaction survey of the academic program of Engineering in Business Management at the Technological Institute of Toluca of online classes during the semester of August-December 2020, period in which it was in pandemic. The variables to be considered were: Teaching, Academic Organization and Infrastructure and University Services. It is concluded from the results obtained that the students are satisfied with the performance of the teacher, however, there are also areas of opportunity in the management of digital platforms, as well as in the feedback and the time that is assigned to carry out conduct assessments online.

Student Satisfaction, Teaching, Online Education

Determination of the Organizational competence of the footwear industry of the Plaza Azul, San Mateo Atenco, State of Mexico

Determinación de la competencia organizativa de la industria del calzado de la Plaza Azul, San Mateo Atenco, Estado de México

ORDOÑEZ-HERNÁNDEZ, Lucía, ZENTENO-BONOLA, Ana Luisa, AGUIRRE-BRITO, Dorian and ARELLANO-CORDOVA, José Antonio.

Tecnológico Nacional de México/Instituto Tecnológico de Toluca

ID 1st Author: *Lucía, Ordoñez-Hernández* / **ORC ID:** 0000-0003-4357-7355, **CVU CONACYT ID:** IT16B526

ID 1st Coauthor: *Ana Luisa, Zenteno-Bonola* / **ORC ID:** 0000-0003-3634-588X, **CVU CONACYT ID**: IT16B709

ID 2nd Coauthor: *Dorian, Aguirre-Brito* / **ORC ID:** 0000-0002-3642-4767, **CVU CONACYT ID:** IT16B446

ID 3rd Coauthor: *José Antonio, Arellano-Cordova* / **ORC ID:** 0000-0002-0425-2905

Abstract

The manufacture of footwear in the State of Mexico is an activity of the utmost importance, since it represents an important source of income for the community of San Mateo Atenco; in the last ten years just over 40% of family workshops have closed. Plaza Azul has also been affected with a considerable decrease in sales volume, a situation that today is considered critical. The purpose of this research is to determine the organizational competence of the footwear producers of the Plaza Azul and from this, design strategies that allow them to increase their competitiveness. The present study is descriptive transectional type. To determine organizational competence, 5 variables are evaluated. Based on the results obtained, which show that the highest optimization factor is power structure and the highest risk factor is strategic direction. Proposals for strategies are presented to the variable of strategic management and information systems and thus optimize organizational competence and improve the overall competitiveness of footwear companies.

Organizational Competence, Strategic Balance, Footwear Industry

Determination of the Technological Advantage of the footwear industry of the Plaza Azul, San Mateo Atenco, State of Mexico

Determinación de la Capacidad Tecnológica como fuente generadora de valor, de la industria del calzado de la Plaza Azul, San Mateo Atenco, Estado de México

CALDERÓN-RÍOS, Norma Otilia, ZENTENO-BONOLA, Ana Luisa, ORDOÑEZ-HERNÁNDEZ, Lucía and ARELLANO-CORDOVA, José Antonio

Tecnológico Nacional de México/Instituto Tecnológico de Toluca

ID 1st Author: *Norma Otilia, Calderón-Ríos* / **ORC ID:** 0000-0002-6292-4140, **CVU CONACYT ID:** 528227

ID 1st Coauthor: *Ana Luisa, Zenteno-Bonola* / **ORC ID:** 0000-0003-3634-588X, **CVU CONACYT ID:** 213685

ID 2nd Coauthor: *Lucía, Ordoñez-Hernán*dez / **ORC ID:** 0000-0002-3642-4767, **CVU CONACYT ID:** 998086

ID 3rd Coauthor: José *Antonio, Arellano-Cordova* / **ORC ID:** 0000-0002-0425-2905

Abstract

The manufacture of footwear in the State of Mexico is an activity of the utmost importance since it represents an important source of income for the community of San Mateo Atenco; in the last ten years, just over 40% of family workshops have closed. Plaza Azul has also been affected by a considerable decrease in sales volume, a situation that today is considered critical. The purpose of this research is to determine the technological capacity, understood as the ability to design, buy, manufacture, and sell products. Technological competence is defined as the results of the evaluation of the 7 variables mentioned below: Differentiated and exclusive products, value-added process, mastery of technology, innovation capacity, strategic assets that are difficult to imitate, productive flexibility, and quality system. The results of the research show that productive flexibility is the main strength and differentiated and exclusive products are the greatest area of opportunity.

Competitive Advantage, Technological Capacity, Footwear Industry

Virtualization of Educational Environments for International Collaboration: Students as Builders of Their Own Learning

Virtualización de entornos educativos para la colaboración internacional: Los estudiantes como constructores de su propio aprendizaje

JUAREZ-SALOMO, Norma Angélica, CUEVAS-OLASCOAGA, Miguel Ángel and SILVEYRA-ROSALES, Mariana Teresa

Autonomous University of the State of Morelos

ID 1st Author: *Norma Angélica, Juarez-Salomo* / **ORC ID:** 0000-0002-9685-1998, **CVU CONACYT ID:** 669011

ID 1st Coauthor: *Miguel Ángel, Cuevas-Olascoaga* / **ORC ID:** 0000-0002-6427-7370, **CVU CONACYT ID:** 242182

ID 2nd Coauhtor: *Mariana Teresa, Silveyra-Rosales* / **ORC ID:** 0000-0003-0883-6809, **CVU CONACYT ID:** 552716

Abstract

The incorporation of communication and information technology (ICT) has been a permanent theme in the most recent decades, generating an intense debate about its implications and efficiency, the possibilities to integrate more effectively educational proposals, among other aspects. However, to think in a compulsory use of technologies as the only way to pursue studies was unthinkable. Even though multimodal education models and diverse experiences in e-learning already existed, at the beginning of 2020, the COVID-19 pandemic triggered a crisis due to the impediment of carrying out face-to-face activities in the classrooms around the world. Considering all the emerging situations due the pandemic, the spirit of this article is to share, three years after, the vision of some Mexican students, participants, and ex-participants in virtual and on-line experiences from public universities, regarding mediatized education, and how they consider their learnings in this regard.

COVID-19, Learning Experiences, Multimodal Education, Students

A proposal of strategies to promote study habits in virtual learning objects

Propuesta de estrategias para fomentar hábitos de estudio en objetos de aprendizaje virtuales

ARREDONDO-SALCEDO, Daniel, MIRELES-MEDINA, Antonia and MOLINA-WONG, Ma. Refugio.

Instituto Tecnológico Superior Zacatecas Norte

ID 1st Author: *Daniel, Arredondo-Salcedo* / **ORC ID:** 0000-0003-3236-4880, **CVU CONACYT ID:** 316030

ID 1st Coauthor: *Antonia, Mireles-Medina* / **ORC ID:** 0000-0001-9773-9108, **CVU CONACYT ID:** 299436

ID 2nd Coauthor: *MA. Refugio, Molina-Wong* / **ORC ID:** 0000-0002-4935-6994, **CVU CONACYT ID:** 998827

Abstract

The recent events produced by the global pandemic COVID-19 have conclusively demonstrated the need to strengthen various learning mechanisms, including e-learning and self-learning, and the adaptation of the use of technology as a fundamental tool in the teaching process. -learning. The objective of this article is to propose strategies to promote study habits in the development of virtual learning objects (VLO), by including a catalog of suggested techniques for strengthening time distribution, reading optimization and exam preparation, encapsulated and standardized with SCORM and reusable in various e-learning platforms. Our contribution is to collect and adapt study habits techniques in a methodology for the development of virtual learning objects

Learning objects, Study habits, SCORM

App Per-Q Teponaztli: innovation for rhythmic music education

App Per-Q Teponaztli: innovación para la educación musical rítmica

MARTÍNEZ-GONZÁLEZ, Fernando Eduardo, MACÍAS-BRAMBILA, Hassem Rubén, RODRÍGUEZ-JIMÉNEZ, Liza Mayela and COTERO-MORENO, Karina Margarita.

Universidad de Guadalajara

ID 1st Author: *Fernando Eduardo, Martínez-González* / **ORC ID:** 0000-0002-5578-2922, **CVU CONACYT ID:** 1217082

ID 1st Coauthor: *Hassem Rubén, Macías-Brambila* / **ORC ID:** 0000-0002-6540-7464, **CVU CONACYT ID**: 902812

ID 2nd Coauthor: *Liza Mayela, Rodríguez-Jiménez* / **ORC ID:** 0000-0002-9084-3831, **CVU CONACYT ID:** 396313

ID 3rd Coauthor: *Karina Margarita, Cotero-Moreno* / **ORC ID:** 0000-0002-8389-5334, **CVU CONACYT ID:** 850498

Abstract

The following article presents the Per-Q Teponaztli mobile application as an innovation proposal for music education. Per-Q Teponaztli is a complementary tool of Per-Q, a rhythmic musical training program for children between 7 and 12 years of age implemented in virtual learning environments and based on different rhythmic musical learning methodologies that promote the development of multi-functional skills. and intercultural. The design and implementation process of the application was carried out through the agile SCRUM methodology. Developed for the Android environment, Per-Q Teponaztli consists of a virtual representation of a teponaztli, a percussion instrument originating in the pre-Hispanic period in Mexico. The direct interaction of the instrument in virtual format through a digital device allows for its implementation of gamification dynamics and game elements mediated by technology, favoring the appropriation of multicultural skills and an approach of students to the musical roots and traditions of our country.

Musical Learning Mobiles Apps, Gamification Techniques, Multiculturalism In Musical Learning, Intercultural Environments

Psychosocial risk factors in students of Dual Education of the Higher Technological Institute of Poza Rica

Factores de riesgo psicosocial en alumnos de Educación Dual del Instituto Tecnológico Superior de Poza Rica

MORENO-RODRIGUEZ, Bertha María, LOYA-ESCALANTE, María Teresa, GODÍNEZ-VITE, Rodolfo Enrique and BERNAL-MAR, Ilse Ariadna

Tecnológico Nacional de México / ITS de Poza Rica.

ID 1st Author: *Bertha María, Moreno-Rodriguez* / **ORC ID:** 0000-0002-0598-7524, **CVU CONACYT ID:** 243865

ID 1st Coauthor: *María Teresa, Loya-Escalante* / **ORC ID:** 0000-0003-1515-4312, **CVU CONACYT ID:** 635849

ID 2nd Coauthor: *Rodolfo Enrique, Godínez Vite* / **ORC ID:** 0000-0003-3214-4167**, CVU CONACYT ID:** 1074966

ID 3rd Coauthor: *Ilse Ariadna,, Bernal-Mar* / **ORC ID:** 0000-0001-9827-2706, **CVU CONACYT ID:** 781560

Abstract

The present work is approached within the Higher Technological Institute of Poza Rica with the purpose of identifying the psychosocial risk factors in the work environment of the students who participate in the Institutional Program of Dual Education, for which an adaptation of the Psychosocial Questionnaire is used. of Copenhagen (CoPsoQ), with 37 questions that correspond to the six large groups of the 20 psychosocial dimensions that are identified with this instrument. The evaluation is carried out on a sample of 9 students belonging to the educational programs of Electronic Engineering and Industrial Engineering. The results obtained allowed to know the level of exposure and the origin of the risks in order to offer information for the design and implementation of preventive actions, which can be carried out during the stay of the students within the company, as well as provide a study focused on dual education, since there are few studies on this developed topic.

Psychosocial Risk, Dual Model, Dual Education

Continuous model in the audit of municipalities in the state of Veracruz

Modelo continuo en la auditoría de municipios en el estado de Veracruz

HERNÁNDEZ-RAMÍREZ, Juan Esteban and GARIZURIETA-BERNABE, Jessica

Universidad Veracruzana, Facultad de Contaduría y Administración, Xalapa, Veracruz

ID 1st Author: *Juan Esteban, Hernández-Ramírez* / **ORC ID:** 0000-0002-2940-3132, **CVU CONACYT ID:** 1000287

ID 1st Coauthor: *Jessica, Garizurieta-Bernabe* / **ORC ID:** 0000-0002-1443-4737, **CVU CONACYT ID:** 273881

Abstract

This study aims to determine the feasibility of carrying out traditional audit procedures applied in the public sector, by continuous procedures, in which the substance of digitalization, distance and the use of specific software for mass analysis prevail, in addition to risk reduction through a total analysis. In this way, an accurate audit is achieved, in which the correct adherence of the municipalities of the State of Veracruz to the applicable regulations is ensured. To carry out this study, the Audit Program granted by the Superior Audit Body of the State of Veracruz to external offices is taken as a basis, subsequently analyzed in detail each of the procedures that make it up and their work papers, in this way it is determined if they are likely to be carried out virtually, and the digital evidence they require for their realization. When determining the feasibility of carrying out the traditional audit of the public sector in Veracruz by a continuous audit, it creates the guidelines to be able not only to apply existing Information Technologies, but to develop specific software that maintains a true analysis in real time, reducing time, costs and human resources.

Continuous Audit, Traditional Audit, Municipal Audit

Hurdles to the adoption of solar energy technologies in the Comcaac nation, Desemboque, Sonora, México, a case study

Obstáculos para la introducción de tecnologías de aplicación solar en la nación Comcaac, caso Desemboque, Sonora

SOTELO-MEDINA, Demetrio, LEÓN-BALDERRAMA, Jorge and CABANILLAS-LÓPEZ, Rafael

Food and Development Research Center

ID 1st Author: *Demetrio, Sotelo-Medina* / **ORC ID:** 0000-0002-4047-1523**, CVU CONACYT ID:** 1094428

ID 1 st Coauthor: *Jorge, León-Balderrama* / **ORC ID:** 0000-0001-5550-6162, **CVU COANCYT ID:** 81406

ID 2nd Coauthor: *Rafael, Cabanillas-López* / **ORC ID:** 0000-0003-0739-3348**, CVU CONACYT ID:** 120410

Abstract

The Comcaac nation (seri) resides mainly in two towns of the State of Sonora: Desemboque and Punta Chueca. Currently, the Comcaac people face conditions of vulnerability due to the absence of water and energy. In 2020, a project with solar energy technologies was carried out in the community of Desemboque to ensure water supply and electrical energy, financed by the Honnold foundation. However, the results of this effort have not fulfilled the expectations. What happened? Through the analysis carried out by the transdisciplinary research collective, which is made up of 16 researchers from 7 institutions, national and foreign, obstacles to the development of local sustainability were identified, and the need to expand the analysis in different dimensions is recognized. This research is developed within the context of the execution of the project with funding from FORDECYT-PRONACES 315254 "Energy, water and food security for indigenous peoples in semi-arid coastal regions of Northern Mexico". (CONACYT, 2021a)

Sustainability, Transdisciplinary, Solar Technology

E-commerce transaction modeling formalisms

Formalismos de modelado de transacciones en comercio electrónico

GONZÁLEZ-CASTOLO, Juan Carlos, RAMOS-CABRAL, Silvia, HERNÁNDEZ-RUEDA, Karen and ZATARAIN-DURÁN, Omar Alí

Universidad De Guadalajara

ID 1st Author: *Juan Carlos, González-Castolo* / **ORC ID:** 0000-0003-2659-0646, **Researcher ID Thomson:** R-5580-2018

ID 1st Coauthor: *Silvia, Ramos-Cabral* / **ORC ID:** 0000-0003-4204-1700, **Researcher ID Thomson:** R-7124-2018

ID 2nd Coauthor: *Karen, Hernández-Rueda* / **ORC ID:** 0000-0002-7209-2907**, Researcher ID Thomson:** AAM-4861-2021

ID 3nd Coauthor: *Omar Alí, Zatarain-Durán* / **ORC ID:** 0000-0002-7934-7765, **Researcher ID Thomson**: E-2222-2019

Abstract

This article presents the modeling of the *purchase-sale transaction* (pst) in *electronic commerce* (e-commerce) using different formalisms. *E-commerce* is an area of interest that is gaining rapid momentum in recent times because of the pandemic. In this work, the *pst* is a basic scheme that particularly excludes the participation of the intermediary that manages the reception and/or transfer of money. With the above, it is intended to minimize the number of actors involved in the *pst* to make relevant the contrast of the power representation of different formalisms to facilitate the analysis and make improvements. Firstly, *conceptual maps* are among formalisms that facilitates the exposition of complex processes. A next formalism is the *coverage tree* which allows to follow the flow of the *pst* in a clear way. The *pst* can be abstracted into a mathematical expression, however, it loses the power of visual scheme. The *pseudocode* is a way of representing computational processes that, in this case, allows modeling the *pst* also. Flowcharts are a tool associated with the development of programs that allow visually displaying the events of the *pst*.

E-commerce, ICT, Modeling

The importance of Organizational Climate as a factor in customer satisfaction: Coppel Villa Guerrero Case Study

La importancia del Clima Organizacional como factor de la satisfacción del cliente: Estudio de Caso Coppel Villa Guerrero

GARCIA-CASTILLO, Karla Yazmín, SEGURA-FIGUEROA, Esperanza and GARCIA-CRUZ, Zelma

Tecnológico de Estudios Superiores de Villa Guerrero

ID 1st Author: *Karla Yazmín, García-Castillo* / **ORC ID**: 0000-0002-5463-1794, **CVU CONACYT ID:** 556904

ID 1st Coauthor: *Esperanza, Segura-Figueroa* / **ORC ID:** 0000-0002-2612-3581

ID 2nd Coauthor: *Zelma, Garcia-Cruz* / **ORC ID:** 0000-0003-1478-8591

Abstract

The study of the organizational climate is fundamental for any company, since it is the most precise indicator that shows the levels of positive and negative labor relations in the organization. Organizational climate is a variable that reflects the interaction between personal and organizational characteristics; it is considered a fundamental element in the perception that the worker has of the structures and processes that occur in his work environment (Goncalves, 1997). Therefore, this research was applied in the Coppel Villa Guerrero branch through a series of questions analyzing the variable as a factor of customer satisfaction both internally (employees) and externally (customers). Therefore, a questionnaire was designed that contemplates the proposed dimensions, with the objective of measuring the organizational climate, and thus determine if this variable is a correlational factor for customer satisfaction, before this was defined a sample of 261 customers and 57 employees, who with their support allowed to conclude the research for the verification of the hypotheses proposed, which is that, The impact on job satisfaction can be both positive and negative because when employees are not satisfied with their work, they generate a negative, toxic environment and this harms the organization in all its processes, which showed that there is indeed a correlation between the organizational climate and customer satisfaction, since the employee usually feels valued by the company and is reflected directly in the treatment of the customer, which leads to job satisfaction.

Organizational Climate, Customer Satisfaction, Coppel, Factors, Correlation

Complexity and post covid resilience in times of war and impact on Mexican organizations

Complejidad y resiliencia post covid en la época de guerra y afectación sobre las organizaciones mexicanas

GUERRERO-SÁNCHEZ, Pablo, PÉREZ-MAYO, Augusto Renato, GUERRERO-GRAJEDA, José and ROMERO-TORRES, Fernando

Universidad Autónoma del Estado de Morelos

ID 1st Author: *Pablo, Guerrero-Sánchez* / **ORC ID** - 0000-0003-2701-8393 y **CVU CONACYT ID**: 171781

ID 1st Coauthor: *Augusto Renato, Pérez-Mayo* / **ORC ID:** 0000-0003-1094-3283, **CVU CONACYT ID**: 239558

ID 2nd Coauthor: *José, Guerrero-Grajeda* / **ORC ID**: 0000-0003-4561-8085

ID 3rd Coauthor: *Fernando, Romero-Torres* / **ORC ID:** 0000-0002-4389-3369, **CVU CONACYT ID**: 253506

Abstract

The international context of post covid war is presented; where US treasury bonds fall, the gold standard rises, the barrel rose to $100 per barrel, with problems with the commercialization of Russian metals such as the titanium used by Boeing; that it fell in its shares as well as in most of the stock markets worldwide, and the strategic factor in fertilizers, where Morocco plays the fundamental role due to phosphate; because Ukraine produces approximately a third of the world's wheat precisely in the area that is being attacked from the beginning, with the possibility of occupied areas with Crimea leaving Ukraine without access to the Black Sea, which would cause a weakening of its capacity to commercialization of the grain and a general increase in prices, also in relation to the loss of value of the peso, and the increase in energy, in a complex and interrelated way, would cause an increase in prices by small retailers in Mexico; this is causing an increase in interest rates. Organizational resilience is proposed as a strategic element to support the leadership of organizations.

Complexity, Resilience, Post Covid, Organizations

The Effectiveness of a Course Taught in the Flipped Classroom Modality

La Efectividad de un Curso Impartido en la Modalidad de Aula Invertida

MEZA-NAVARRO, Miguel, CHÁVEZ-ÁRCEGA, Marco Antonio, ÁVILA-HERNÁNDEZ, José César and AVILA-SOTO, Ernesto Alonso

Nova Southeastern University

ID 1st Author: *Miguel, Meza-Navarro* / **ORC ID:** 0000-0003-2367-4326

ID 1st Coauthor: *Marco Antonio, Chávez-Árcega* / **ORC ID:** 0000-0002-6377-4471

ID 2nd Coauthor: *José César, Ávila-Hernández* / **ORC ID:** 0000-0002-4606-358X

ID 3rd Coauthor: *Ernesto Alonso, Avila-Soto* / **ORC ID:** 0000-0002-4499-5914

Abstract

The purpose of this research was to determine, through the Kirkpatrick and Kirkpatrick evaluation model, the effectiveness of a course taught in the flipped classroom modality to students of Information Technology Engineering at a Technological University in Mexico. This model comprises four levels for measuring the effectiveness of a training program: satisfaction, learning, applicability and results. To carry out the present study, a methodology with a quantitative approach and a quasi-experimental design of a group with measurement before and after, without a control group, was used. To measure the level of learning, the group was evaluated by a pre test starting the course and by a post test after finishing it. To measure the levels of satisfaction, applicability and results, Likert-type questionnaires were administered. The results showed that the level of satisfaction of the course participants was 86.6%. Regarding the level of learning, it was found that students improved their learning by 25.3%. Regarding the applicability, 86.5% was obtained, while 89.2% was reached for the level of results. In conclusion, it was possible to conclude that the course taught in the flipped classroom modality was effective.

Effectiveness, Flipped classroom, Kirkpatrick's model

Most used Digital Marketing tool in Agricultural SMEs in the Municipality of Villa Guerrero

Herramienta más utilizada de Marketing Digital en las PYMES Agrícolas del Municipio de Villa Guerrero

RAYAS-HERRERA, Cynthia Lizbeth, RAMIREZ-RAMIREZ, Ulises Jesús and GARCÍA-CASTILLO, Karla Yazmín

Tecnológico de Estudios Superiores de Villa Guerrero, Administración, Estado de México.

ID 1st Autor: *Cynthia Lizbeth, Rayas-Herrera* / **ORC ID:** 0000-0003-1977-5167

ID 1st Coautor: *Ulises Jesus, Ramirez-Ramirez* / **ORC ID:** 0000-0003-1148-7937

ID 2nd Coautor: *Karla Yazmin, Garcia-Castillo* / **ORC ID:** 0000-0002-5463-1794, **CVU CONACYT ID:** 556904

Abstract

Digital marketing according to Herrera (2019), began to have a strong presence in Mexico from 2016, however, it was until 2018 when companies considered integrating specialists within their payroll, and after the pandemic by COVID-19, the techniques of this were increasing, since they went through a stage of isolation that led companies to sell through the internet, mainly through social networks if they wanted to survive. Therefore, the objective of this research is to know the digital marketing strategies most used in agricultural companies in the municipality of Villa Guerrero, State of Mexico, all this, because in this municipality the floricultural economic activity predominates and therefore there are many SMEs dedicated to the sale of inputs and fertilizers for production in the region. Therefore, a quantitative methodology was used to test the hypothesis, because data collection was carried out through surveys, which were applied in person to a representative sample of agricultural companies, located in the head of the municipality of Villa Guerrero and its surroundings, to demonstrate whether the most used social network as a digital marketing tool was Facebook, using descriptive and correlational data analysis techniques.

Marketing, Agricultural, Strategies, Predominates, Analysis

Impact of the work motivation of the Colibri´s cinema in times of Pandemic by COVID-19

Impacto de la motivación laboral del cinema colibrí en tiempos de Pandemia por COVID-19

PEDROZA-CRUZ, Mariela, CHAVEZ-ISOJO, Irlanda, ORTIZ-MEJIA, Paola and GARCÍA-CASTILLO, Karla Yazmín.

Tecnológico de Estudios Superiores de Villa Guerrero, Administración, Estado de México.

ID 1st Author: *Mariela, Pedroza-Cruz* / **ORC ID:** 0000-0001-6162-0586

ID 1st Coauthor: *Irlanda, Chavez-Isojo* / **ORC ID:** 0000-0002-0318-7662

ID 2nd Coauthor: *Paola, Ortiz Mejía* / **ORC ID:** 0000-0001-6236-676X

ID 3rd Coauthor: *Karla Yazmín, García-Castillo* / **ORC ID:** 0000-0002-5463-1794, **CVU CONACYT ID:** 556904

Abstract

It is very important for organizations to find staff with emotional intelligence because they are valuable people, committed to work and know how to make better decisions, this benefits them greatly because they take care of the organization as if it were about them; However, it is also imperative to keep them in that balance, in that healthy environment, since it has been seen that motivation is something that human beings should possess by nature, which should not depend on external agents, but in many occasions the environment in which an individual develops can affect their way of thinking and therefore their way of acting, such is the case of the mandatory isolation due to the pandemic by COVID-19, where the emotional state of the workers was discussed a lot, In this research we intend to analyze the impact that the COVID-19 pandemic had on the work motivation of Cinema Colibri, which was an industry that was undoubtedly very damaged, so a series of tests and surveys were conducted to employees, to verify the working hypothesis, which was, work motivation influences the performance of the staff of the company Cinema Colibri Tenancingo.

Motivation, Organization, Pandemic, Productivity, Employees, Employees, Motivation

Semiotic analysis of women on the front and back covers of the *Benemérita Universidad Autónoma de Puebla's* gazette, Mexico

Análisis semiótico de las mujeres en la portada y contraportada de la gaceta de la Benemérita Universidad Autónoma de Puebla, México

VÁZQUEZ-VALDÉS, Verónica and MATA-SANTEL, Jaqueline

ID 1st Author: *Verónica, Vázquez-Valdés* / **ORC ID:** 0000-0001-5466-4679, **CVU CONACYT ID:** 48872.

ID 1st Coauthor: *Jaqueline, Mata-Santel* / **ORC ID:** 0000-0003-1767-0484, **CVU CONACYT ID:** 499554.

Abstract

It is known that women's image on the front and back covers is crucial for magazines in commercial and business fields; in academic magazines, nevertheless, the image on the outside doesn't get the same weight since the purpose of these magazines is to inform about the university life that every student, faculty, and administrative staff live day by day. Therefore, the objective of this work is to analyze women's representation on the front and back covers of the *Gaceta Universidad Benemérita Universidad Autónoma de Puebla* (BUAP's gazette) from 2012 to 2018. This was determined to identify the identity changes that these images have undergone based on institutional contexts. The chosen method to come to this was a semiotic model based on the proposal of Morris and Vilches retaking the syntactic and semantic dimensions to identify the identity elements of the female student. As a result of this analysis, the following categories emerged to reinforce the image of college women in its different facets: women entering the university; women in university spaces; women in academic activities; and women in sports activities. The analysis of these images leads us to conclude that the college women's representation is observed in two administrative periods of the rector's office, one of which women were represented from the gender stereotypes assigned to women; nevertheless, the other period shows a change in the representation of college women with more inclusive images influenced by the policies of gender mainstreaming in higher education.

Image Semiotic, College Woman, Academic Magazine, Front Covers, Back Covers

Biopolitics: "letting die" and modes of resistance in Mexico. The case of the Ngigua people of San Marcos Tlacoyalco

Biopolítica: “dejar morir” y modos de resistencia en México. El caso de la comunidad Ngigua de San Marcos Tlacoyalco

TIVEROVSKY-SCHEINES, María Sol and MANZANO-MUNGUÍA, María Cristina

Universidad Autónoma de Puebla (BUAP)

ID 1st Author: *María Sol, Tiverovsky-Scheines* / **ORC ID**: 0000-0003-1584-4663, **CVU CONACYT ID**: 487700 (Becaria posdoctoral CONACyT)

ID 1st Coauthor: *María Cristina, Manzano-Munguía* / **ORC ID**: 0000-0001-6622-1939, **CVU CONACYT ID**: 474518 (SNI-CONACYT)

Abstract

Here biopolitics is understood as the management of life that ensures healthy and vigorous development in turn, its counterpart is the sovereign right of the State to let die those sectors of the population that are, for some reason, disposable. Here we look at if this is the case within the Ngigua community of San Marcos Tlacoyalco and how the COVID-19 pandemic has deepened this issue at stake of being disposable and to a greater extent, detrimental for them. Nevertheless, we also strive to illustrate the agency deployed among community members in order to ensure survival and health during the pandemic.

Biopolitic, COVID-19, Modes Of Resistance, Ngigua Community

Theoretical Reflections and Empirical Evidence on Informal Employment: an application using panel data with small within country-variation

Reflecciones Teóricas y Evidencia Empírica sobre la Informalidad Laboral: una aplicación usando datos panel con variación pequeña por país

GUILLERMO-PEÓN, Sylvia Beatriz and ESTRADA-QUIROZ, Liiana

Benemérita Universidad Autónoma de Puebla

ID 1st Author: *Sylvia Beatriz, Guillermo-Peón* / **ORCID:** 0000-0002-0510-3645, **CVU CONACYT ID:** 30484

ID 1 st Coauthor: *Liliana Estrada Quiroz* **/ ORC ID:** 0000-0002-0168-602X, **CVU CONACYT ID:** 87000

Abstract

This research paper presents some theoretical reflections on the economic sources of the informal economy phenomenon. The discussion is presented under a new approach called the *non-retributed factors approach*. Under this approach, we consider informal economy, all economic activities in which at least one factor of production is non-retributed or under-retributed. Additionally, using panel data for Latin American countries and other developing countries as well as data for developed countries, we present empirical evidence regarding the impact of physical capital and human capital on informal employment rates. Because these variables show very small variation over time, the *small within-group variation* characteristic must be considered when choosing the appropriate model estimation technique with panel data. Our findings show that the scarcer the physical and human capital, the higher the informal employment rates will be.

Informal Employment, Informal Economy, Panel data model, Small within-group variation

Social media as a marketing strategy in commercial microenterprises in the Southern Region of Tamaulipas

El social media como estrategia de marketing en Microempresas comerciales de la Región Sur de Tamaulipas

GONZALEZ-DURAN, Nora Hilda and GUZMAN-GARCIA, Juan Carlos

Universidad Autónoma de Tamaulipas, Profesores -Investigadores,

ID 1st Author: *Nora Hilda, Gonzalez-Duran* / **ORC ID:** 0000 0002 6139 3958, **CVU CONACYT ID:** 504760.

ID 1st Coauthor: *Juan Carlos, Guzman-Garcia* / **ORC ID:** 0000 0003 2284 0716, **CVU COANCYT ID:** 6179

Abstract

Local businesses everyday face problems in sales and last year was no exception as it was more marked by the pandemic we are experiencing worldwide. The emergence of social media and the COVID-19 pandemic has changed the way businesses interact with customers so they can communicate more directly and quickly, as well as their advertising or marketing strategies. In addition, the cost of advertising on social networks is much lower than in traditional media such as radio and television. All this clearly shows that entering social networks is not only a trend, it is a requirement of every company and organization that wants to expand its horizons. In this sense, there are several points to consider, it is necessary to understand that each company is an independent entity, and its products are unique and different. In principle, you must set the objectives and not forget your philosophy as a company. . Based on what has been experienced in recent years as a result of the COVID-19 epidemic, social media has had an impressive boom, speaking of the case of Mexico, the forecasts that were had according to the Mexican Internet Association Mx, the forecasts that were had according to the Mexican Internet Association Mx, was that we would have a presence of between 85-90 million people within the internet by 2020, but by the end of that year the mark of 100 million internet users was exceeded, this opens up a huge channel for us, where talking about the business approach can be used in different ways to obtain an economic benefit.

Social Media, Strategies, Companies

6 Agricultural Sciences and Biotechnology

Cenote Chen ha, and water quality indicators

Cenote Chen ha, e indicadores de calidad de agua

VIZCAINO-RODRIGUEZ, Luz Adriana, RAVELERO-VAZQUEZ, Victor, LUJAN-GODINEZ, Ramiro and, CANUL-GARRIDO, Divino Miguel

Universidad Politécnica de la Zona Metropolitana de Guadalajara (UPZMG), Universidad Tecnológica del Poniente (UTP).

ID 1 st Author: *Luz Adriana Vizcaino-Rodriguez* / **ORC ID:** 0000-0001-8301-6160, **Researcher ID Thomson:** T-1324-2018, **CVU CONACYT ID:** 175164.

ID 1 st Coauthor: Victor, Ravelero-Vazquez / **ORC ID:** 0000-0003-3496-4994

ID 2 nd Coauthor: Ramiro, Lujan-Godinez / **ORC ID:** 0000-003-4138-7590, **Researcher ID Thomson:** T-2648-2018, **CVU CONACYT ID:** 503875.

ID 3 rd Coauthor: *Divino Miguel, Canul-Garrido* / **ORC ID:** 0000-0002-9321-757, **CVU CONACYT ID:** 266590

Abstract

The cenotes of the Yucatan Peninsula are characterized by karstic relief, warm temperatures, and transparency of their water bodies. The mixture of fresh water from infiltrations of rainwater and runoff coupled with underground rivers or marine intrusion, make up the habitat of aquatic, amphibian, and terrestrial species. The Chen ha cenote, located in Chocholá, was used for tourist purposes, however, the lack of an environmental culture and some anthropogenic activities cause deterioration and contamination of the wetland, which putting its conservation at risk. The objective of the present work was to carry out a limnological analysis in Cenote Chen ha, to determine the level of fragility of the ecosystem. The variables analyzed were pH, dissolved oxygen, temperature, conductivity and phytoplankton biodiversity. Results. 2600 µS/cm of conductivity, 8.25 pH and 2.8 ppm of dissolved Oxygen. Phytoplankton: Diatoms 46.2%, Cyanobacteria 38.1%, Chlorophytes 8.1%, Euglenas 5.5%, and Dinoflagellates 2.1% predominated. *Asterionella* was identified as an indicator species of environmental health. *Microcystis aureginosa*, *Planktothrix agardhii, and Cyanosarcina Caribeana*, *Pseudanaena*, *Peridium* and *Gonyaulax* species are shown as indicators of environmental contamination. No dominance of any species was observed; however, frequent monitoring of indicator species is recommended.

Anthropogenic, Intrusión, Enviromental

Production of four varieties of cocoa (*theobroma cacao l*), in úrsulo galván, Veracruz, Mexico

Producción de cuatro variedades de cacao (theobroma cacao l), en úrsulo galván, Veracruz, México

GARAY-PERALTA, Ignacio, HERRERA-ALARCÓN, Jesús, DÍAZ-CRIOLLO, Alfredo and ESCUDERO-RAMÍREZ, Leira Carol

Tecnológico Nacional de México Campus Úrsulo Galván

ID 1st Author: *Ignacio, Garay-Peralta* / **ORC ID:** 0000-0003-3091-5255, **CVU CONACYT ID:** 209712

ID 1st Coauthor: *Jesús, Herrera-Alarcón* / **ORC ID:** 0000-0001-6904-8617, **CVU CONACYT ID:** 103803

ID 2nd Coauthor: *Alfredo, Díaz-Criollo* / **ORC ID**: 0000-0002-1995-2488, **CVU CONACYT ID:** 371777

ID 3rd Coauthor: *Leira Carol, Escudero-Ramírez* / **ORC ID:** 0000-0003-1820-694X, **CVU CONACYT ID:** 1133403

Abstract

Currently, research in the introduction of crops in an area, region, or zone, is essential to determine the potential that the species being introduced may have. Therefore, the importance of introducing four species of cocoa (Theobroma cacao L), in the region of Úrsulo Galván, under a completely randomized experimental design. Specially in those places where monocultures predominate, since the option provided as an alternative must meet several characteristics, among which the main ones are: adaptation, growth, development, production and commercialization. To determine which of the species are those that adapt to the climatic conditions, as well as edaphic conditions of the area. If we add to the above economic improvements in terms of the income received per hectare, it will be much more attractive for producers. However, proposals should also be sought that contribute to reforestation, carbon dioxide capture and that benefits the local species. All the above with the intention of implementing sustainable polycultures and improving the characteristics of the region where they are established, as well as diversifying crops.

Research, Sustainability, Polycultures

Influence of royal jelly components on the development of *melissococcus plutonius*

Influencia de los componentes de la jalea real en el dasarrollo de *melissococcus plutonius*

PONCE-DE LEÓN DOOR, Adrián, ROMO-CHACÓN, Alejandro, PEREZ-ORDOÑEZ, Gerardo and ACOSTA-MUÑIZ, Carlos Horacio

Universidad Tecnológica de la Babícora

ID 1st Author: *Adrián, Ponce-de León Door* / **ORC ID:** 0000-0002-1283-5262, **Researcher ID Thomson:** L-6990-2017, **CVU CONACYT ID**: 565419

ID 1st Coauthor: *Alejandro, Romo-Chacón* / **ORC ID:** 0000-0002-3782-1940, **CVU CONACYT ID**: 299662

ID 2nd Coauthor: *Gerardo, Pérez-Ordoñez* / **ORC ID:** 0000-0001-7429-0774, **CVU CONACYT ID**: 790858

ID 3rd Coauthor: *Carlos Horacio, Acosta-Muñiz* / **ORC ID:** 0000-0001-6329-3507, **CVU CONACYT ID**: 212932

Abstract

Objectives. European Foulbrood (EFB) is a severe disease that affects the first larval stages of different types of bees, including *Apis mellifera*. This disease is caused by the bacteria *Melissococcus plutonius*, spreading through contaminated food like royal jelly (RJ). In this study, some components of RJ that could affect the survival and virulence of the bacterium were characterized. Methodology Bromatological analyses, electrophoretic protein profile, organic acid profile, and mineral content of RJs from different origins were determined. Additionally, the variations in RJs were related to the virulence of *M. plutonius* through *in vitro* infections. Contributions. The results showed that the RJs have a different chemical composition, which affects the virulence of M. plutonius. These compounds are royal jelly major protein 1 (MRJP1) and glucose oxidase (GOX), which were absent in some JRs; 10 -hydroxy-2-decenoic acid(10-HDA), whose concentration varied from 1.8 to 3.1%, and the relationship between Potassium and Sodium (K/Na) with values between 4.21 to 20.27. These parameters can be considered a reference to indirectly evaluate the susceptibility of bee colonies against EFB in different geographical locations or seasonal periods and can also be used to develop natural treatments for diseased colonies.

Components, Virulence, Susceptibility

Silver nanoparticles' incorporation in spider silk (*Paraphidippus aurantius*) for therapeutic purposes

Incorporación de nanopartículas de plata en seda de araña (*Paraphidippus aurantius*) con fines terapeúticos

GRANADOS-OLVERA, Jorge Alberto, VARGAS-SOLANO, Zaira, RANGEL-RUIZ, Karelia Liliana and RAMIREZ-HERRRERA, Sandra Teresa

Universidad Politénica de Cuautitlan Izcalli

ID 1st Author: *Jorge Alberto, Granados-Olvera* / **ORC ID**: 0000-0003-0546-5328, **Researcher ID Thomson**: S-5756-2018, **CVU CONACYT ID**: 946998

ID 1st Coauthor: *Zaira, Vargas-Solano* / **ORC ID**: 0000-0001-7404-8769, **Researcher ID Thomson**: S-5739-2018, **CVU CONACYT ID**: 313021

ID 2nd Coauthor: *Karelia Liliana, Rangel-Ruiz* / **ORC ID**: 0000-0003-1805-0447, **Researcher ID Thomson**: GLQ-8704-2022, **CVU CONACYT ID**: 225798

ID 3rd Coauthor: *Sandra Teresa, Ramirez-Herrera* / **ORC ID**: 0000-0002-7729-3089, **Researcher ID Thomson**: GLQ-8769-2022, **CVU CONACYT ID**: 1218690

Abstract

Spiders produce a wide range of multipurpose silk fibers that are composed of Fibroin (Xiaonan et.al., 2016) with hydrophilic, biodegradable, biocompatible and high-strength properties. On the other hand, silver nanoparticles have remarkable properties, and their morphology can be controlled and strongly influenced by the experimental conditions, generating an effect on their antimicrobial capacity. The present work proposes a successful experimental sequence for the incorporation process of Silver Nanoparticles synthesized from Aloe Vera extract in Spider (*Paraphidippus aurantius*) silk. Once the spider web is clean and sanitized, it is submerged in a solution of Silver Nanoparticles (Solomon et al., 2007), to be subjected to sonication in order to achieve incorporation.

Silver Nanoparticles, Spider Silk, Therapeutic, Incorporation, Nanoparticles, Biocompatible

Community Land Use Planning in La Gloria Community

Ordenamiento Territorial Comunitario en la comunidad la Gloria

MUÑOZ-ROJAS, Marco Antonio, VÁZQUEZ-HERNÁNDEZ, Gabriel, PÉREZ-ESTEBAN, Guillermo and LEGUIZAMO-HERNÁNDEZ, Miriam

Instituto Tecnológico Superior de la Sierra Norte de Puebla.

ID 1st Author: *Marco Antonio, Muñoz-Rojas* / **ORC ID:** 0000-0002-0997-9935, **CVU CONACYT ID:** 1195989

ID 1st Coauthor: *Gabriel, Vázquez-Hernández* / **ORC ID:** 0000-0002-7747-0006, **CVU CONACYT ID:** 1200088

ID 2nd Coauthor: *Guillermo, Pérez-Esteban* / **ORC ID:** 0000-0002-1093-4566, **CVU CONACYT ID:** 621521

ID 3rd Coauthor: *Miriam, Leguizamo-Hernández* / **ORC ID:** 0000-0002-8399-0411, **CVU CONACYT ID:** 514557, **Researcher ID Thomson:** P-5243-2018

Abstract

The environmental deterioration in the Gloria Primera Seccion community due to the traditional land use and the natural resources has generated a preoccupation in the population, who before this panorama are looking for formalize their practices. In this research were identified the problems that are present in the community, in the social, economic, and environmental ambit, this based on the article 41 of the Reglamento de la Ley General de Equilibrio Ecologico y Proteccion al ambiente en Materia de Ordenamiento Ecologico. A Community Land Use Planning was made in the Gloria Primera Seccion community, this with the goal to distribute the land use in a correct way, through a land management action plan, posing activities that entail to a sustainable human development.

Enviromental, Deterioration, Sustainable, Traditional, Formalize, Development

Polyhydroxyalkanoates (PHA): natural polymers produced by bacteria, an option for the replacement of plastics

Polihidroxialcanoatos (PHA): polímeros naturales producidos por bacterias, una opción para el remplazo de los plásticos

FONSECA-BARRERA, Itzel del Carmen, MENDOZA-GARCÍA, Patricia Guillermina, PEÑA-MONTES, Carolina and RAMÍREZ-HIGUERA, Abril.

Unidad de Investigación y Desarrollo de Alimentos

ID 1st Author: *Itzel Del Carmen, Fonseca-Barrera* / **ORC ID:** 0000-0003-3562-9899, **CVU CONACYT ID:** 950657

ID 1st Coauthor: *Patricia Guillermina, Mendoza-García* / **ORC ID:** 0000-00001-6838-0861, **CVU CONACYT ID:** 270773

ID 2nd Coauthor: *Carolina, Peña-Montes* / **ORC ID:** 0000-0002-4767, **CVU CONACYT ID:** 277236

ID 3rd Coauthor: *Abril, Ramírez-Higuera* / **ORC ID:** 0000-0002-1430-2689, **CVU CONACYT ID:** 242658

Abstract

Synthetic plastics have facilitated the transport of food and various products; however, their time to degrade has caused severe environmental problems due to their accumulation in seas and rivers. Polyhydroxyalkanoates (PHA) have been proposed as an alternative to synthetic plastics due to their biodegradable characteristics and similar properties to polypropylene and polystyrene. PHA are polymers produced by bacteria such as *Bacillus* spp, *Streptomyces* sp, *Staphylococcus* sp, *Cupriavidus necator, R. eutropha* and *Alcaligenes latus* that accumulate the polymer in intracellular lipid granules that serve as their energy source. This review aims to provide an overview of research in recent years on identifying PHA-producing strains, methods for their extraction, factors affecting their production, the study of their structure and film-forming characteristics, and their applications and future developments related to PHA.

Polihidroxialcanoatos, Intracelular, Bioplasticos, Ambiental

Effects of selenium on yield, seed size, and phenolic compound content of common bean (*Phaseolus vulgaris* L.)

Efectos del selenio en el rendimiento, tamaño de la semilla y contenido de compuestos fenólicos del frijol común (*Phaseolus vulgaris* L.)

GARCÍA-MORALES, Soledad, MACÍAS-GARCÍA, María Juventina, LUGO-CERVANTES, Eugenia and ALCÁZAR-VALLE, Elba Montserrat

CONACYT-Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco

ID 1st Author: *Soledad, García*-Morales / **ORC ID**: 0000-0002-2551-2518, **CVU CONACYT ID**: 224490

ID 1st Coauthor: *María Juventina, Macías-García* / **ORC ID:** 0000-0002-9657-2286

ID 2nd Coauthor: *Eugenia, Lugo-Cervantes* / **ORC ID:** 0000-0003-3337-5872, **CVU CONACYT ID**: 57433

ID 3rd Coauthor: *Montserrat, Alcázar-Valle* / **ORC ID**: 0000-0003-2949-4799/ **CVU-CONACYT ID**: 274400

Abstract

Beans are some of the most important legumes in human nutrition since they contain various secondary metabolites with antioxidant activity, such as phenolic compounds, associated with the color of the seed coat. Several reports indicate that beans with dark colors (black, red, brown, etc.) provide the highest contents of phenolic compounds, while those with light-colored seed coats have the lowest contents. Furthermore, selenium (Se) is an essential microelement for humans since it acts as an antioxidant and can help prevent various types of cancer and maintain good immune system functioning. This work aims to determine the effects of selenium on the yield, seed size, and phenolic compound content of common bean varieties with white seed coats. Four (0, 2.5, 5, and 10 µM) concentrations of sodium selenite (Na_2SeO_3) were evaluated during the cultivation of three beans (*Phaseolus vulgaris* L.) varieties with white coats, named OX-7, OX-11, and OX-14. Selenium concentrations were applied along with irrigation every 15 days. The OX-7 variety had the longest seeds, while the OX-11 and OX-14 varieties had the highest and lowest numbers of pods, respectively, and the highest and lowest yields. The highest content of phenolic compounds was obtained in the OX-11 variety, with the application of 5 µM Na_2SeO_3. Moreover, the highest concentration of flavonoids was found in OX-11, with both 5 and 10 µM Na_2SeO_3 treatments, as well as in OX-14 treated with 2.5 µM Na_2SeO_3. These findings indicate that the beneficial effect of selenium depends on the concentration, variety, and stage of plant development.

Secondary Metabolites, Phenolic Compounds, Legumes, Beneficial Element

Genetic improvement of polyester degrading enzymes

Mejoramiento genético de enzimas degradadoras de poliésteres

VÁZQUEZ-ALCÁNTARA, Laura and PEÑA-MONTES, Carolina

Unidad de investigación y Desarrollo de Alimentos,

ID 1st Author: *Laura, Vázquez-Alcántara* / **ORC ID:** 0000-0001-9920-7703, **CVU CONACYT ID:** 714254

ID 1st Coauthor: *Carolina, Peña-Montes* / **ORC ID:** 0000-0002-4767-1210, **CVU CONACYT ID:** 277236

Abstract

Synthetic polymers usage has increased according to modern society to have basic applications such as high technology in generating different plastic materials. Therefore, plastic debris accumulates in the environment while biodegradation occurs very slowly. Therefore, the application of hydrolases in the degradation of polyesters has been limited by the ranges of pH and temperature of the environment where these contaminants are found; for this reason, changes have been made in the sequence of some enzymes, resulting in modifications in the structure and change in its characteristics, using molecular techniques such as site-directed mutagenesis, error-prone PCR and random mutagenesis. Many enzymes with polyester degradation activity have been discovered, characterized and designed. However, the classification and integrated knowledge of these enzymes are of interest. For this reason, this paper summarizes the currently known improvement of polyester-degrading enzymes, focusing on their structural and activity modifications.

Mutagenesis, PCR, Enzyme, Mutation, Polyesters

7 Engineering

Recent advances of graphene-based nanofluids for the application in solar collectors

Avances recientes de los nanofluidos basados en grafeno para su aplicación en colectores solares

ROSALES-GUZMÁN, Miguel, DÍAZ-SILVESTRE, Sergio Enrique, CANALES-PATIÑO, Eduardo Luis and IBARRA-SAMANIEGO, Lucía del Carmen

Universidad Tecnológica de Saltillo

ID 1st Author: *Miguel, Rosales-Guzmán* / **ORC ID:** 0000-0002-0955-2309, **CVU CONACYT ID:** 227119

ID 1st Coauthor: *Sergio Enrique, Díaz-Silvestre* / **ORC ID:** 0000-0002-6765-3415, **CVU CONACYT ID**: 334151

ID 2nd Coauthor: *Eduardo Luis, Canales-Patiño* / **ORC ID:** 0000-0002-4327-2714, **CVU CONACYT ID:** 636576

ID 3rd Coauthor: *Lucía Del Carmen, Ibarra-Samaniego* / **ORC ID:** 0000-0002-6974-4847, **CVU CONACYT ID:** 483788

Abstract

The present work provides a perspective on the recent research on the application of graphene based-nanofluids in different types of solar collectors such as flat plate, evacuated tube, parabolic and linear Fresnel, among many others available. Although significant advances have been reported in this direction regarding the efficiency and short-time stability of the reported dispersions, there remain challenges that need to be addressed before the full potential of these graphene-based nanofluids can be realized. For example, there are not efficient and green routes for the mass production of nanofluids at relatively low cost. In addition, the need for detailed studies on the effect of graphene nanoparticles on the internal surfaces of solar collectors as well as its effect on the pumping systems used is mandatory. Lifetime of the different nanofluids, environmental concerns and recycling of these nanofluids is still a topic to be explored.

Graphene, Efficiency, Solar Collectors

Development of a Low-cost and Low-Power Air Quality and Weather Monitoring System

Desarrollo de sistemas de bajo costo y bajo consumo para mediciones de calidad de aire y meteorología

QUIÑONEZ-RODRIGUEZ, Alvaro Humberto, SOSA-TINOCO, Ian Mateo, RUIZ-IBARRA, Erica Cecilia and ROBLES-MORUA, Agustín

Instituto Tecnológico de Sonora

ID 1st Author: *Alvaro Humberto, Quiñonez-Rodríguez* / **ORC ID:** 0000-0003-0966-4682, **CVU CONACYT ID:** 1073750

ID 1st Coauthor: *Ian Mateo, Sosa-Tinoco* / **ORC ID:** 0000-0001-7579-5985**, CVU CONACYT ID:** 291950

ID 2 nd Coauthor: *Erica Cecilia, Ruiz-Ibarra* / **ORC ID:** 0000-0002-7020-4960, **CVU CONACYT ID:** 86862

ID 3rd Coauthor: *Agustin, Robles-Morua* / **ORC ID:** 0000-0001-8813-8124, **CVU CONACYT ID:** 200202

Abstract

Due to the recent pandemic, air quality monitoring has seen a resurgence of interest, however, commercial equipment for environmental monitoring needs a considerable economic effort. In this project, a prototype of a meteorological and air quality monitoring system is developed and implemented. The validation of the system was conducted by comparing the energy consumption with the Gila station, a version used previously. The system is composed of a sensor node, a gateway, and an application server. Communication between the sensor node and the gateway is through the LoRaWAN low-power protocol and The Things Network (TTN) service is used for IoT integration. The system monitored meteorological and air quality variables using low-cost components and with low energy consumption and prolong its autonomous life thanks to an energy harvesting system.

Monitoring, Lorawan, Economic

Ultrasonic detector for predictive maintenance

Detector ultrasónico para el mantenimiento predictivo

DUARTE-LOERA, Jorge, REYNOSO-JARDÓN, Elva Lilia, DÍAZ-RIVERA, Abelardo and ARÁMBULA-LEDEZMA, David Daniel

Universidad Tecnológica de Chihuahua

ID 1st Author: *Jorge, Duarte-Loera* / **ORC ID:** 0000-0002-6721-1406, **Researcher ID Thomson:** X-9796-2019, **CVU CONACYT ID:** 69449

ID 1st Coauthor: *Elva Lilia, Reynoso-Jardón* / **ORC ID:** 0000-0002-0729-2822, **Researcher ID Thomson:** AFZ-2483-2022, **CVU CONACYT ID:** 264446

ID 2nd Coauthor: *Abelardo, Díaz-Rivera* / **ORC ID:** 0000-0001-7511-2697, **Researcher ID Thomson:** X-9791-2019, **CVU CONACYT ID:** 990710

ID 3rd Coauthor: *David Daniel, Arámbula-Ledezma* / **ORC ID:** 0000-0003-0267-8803, **Researcher ID Thomson:** AGO-9021-2022, **CVU CONACYT ID:** 1063890

Abstract

In the industry it is very common for failures to occur in machinery and equipment such as poorly lubricated elements; friction between mechanical elements; gas or vacuum leaks in pressurized systems; and electric arcs in motors, transformers and electrical installations. Each of these faults emits ultrasound and can be detected early using an ultrasonic detector. The objective of this work is to present a proposal for the development of a system capable of opportunely detecting the ultrasound emitted by faults, which is very useful for predictive maintenance. The methodology consists of the development of a system that detects the ultrasound decibels emitted by the fault using an ultrasonic sensor of the last generation, and the necessary interfaces. Ultrasound decibels will increase exponentially in the presence of these flaws, allowing their detection. This document offers an alternative for the development of an ultrasonic system useful in predictive maintenance, which is within the reach of any company.

Predictive Maintenance, Ultrasonic Sensor, Ultrasonic Detector

Development an Artificial Intelligence to Automate the Buying and Selling of bitcoins

Desarrollo de una Inteligencia Artificial para Automatizar la Compra y Venta de bitcoins

LEDESMA-URIBE, Norma Alejandra, OLVERA-MONROY, Jared Fabian, ATANACIO-MELCHOR, Jesus David and RODRIGUEZ-MIRANDA, Gregorio

Universidad Tecnológica de San Juan del Río

ID 1st Author: *Norma Alejandra, Ledesma-Uribe* / **ORC ID:** 0000-0001-8422-2046, **CVU CONACYT ID:** 673202

ID 1st Coauthor: *Jesus David Atanacio-Melchor* / **ORC ID:** 0000-0001-6519-9346, **Researcher ID Thomson:** AGY-2511-2022, **CVU CONACYT ID:** 1198872

ID 2nd Coauthor: *Jared Fabian, Olvera-Monroy* / **ORC ID:** 0000-0003-4777-6642, **Researcher ID Thomson:** AGY-2510-2022, **CVU CONACYT ID:** 1198873

ID 3rd Coauthor: *Gregorio, Rodriguez-Miranda* / **ORC ID:** 0000-0002-2512-892X, **CVU CONACYT ID:** 246718

Abstract

Trading consists of purchasing and selling listed assets with high market liquidity such as: stocks, currencies and futures. then this financial market is used electronically and it is regulated (the trading and generation price is freely agreed through a negotiation process between the consumer and the trader.). One of its objective is to obtain an economic benefit when the operation generates a capital income , repeating the process for a considerable number of operations, therefore it makes it possible to increase the initial capital. This article will approach the implementation of an algorithmic trading model which can help to maximize the profitability of a portfolio for cryptocurrency assets based on the application, combination and weighting of some of the most advanced mathematical techniques using the Python programming language, its libraries and some other tools in a controlled development environment and also guided by a previous research and training based on the topics planned for the completion and satisfaction of the project.

Trading, Exchange, Cryptocurrency, Bot, Genetic Algorithms

Web Business Management System

Sistema de gestión empresarial en la web

GONZÁLEZ-RAMÍREZ, Claudia Teresa, PATIÑO-BUCIO, Alfha Michel, RUIZ-GARDUÑO, Jhacer Kharen and DELGADO PICHARDO, Mauricio

Tecnológico Nacional de México campus Zitácuaro

ID 1st Author: *Claudia Teresa, González-Ramírez* / **ORC ID**: 0000-0002-4106-4583, **Researcher ID Thomson**: G-6313-2019

ID 1st Coauthor: *Alfha Michel, Patiño-Bucio* / **ORC ID**: 0000-0003-4735-8555

ID 2nd Coauthor: *Jhacer Kharen, Ruiz-Garduño* / **ORC ID**: 0000-0003-3353-7966

ID 3rd Coauthor: *Mauricio, Delgado-Pichardo* / **ORC ID**: 0000-0003-1129-2128

Abstract

The developed project addresses the existing functional impact of automation and streamlining organizational management systems, through the most ad hoc technological tools for the generation of web systems in an integral way. Organizational Management System on the Web, part of having control of the activities and documents, identified mainly from within the organization's problems, as is the case of Biocenosis A.C. Monarca region, with the purpose of keeping the proper record of the activities to be carried out within the company, in addition to being able to have a space in which they can store and download all the necessary documents to complete said activities, the web system is developed, strengthening with an activity manager application optimizing towards an organization and management of the registration of the different participation activities, calls, monitoring of plans according to the activities of the organization a priori. The web system and application are obtained with technological tools, such as SCRUM, Android

Web System, Comprehensive, Technological Tools

Assessment of an Organic Rankine Cycle and a Kalina Cycle for a Single Source of Low-Enthalpy Geothermal Heat

Evaluación de un Ciclo Rankine Orgánico y un Ciclo Kalina para una misma fuente de calor geotérmica de baja entalpía

VERA-ROMERO, Iván, MARTÍNEZ-REYES, José and MÉNDEZ-ÁBREGO, V. Manuel.

Universidad de la Ciénega del Estado de Michoacán de Ocampo

ID 1st Author: *Iván, Vera-Romero* / **ORC ID:** 0000-0003-1771-6630, **CVU CONACYT ID:** 102272

ID 1st Coauthor: *José, Martínez-Reyes* / **ORC ID:** 0000-0001-6601-1851**, CVU CONACYT ID:** 232124

ID 2nd Coauthor: *V. Manuel, Méndez-Ábrego* / **ORC ID:** 0000-0003-3409-8619, **CVU CONACYT ID:** 596022

Abstract

This article shows the simulation results of an organic Rankine cycle (ORC) operating with the R134a working fluid and a Kalina Cycle operating with the ammonia-water mixture in order to compare the results and detect the better performing cycle. The working conditions were attained through a field visit to the town of Los Negritos, Michoacán, where it was determined that it is a superficial low-enthalpy source. To conduct the simulations, the Software Engineering Equation Solver (EES^{TM}) was employed. In the ORC, a net electric power output of 10.97 kWe was obtained with 4.58% cycle efficiency, while with the Kalina cycle, a net power output of 5.53 kWe was obtained along with an overall efficiency of 6.61%.

Energy Evaluation, Geothermal Energy, Thermodynamic Cycles

Development of sanitizing system

Desarrollo de un sistema higienizador

PÉREZ-GALINDO, Liliana Eloisa, SANDOVAL-LUNA, Miguel Ángel, CRUZ-BARRÓN, Alonso and PÉREZ-PASCUAL, Agustín

Universidad Tecnológica Fidel Velázquez.

ID 1 st Author: *Liliana Eloisa, Pérez-Galindo* / **ORC ID:** 0000-0001-6016-2595

ID 1 st Coauthor: *Miguel Ángel, Sandoval-Luna* / **ORC ID:** 0000-0003-2478-9686

ID 2 nd Coauthor: *Alonso, Cruz-Barrón* / **ORC ID:** 0000-0002-3695-1620

ID 3 rd Coauthor: *Agustín, Pérez-Pascual* / **ORC ID:** 0000-0003-2879-8280

Abstract

In accordance with the health emergency suffered at the international level, as a result of the pandemic generated by COVID-19, this research consists of the development of the design of a prototype of a technical full-body disinfection chamber to prevent the spread of COVID-19. 19, Through a research methodology carried out in the best way where it includes the implementation of a descriptive method based on the study and analysis of the existing bibliography, which is characterized by the collection of national and international background information, with the in order to generate a solid database as a guide, mainly focused on the explanation of the operating mechanisms and design methods of disinfection cabinets. At the same time, fulfilling the execution of a series of specific activities, which result in the first place the parameterization of all the elements, both mechanical and electromechanical, necessary for the chamber to be designed, as a second a modeling in Software Solidworks of the chamber of disinfection where it has the design of the electrical circuit of the chamber, design of the hydraulic system, the structure and the electromechanical accessories that the chamber must have.

Development, System, Saniting

Design and characterization of a prototype anaerobic reactor for domestic wastewater treatment using fixed biomass

Diseño y caracterizacion de un reactor anaerobio prototipo para tratamiento de aguas residuales domésticas utilizando biomasa fija

RODRIGUEZ-MORALES, José Alberto, RAMOS-LOPEZ, Miguel Angel, CAMPOS-GUILLEN, Juan and LEDESMA-GARCIA, Janet

ID 1st Author: *José Alberto, Rodriguez-Morales* / **ORC ID:** 0000-0002-4532-9665, **CVU CONACYT ID:** 200320

ID 1st Coauthor: *Miguel Angel, Ramos-Lopez* / **ORC ID:** 0000-0002-7105-5039, **CVU CONACYT ID:** 86826

ID 2nd Coauthor: *Juan, Campos-Guillen* / **ORC ID:** 0000-0001-7117-6781, **CVU CONACYT ID:** 8493

ID 3rd Coauthor: *Janet, Ledesma-Garcia* / **ORC ID:** 0000-0002-0677-4280, **CVU CONACYT ID:** 104183

Abstract

In developing countries, the RAFA (Anaerobic Upflow Reactor) reactor stands out as a viable alternative in wastewater treatment. In addition, biofilters are used in the biological reactors that have the objective of biofilm formation, by means of which effluents of better quality are obtained. An anaerobic reactor of 140 Liters was evaluated for the treatment of domestic wastewater. Granular activated carbon and cellulose fiber filters were placed outside. After the stabilization of the reactor (3-6 months), different volumes corresponding to 3, 5 and 7 liters / day of residual water were evaluated, with hydraulic retention times (HRT) of 47, 28 and 20 days, respectively. Percentages of reduction of BOD5, COD, SST and fecal coliforms were obtained for the 3 effluents. It was obtained for 3 liters / day: 90%, 66%, 90% and 99.9%. For 5 liters / day: 93%, 71%, 90% and 99.9%. For 7 liters / day: 80%, 65%, 91% and 99.9%. With these results and comparing them with the NOM-003-Ecol-1997. It is concluded that the treated wastewater can be reused to be reused in public services.

Wastewater, Hydraulic Retention Time, Biofilm, Biological Reactor

Methodology for the Development of Augmented Reality Applications for the elimination of errors in the Interpretation of Manufacturing Drawings

Metodología para el Desarrollo de Aplicaciones de Realidad Aumentada para la eliminación de errores en la Interpretación de Planos de Manufactura

MERAZ-MENDEZ, Manuel, REYNOSO-JARDON, Elva Lilia and CORRAL-RAMIREZ, Guadalupe

Universidad Tecnológica de Chihuahua

ID 1st Autor: *Manuel, Meraz-Méndez*/ **ORC ID:** 0000-0001-8254-957, **Researcher ID Thomson**: S-4565-2018, **CVU CONACYT:** 250582

ID 1st Coauthor: *Elva Lilia, Reynoso-Jardon* / **ORC ID:** 0000-0002-0729-2822, **Researcher ID Thomson:** AFZ-2483-2022, **CVU CONACYT:** 264446

ID 2nd Coauthor: *Guadalupe, Corral-Ramírez* / **ORC ID:** 0000-0003-4874-4036 **CVU CONACYT:** 520946

Abstract

In recent years, the precision machining process has been widely used in manufacturing products focused mainly on aerospace, automotive, mold manufacturing, and various products that demand high production volumes, precision, and surface quality. However, these manufacturing processes are not exempt from Interoperability errors and failures during the machining process. Recent studies found that the main errors are interpreting information from manufacturing drawings (MD) and in the machining's Work Coordinate Setup (WCS). This research project aims to implement an Augmented Reality (AR) application tool to reduce errors in Computer Numerical Control (CNC) machining processes. The main goal is to help operators work more efficiently through a technological application that can be installed on a smartphone or tablet as an alternative low-cost solution.

Interoperability, Augmented, Processes, Interpreting, Implement, Technological, Manufacturing, Production, Coordinate, Numerical, Operators, Alternative, Tablet, Application

Design and Construction of a rectangular section channel-prototype, to determine the specific energy in the three types of regimens: critical, subcritical and supercritical

Diseño y Construcción de un canal-prototipo de sección rectangular, para determinar la energía especifica en los tres tipos de regímenes: crítico, subcrítico y supercrítico

CARO-BECERRA, Juan Luis, LUJÁN-GODÍNEZ, Ramiro, VIZCAÍNO-RODRÍGUEZ, Luz Adriana and REYES-BARRAGÁN, José Luis

Universidad Politécnica de la Zona Metropolitana de Guadalajara, México.

ID 1st Author: *Juan Luis, Caro-Becerra* / **ORC ID:** 0000-0002-3884-2178, **Researcher ID Thomson:** K-2859-2018, **arXiv Author ID:** juanluis74.

ID 1st Coauthor: *Ramiro, Luján-Godinez* / **ORC ID:** 0000-0003-4138-7590, **arXiv Author ID**: ramiro5302, **CVU CONACYT ID:** 503875

ID 2nd Coauthor: *Luz Adriana, Vizcaíno-Rodríguez* / **ORC ID:** 0000-0001-8301-6160, **Researcher ID Thomson:** T-1324-2018, **CVU CONACYT ID:** 175164

ID 3rd Coauthor: *José Luis, Reyes-Barragán* / **ORC ID:** 0000-0003-2431-3784, **arXiv Author ID**: jlbecario, **CVU CONACYT ID:** 85698

Abstract

The problem of water scarcity is not a transient issue, but to solve it has been a long lasting endeavor for humanity. Many human societies have tried diverse solutions to solve this problem and one of them was to efficiently move water for the subsistence of all people. For this purpose, civil and agricultural engineers seek to find novel ways to conduct water as close as possible to where it is needed, e.g., cultivated fields and water supply reservoirs, or to build up infrastructure to greatly reduce the immense problem of floods generated by high intensity rains. The main goal of this paper is to determine the water specific energies occurring in critical, subcritical and supercritical flow regimes, by means of a prototype rectangular section channel operation. Application of Bernoulli´s equation for uniform flow conditions is the adopted methodology. As final conclusions we can state that development of new channel prototypes facilitates the experimentation of fluids, allowing to a great extent the stabilization of flow, thus, optimizing the measurement of different types of key water variables.

Conduction, Flooding, Specific Energy

Transfer Learning for Handgun Detection

Transferencia de aprendizaje para la detección de armas de fuego

MARTÍNEZ-DÍAZ, Saúl

División de estudios de Posgrado e Investigación

ID 1st Author: *Saúl, Martínez-Díaz* / **ORC ID:** 0000-0003-4962-5995, **Researcher ID Thomson**: Q-7112-2019, **CVU CONACYT ID**: 175255

Abstract

Insecurity is a growing up problem affecting many cities around the world. Among others, firearm assault is one of the most common crimes committed. Although in some places have been installed video surveillance cameras, human intervention is still required to analyze the captured scenes. To prevent crime, a system that automatically detects dangerous situations is required. However, several problems arise when detecting objects from low-cost video surveillance systems. Some of these problems are poor quality of images, non-homogeneous illumination, background noise, occluded and rotated objects. In this paper, we propose a method to detect handguns by adapting a previously trained Convolutional Neural Network (transfer learning). The system was tested with images obtained from three video sequence captured with a low-cost webcam, under not controlled conditions. The detection errors were 8.3%, 15.7 and 11.7%, respectively. These results are comparable with other state of the art methods tested with higher quality images.

Transfer Learning, Crime Prevention, Convolutional Neural Network

CAD-CAE-CAM technology in the manufacture of a 3-jaw independent chuck prototype in acrylic

Tecnología CAD-CAE-CAM en Manufactura de prototipo de mandril de 3 mordazas independientes en acrílico

RIVAS-RODRIGUEZ, Amando, BECERRA-CASTRO, Juan Miguel, TRISTÁN-CALLEJA, Abel Israel and VAZQUEZ-SÁNCHEZ, Esteban

Tecnológico de Estudios Superiores de Cuautitlán Izcalli

ID 1 st Author: *Amando, Rivas-Rodriguez* / **ORC ID:** 0000-0002-8543-0426, **CVU CONACYT ID:** 336139

ID 1 st Coauthor: *Juan Miguel, Becerra-Castro* / **ORC ID:** 0000-0003-0919-3120, **CVU CONACYT ID:** 495445

ID 2 nd Coauthor: *Abel Israel, Tristán-Calleja* / **ORC ID:** 0000-0003-0919-3120, **CVU CONACYT ID:** 625685

ID 3 rd Coauthor: *Esteban, Vazquez-Sánchez* / **ORC ID:** 0000-0002-9636-1948, **CVU CONACYT ID:** 1129328

Abstract

The use and application of CAD, CAE, CAM systems are increasingly necessary in the industry, (Arriaga Segundo, 1999). To meet the needs of the accelerated industrial transformation that is taking place in industrially developed and developing countries, it is essential that those involved in the Mexican metalworking industry. In the technological area, there is a machining center for 4 axes, of which only 3 are used, due to not having a chuck for the 4th axis, which is necessary to manufacture more complex parts, and to prepare future engineers in the use of this technology. For this reason, an acrylic mandrel prototype was designed and manufactured using CAD, CAM and CAE technology. To demonstrate its application and usefulness in the manufacture of complex parts. First, the components that make it up were designed in CAD software: clamps, "worm" screw and casing, to later carry out the finite analysis in CAE software, computer-aided engineering, ending with the simulation and manufacturing in CAM software. This will validate and demonstrate the feasibility of manufacturing the mandrel in steel, with existing resources and with a design that best suits the requirements.

Design, Manufacturing, Innovation

Solar drying study of mango (*Mangifera indica*) and determination of glucose content in dehydrated samples

Estudio del secado solar de mango (*Mangifera indica*) y determinación del contenido de glucosa en muestras deshidratadas

CASTILLO-TÉLLEZ, Margarita, CASTILLO-TÉLLEZ, Beatriz, HERNÁNDEZ-CRUZ, Luz María and MEJÍA-PÉREZ, Gerardo Alberto

Facultad de Ingeniería, Universidad Autónoma de Campeche

ID 1st Author: *Margarita, Castillo-Téllez* / **ORC ID:** 0000-0001-9639-1736, **Researcher ID Thomson:** S-2283-2018, **CVU CONACYT ID:** 210428

ID 1st Coauthor: *Beatriz, Castillo-Téllez* / **ORC ID:** 0000-0003-3747-6320, **Researcher ID Thomson:** S-2264-2018, **CVU CONACYT ID:** 210564

ID 2nd Coauthor: *Luz María, Hernández-Cruz* / **ORC ID:** 0000-0002-0469-5298, **Researcher ID Thomson:** H-3153-2018, **CVU CONACYT ID:** 662220

ID 3rd Coauthor: *Gerardo Alberto, Mejía-Pérez* / **ORC ID:** 0000-0003-1701-1171

Abstract

Today, the food industry processes are increasing both the costs and the consumption of energy through fossil fuels. The dehydration process to preserve food is increasingly used worldwide to safeguard both its organoleptic and nutritional properties, so it is essential to use renewable energies to replace conventional technologies. Mexico is a great producer and exporter of different mango varieties, with excellent culinary quality and nutritional properties. In the present work, direct cabinet-type solar dryers were used, and drying times between 420 and 540 min were obtained in fresh samples with 74.5% and 7.5% of initial and final humidity, respectively. Compared to its new mango content, glucose decreased in the dry samples.

Glucose, Moisture Content, Drying Rate

Design and evaluation of a Distributed Generation system based on renewable energies applied to a rural area of the state of Veracruz

Diseño y evaluación de un sistema de Generación Distribuida basado en energías renovables aplicado a una zona rural del estado de Veracruz

GRANADOS-PALMA, Ivan, GÓMEZ-GONZÁLEZ, Francisco Javier, DOMÍNGUEZ-SÁNCHEZ, Genoveva and SOSA-VILLALOBOS, Cinthya Alejandra

Instituto Tecnológico de Veracruz

ID 1st Author: *Ivan, Granados-Palma* / **ORC ID:** 0000-0002-112-8478, **CVU CONACYT ID:** 10008168

ID 1st Coauthor: *Francisco Javier, Gómez-González* / **ORC ID:** 0000-0001-7798-9601, **CVU CONACYT ID:** 831120

ID 2nd Coauthor: *Genoveva, Domínguez-Sánchez* / **ORC ID:** 0000-0002-9286-1435, **CVU CONACYT ID:** 38534

ID 3rd Coauthor: *Cinthya Alejandra, Sosa-Villalobos* / **ORC ID:** 0000-0002-2855-9311, **CVU CONACYT ID:** 234482

Abstract

This article aims to show the dimensioning and evaluation of a Distributed Generation system based on renewable energies for its application in a rural area in the state of Veracruz, Mexico. The main motivation of this work arises from the shortage of energy or a deficient supply in numerous localities located in the state of Veracruz, derived from different reasons. A methodology based on the application of HOMER Pro software is proposed for the sizing and optimization of a renewable hybrid system, considering it as an isolated set from the supply network, achieving the optimization and evaluation from technical and economic aspects. Initially, the meteorological data of the site were obtained, from its geographical coordinates; subsequently, the demand profile of one of the households in the community is determined to extrapolate it to the total number of dwellings. The results obtained in this research can serve as a basis for its implementation and, therefore, improve the conditions in which the population of rural communities or isolated from supply networks usually live.

Distributed generation, Optimization, Rural electrification

Contingency Access Control COVID-19

Control de Acceso por Contingencia COVID-19

RODRÍGUEZ-MIRANDA, Gregorio, VALENCIA-GARCÍA, Alejandro Cesar, SANTOS-OSORIO, Rene and JUÁREZ-SANTIAGO, Brenda

Universidad Tecnológica de San Juan del Río

ID 1st Author: *Gregorio, Rodríguez-Miranda* / **ORC ID:** 0000-0002-2512-892X, **Publons ID:** S-5808-2018, **CVU CONACYT ID:** 246718

ID 1st Coauthor: *Alejandro Cesar, Valencia-García* / **ORC ID:** 0000-0002-6671-7915, **CVU CONACYT ID:** 671805

ID 2nd Coauthor: *Rene, Santos-Osorio* / **ORC ID** 0000-0002-4411-7628, **Thomson** G-3453-2019, **CVU** 619722

ID 3rd Coauthor: *Brenda, Juárez-Santiago* / **ORC ID:** 0000-0001-9071-9243, **CVU CONACYT ID:** 511613

Abstract

The main goal of this work is to show results obtained from a software called "Access Control by Contingency COVID-19" which allows the institution control the access to facilities after returning from COVID pandemic in order to avoid crowds of people, this software will help avoid COVID-19 infections .The methodology used for this project was Scrum ,since the development of the project required mainly a constant testing and delivery follow-up, prioritizing activities and adapting changes for greater flexibility to modifications to achieve the main objective in a established time. Currently web applications are being used as a resource in order to put together different projects, in this case health control and University access, applying a survey to generate a QR code with which people will be able to enter the university facilities, this code is read by a mobile application that sends data via wifi to a desktop application that is in charge for validating and recording student`s data, employees and external personnel accessing the institution facilities.

Contingency, Pandemic, Contagions

Development of the Lobo Connect mobile application

Desarrollo de la aplicación móvil Lobo Connect

VALENCIA-GARCIA, Alejandro Cesar, LEDESMA-URIBE, Norma Alejandra, CORTES-GARCIA, Alicia and JUÁREZ-SANTIAGO, Brenda

Universidad Tecnológica de San Juan del Río

ID 1st Autor: *Alejandro Cesar, Valencia-Garcia* / **ORC ID:** 0000-0002-6671-7915, **CVU CONACYT ID:** 671805

ID 1st Coauthor: *Norma Alejandra, Ledesma-Uribe* / **ORC ID:** 0000-0001-8422-2046, **CVU CONACYT ID:** 673202

ID 2nd Coauthor: *Alicia, Cortes-Garcia* / **ORC ID:** 0000-0003-1044-9787, **CVU CONACYT ID:** 671816

ID 3rd Coauthor: *Brenda, Juárez-Santiago* / **ORC ID:** 0000-0001-9071-9243, **CVU CONACYT ID:** 511613

Abstract

Cross-platform mobile applications have become essential to society. Most people have a mobile device, and the apps help users stay connected, informed, and even entertained. In the context of an educational institution, and considering the characteristics of the so-called Generation Z or Centennials, who are naturally linked to the virtual world and consider it part of their community, it is essential to have communication tools according to their needs and motivations. The objective is to develop a mobile application that helps the student community of the Technological University of San Juan del Río to stay informed and can access in real time to news of important events and know their status of the evaluations in the subjects they take.

As A Result, The Application Called "Lobo Connect" Was Obtained

Reduction of unproductive times in auto parts company by applying the time and motion methodology

Reducción de tiempos improductivos en una empresa de autopartes aplicando la metodología de tiempos y movimientos

BAHENA-MEDINA, Lilia Araceli, GÓMEZ-VICARIO, Miguel Ángel, PÉREZ-ESPAÑA, Nohema and ACOSTA-FLORES, Norma Karina

Universidad Politécnica del Estado de Morelos

ID 1st Author: *Lilia Araceli, Bahena-Medina* / **ORC ID**: 0000-0003-0828-2172, **CVU CONACYT ID**: 238166, **Open ID**: 42760959200

ID 1st Coauthor: *Miguel Ángel, Gómez-Vicario* / **ORC ID**: 0000-0002-4979-5524, **CVU CONACYT ID**: 171593

ID 2nd Coauthor: *Nohema, Pérez-España* / **ORC ID:** 0000-0002-7678-2868, **CVU CONACYT ID**: 309018

ID 3rd Coauthor: *Norma Karina, Acosta Flores* / **ORC ID**: 0000-0002-9129-9946

Abstract

A study of times and movements was developed to reduce unproductive travel times in an assembly line of an auto parts company. The tools used for the study were three: time analysis by elements (ten samples were filmed for each method and the videos were analyzed breaking down the cycle into elements); flow process diagram, to identify each of the activities and the spaghetti diagram that shows the actual flow with measures and trajectories. A proposal for the redistribution of materials was created taking into account the principle of the minimum distance traveled, the collaborators were trained on the modifications in both methods (one piece at a time and several pieces at a time); subsequently, a pilot test was run to verify the feasibility of the proposal. Both the distance and the time were reduced between 20 to 30% for the two methods analyzed.

Time and motion study, Cycle time, Spaghetti diagram

Livestock Biomass: Energy Source for 26 Municipalities in Hidalgo State Experiencing High Marginalization

Biomasa ganadera: fuente de energía para los 26 municipios de Alta Marginación del estado de Hidalgo

GONZÁLEZ-ROSAS, Angelina, ORTEGA-MARIN, Blanca Andrea, GONZÁLEZ-ISLAS, Juan Carlos and GODÍNEZ-GARRIDO Gildardo

Universidad Tecnológica de Tulancingo

ID 1st Author: *Angelina, González Rosas* / **ORC ID:** 0000-0002-5631-0281, **Researcher ID Thomson:** H-2130-2018, **CVU CONACYT ID:** 343166

ID 1st Coauthor: *Blanca Andrea, Ortega-Marin* / **ORC ID:** 0000-0002-6821-8239, **CVU CONACYT ID:** 58799

ID 2nd Coauthor: *Juan Carlos, González-Islas* / **ORC ID:** 0000-0002-2190-0660, **Researcher ID Thomson:** I-3392-2018, **CVU CONACYT ID:** 232145

ID 3rd Coauthor: *Gildardo, Godínez-Garrido* / **ORC ID:** 0000-0002-5462-4818, **Researcher ID Thomson:** I-4987-2018, **CVU CONACYT ID:** 552521

Abstract

The high consumption of natural non-renewable resources has caused an exponential increase in the greenhouse gases which provoke global warming and as a result, every country on the planet suffers environmental issues due to the excessive use of fossil fuels. There are several different sources of gas production, principally caused by human beings, however there is little to no interest in mitigating them. Global interest is instead currently focused on containing them via the reduction of carbon dioxide (CO2) and methane (CH4). In the Paris Agreement, participating countries have committed to keeping the rise of the mean global temperature below 2 °C and to limiting its increase to 1.5 °C. Latin America as a whole (and principally, Mexico) has committed to lowering greenhouse gases 25% by 2030 and 50% by 2050 (AZEL, 2018). To achieve this, it is necessary to contribute by applying clean energy alternatives. The current project proposes using bovine and swine organic wastes for the production of biogas and electric energy in 26 cities of high marginalization in Hidalgo, a state in Mexico which contributes to lowering environmental pollution, providing access to better services for raising the quality of life of its inhabitants, and minimizing the use of (therefore saving the money provided for) subsidies for conventional electric energy.

Biofuels, Biogas, High Marginalization

Design and construction of a material fastening system for automotive finishing supplies

Diseño y construcción de un sistema de sujeción de material para el acabado automotriz

FLORES-RAMÍREZ, Néstor, MARTÍNEZ-CARRILLO, Irma, JUÁREZ-TOLEDO, Carlos and HUITRÓN-CONTRERAS, Amador

Universidad Autónoma del Estado de México

ID 1st Author: *Néstor, Flores-Ramirez* / **ORC ID**: 0000-0002-7662-2637

ID 1st Coauthor: *Irma, Martínez-Carrillo* / **ORC ID**: 0000-0002-7952-4418, **Researcher ID Thomson**: B-9264-2016, **CVU CONACYT ID**: 39914

ID 2nd Coauthor: *Carlos, Juárez-Toledo* / **ORC ID**: 0000-0002-7440-3246, **Researcher ID Thomson**: C-1368-2016, **CVU CONACYT ID**: 39912

ID 3rd Coauthor: *Amador, Huitrón-Contreras* / **ORC ID**: 0000-0001-6608-8453

Abstract

The opening of opportunities in the automotive sector, the global market currently forces companies to be more competitive in their daily activities, this requires them to adopt new strategies, tools and techniques, in order to optimization processes, reduce waste, decrease costs, etc. Automation and the use of smart devices in the industrial sector has evolved impressively, due to improving and increasing production, it also allows to produce better quality products without requiring the control of human intervention to be operated. However, today the use of increasingly sophisticated devices not only allows companies to be more competitive, but also contributes to improving their processes by reducing operating times per workstation. It should be noted that through the implementation of automated devices, not only are production processes improved, in the same time it allows workers to carry out their work activities more easily and comfortably, the objective is avoiding errors or line stops. The present project aims to design and propose a system to provide fastening elements and to saving raw materials, reducing downtime and improving workstation ergonomics for workers in an automotive industry, with the aim of improving production processes, but it could be applied in other industrial sector.

Fastening System, Finishing Supplies Automotive, Saving Raw Materials, Optimization Of Processes

Strategies for passive air conditioning and energy saving of a house considering the bioclimate of the place

Estrategias para la climatización pasiva y ahorro de energía de una vivienda considerando el bioclima del lugar

HERNÁNDEZ-GÓMEZ, Víctor Hugo, MORILLÓN-GÁLVEZ, David, OLVERA-GARCÍA, Omar and GUZMAN-TINAJERO, Pedro

Universidad Nacional Autónoma de México, FES Cuautitlán

ID 1st Author: *Víctor Hugo, Hernández-Gómez* / **ORC ID:** 0000-0001-9315-5869, **Researcher ID Thomson:** S-6575-2018, **CVU CONACYT ID:** 122247

ID 1st Coauthor: *David, Morillón-Gálvez* / **ORC ID:** 0000-0002-9178-3092, **Researcher ID Thomson:** S-6702-2018, **CVU CONACYT ID:** 253013

ID 2nd Coauthor: *Omar, Olvera-García* / **ORC ID:** 0000-0001-6386-9772, **Researcher ID Thomson**: S-6644-2018, **CVU CONACYT ID:** 706478

ID 3rd Coauthor: *Pedro, Guzman-Tinajero* / **ORC ID:** 0000-0002-2297-7758, **CVU CONACYT ID:** 251228

Abstract

The document presents different air conditioning and energy saving strategies for a building located in the Presa la Concepción subdivision of Santiago Cuautlalpan, municipality of Tepotzotlán, State of Mexico. To do this, it was necessary to consider the location of the house, the bioclimate of the place and the characteristics of the building envelope, later the temperature and hourly humidity tables of the place were determined and the thermal comfort zone was established. Afterwards, the psychrometric process involved, the thermal balance or resulting sensible heat (sensible heat gains by occupants, equipment, solar radiation and environment) and the air flow required by the equipment were determined. With the results of the thermal balance, some strategies were proposed, first considering thermal insulation and coatings, where the energy savings that could be had when implementing these strategies were included. Second, with passive air conditioning strategies considering passive systems, wind and sun.

Thermal Balance, Passive Air Conditioning, Energy Saving

Reduction of fluorides present in drinking water in the municipality of Calera de Víctor Rosales, Zacatecas using chitosan gel pearls

Disminución de fluoruros presentes en agua potable del municipio de Calera de Víctor Rosales, Zacatecas usando perlas de gel de quitosano

GONZÁLEZ-MARTÍNEZ, Enrique Iván, GARCÍA-GONZÁLEZ, Juan Manuel, CONEJO-FLORES, Ricardo and GUZMÁN-PANTOJA, Javier

Universidad Autónoma de Zacatecas

ID 1st Author: *Enrique Iván, González-Martínez* / **ORC ID:** 0000-0001-9885-6496

ID 1st Coauthor: *Juan Manuel, García-González* / **ORC ID:** 0000-0001-7259-5021

ID 2nd Coauthor: *Ricardo, Conejo-Flores* / **ORC ID:** 0000-0002-8513-1821

ID 3rd Coauthor: *Javier, Guzmán-Pantoja* / **ORC ID:** 0000-0003-2103-3488

Abstract

The quality of water distributed to the population in Zacatecas shows a deficit due to contaminants such as fluorinated compounds that exceed the limits allowed in the volumes of water used as a source of public supply. The objective of this work is to reduce the concentration of fluorides present in the drinking water of the municipality of Calera de Víctor Rosales, Zac.; by using PVA cross-linked chitosan gel beads. An initial sample from a public supply was characterized, showing a fluoride concentration of 5.3 ppm, a value higher than the limit set in NOM-127-SSA1-1994. Batch experimentation was carried out at different degrees of sample dissolution with stirring conditions temperature of 450 rpm and 18.5 ^{o}C, respectively, in volumes of 150 ml and 0.3 g of chitosan gel beads. The adjustment of the experimental data to the various models of isotherms and adsorption kinetics was carried out, of these, the Freundlich isotherm and the pseudo-second order kinetic model are the models with the highest correlation to the experimental data; In addition, an average fluoride decrease of 80.08% is achieved in the samples with the established conditions.

Fluorides, Adsorption, Chitosan

Control based on GLRT algorithm for Unmanned Aerial Vehicle

Control basado en algoritmo GLRT para vehículos aéreos no tripulados

ZAVALA-CONTRERAS, Francisco Javier, Alazki-Hussain, CORTES-VEGA, David and GOLIKOV, Victor

Universidad Autónoma del Carmen Facultad de ingeniería

ID 1st Author: *Francisco Javier, Zavala-Contreras* / **ORC ID:** 0000-0003-2955-4827, **CVU CONACYT ID:** 1085721

ID 1st Coauthor: *Hussain-Alazki* / **ORC ID:** 0000-0002-1960-3624

ID 2nd Coauthor: David, Cortés-Vega / **ORC ID:** 0000-0002-6209-2081

ID 3rd Coauthor: *Victor, Golikov* / **ORC ID:** 0000-0001-7909-9215

Abstract

This paper proposes the study of a vision-based control scheme for an Unmanned Aerial Vehicle (UAV) for tracking objects floating on the sea surface. The applied vision scheme is based on the generalized likelihood ratio test (GLRT) algorithm. Once the target is detected, its coordinates are computed and used by the UAV control to track the target. The quadrotor mathematical model is developed using the Newton-Euler approach and a PID controller is implemented to track the vector containing the coordinates obtained through the vision scheme. To verify the effectiveness of the proposal, simulation tests are developed in MATLAB/Simulink based on a real video of an objective floating in the sea surface. The obtained results show an appropriate detection and tracking of the objective.

Unmanned Aerial Vehicle, Tracking Control, GLRT

Spur gear manufacturing using conventional machine tools

Manufactura de engrane recto utilizando maquinas herramientas convencionales

DELGADO-HERNANDEZ, Alberto, GONZALEZ-VIZCARRA, Benjamín, SIQUEIROS-HERNANDEZ, Miriam and AVILA-PUC, Miguel Ángel.

Universidad Autónoma de Baja California

ID 1st Author: *Alberto, Delgado-Hernandez* / **ORC ID:** 0000-0003-2132-9377, **CVU CONACYT ID:** 989649

ID 1st Coauthor: *Benjamín, González-Vizcarra* / **ORC ID:** 0000-0003-2143-8725, **CVU CONACYT ID:** 101772

ID 2nd Coauthor: *Miriam, Siqueiros-Hernandez* / **ORC ID:** 0000-0001-5694-8923**, CVU CONACYT ID:** 404951

ID 3rd Coauthor: *Miguel Angel, Ávila-Puc* / **ORC ID:** 0000-0003-0324-7888, **CVU CONACYT ID:** 990219

Abstract

The objective of this writing is to develop a methodology for the manufacture of a spur gear prototype using conventional machine tools. The purpose of this article is to help scientists and engineering students who need a guide to manufacture this type of elements that are part of a mechanical system for the transmission of movement and force. This study intends a comprehensive analysis of each step used for the manufacture of a spur gear, which allows in an objective way to determine the cutting tools and equipment necessary to carry out its manufacture, starting from the design of the element in question and applying the technical formulas necessary to adjust the parameters in the machining of the part. The methodological approach for this study has been determined based on the practical skills and experience that are paramount in the use of conventional machines. As a contribution we can say that with this methodology it will be possible to eliminate many previous problems in terms of planning and the lack of experience in handling conventional tools.

Spur gear, Manufacturing, Conventional machines

Evaluation of the uv index in the campus uaz siglo xxi for the year 2019

Evaluación del índice uv en el campus uaz siglo xxi para el año 2019

FRÍAS-HERNÁNDEZ, Juan Daniel, GONZÁLEZ-CABRERA, Adriana Elizabeth, VILLEGAS-MARTÍNEZ, Rodrigo Cervando and GARCÍA-GONZÁLEZ, Juan Manuel

Universidad Autónoma de Zacatecas. Unidad Académica de Ciencias Químicas

ID 1st Author: *Juan Daniel, Frías-Hernández* / **ORC ID:** 0000-0002-8828-3660

ID 1st Coauthor: *Adriana Elizabeth, González-Cabrera* / **ORC ID:** 0000-0003-2802-6811

ID 2nd Coauthor: *Rodrigo Cervando, Villegas-Martínez* / **ORC ID**: 0000-0003-0474-6734

ID 3rd Coauthor: *Juan Manuel, García-González* / **ORC ID:** 0000-0001-7259-5021

Abstract

The objective of this research is to quantify the UV Index in the city of Zacatecas. The UV Index is a measure of the intensity of UV radiation at the earth's surface and is an indicator of its ability to cause skin damage. UVB radiation is the main cause of skin cancer. The Methodology consisted of collecting ultraviolet radiation data (UVB) in the period from January 1 to December 31, 2019, using a Solar Ligth 501-A Biometer, installed in the Zacatecas_04 solarimetric station belonging to the National Solarimetry System, located in Building E6 of the UAZ Siglo XXI Campus. Subsequently, the data was transformed to the UV Index (2.332 by the Biometer reading in Med/hr to W/m² at IUV). The results that were obtained in the period of time evaluated show that most of the year the radiation received is high and very high according to the sun protection system recommended by the O.M.S. UVB exposure begins with greater intensity at 10:00 am until 4:00 pm. Concluding, that in the city of Zacatecas most of the year there is a high UV Index.

Ultraviolet Radiation, Biometer, UV Index

Current perspective on quantum programming: A systematic mapping study

Perspectiva actual de la programación cuántica: Un estudio de mapeo sistemático

HERNÁNDEZ-CRUZ, Luz María, XOOL-MEDINA, Carlos Armando, ORTIZ-CUEVAS, Nancy Georgina and PANTÍ GONZÁLEZ, Daniel Alberto

Universidad Autónoma de Campeche, Instituto Tecnológico Superior de Hopelchén

ID 1st Author: *Luz María Hernández-Cruz* / **ORC ID:** 0000-0002-0469-5298, **CVU CONACYT ID:** 662220

ID 1st Coauthor: *Carlos Armando, Xool-Medina* / **ORC ID:** 0000-0001-9821-6704, **CVU CONACYT ID:** 1203480

ID 2nd Coauthor: *Nancy Georgina, Ortiz-Cuevas* / **ORC ID:** 0000-0003-4191-9630, **CVU CONACYT ID:** 964285

ID 3rd Coauthor: *Daniel Alberto, Pantí González* / **ORC ID:** 0000-0001-7577-7146, **CVU CONACYT ID:** 649888

Abstract

The objective of this study is to provide foundations and theoretical concepts that allow creating and/or cultivating lines of scientific research in application and implementation of quantum programming. The research is carried out from a systematic mapping study. This considered articles published in the current year whose search was carried out in recognized scientific databases: Google Scholar, DOAJ and SCOPUS; Similarly, the Bibliographic Manager Mendeley is used. Additionally, the snowball search strategy is also used to carry out a more exhaustive and specific search, which does not leave contributions without considering the investigation. The result achieved is the successful implementation of the methodology in the field of computer science. Said systematic mapping study yields a high number of scientific articles in the first search or inquiry. However, when applying the inclusion and exclusion criteria, the results of the significant contributions on the subject are very scarce, which allows concluding that there is a great breadth in the scientific field of research for quantum programming and its application.

Systematic, Quantum Programming, Current Perspective

The Project-Based Learning (PBL) integrating the framework Scrum

El aprendizaje basado en proyectos (ABP) integrando el marco de trabajo *Scrum*

HERNÁNDEZ-CRUZ, Luz María, MANZANILLA-ORTEGA, Martín Alejandro, CASTILLO-TÉLLEZ, Margarita and UICAB BRITO, Luis Alberto

Universidad Autónoma de Campeche, Instituto Tecnológico Superior de Hopelchén

ID 1st Author: *Luz María Hernández-Cruz* / **ORC ID:** 0000-0002-0469-5298, **CVU CONACYT ID:** 662220

ID 1st Coauthor: *Martín Alejandro Manzanilla-Ortega* / **ORC ID:** 0000-0001-7968-0608, **CVU CONACYT ID:** 1203480

ID 2nd Coauthor: *Margarita Castillo-Téllez* / **ORC ID:** 0000-0001-9419-7868, **CVU CONACYT ID:** 842039

ID 3rd Coauthor: *Luis Alberto Uicab Brito* / **ORC ID:** 0000-0001-6986-514X, **CVU CONACYT ID:** 203367

Abstract

Currently, Project-Based Learning is a strategy that is frequently used in the educational field at all levels. This allows the development of knowledge, skills and attitudes that guarantee meaningful learning. On the other hand, when thinking about a project, the agile approach has been efficient to achieve success in managing them. The research presents an inductive-deductive study with the aim of integrating the Project-Based Learning strategy (PBL) and the Scrum framework. With this, juxtapose the benefits of the agile approach that allow simultaneously achieving successful projects and meaningful learning. The adopted methodology consists of two steps, the first consisting of a theoretical framework that supports the primary concepts of the study and, successively, the second involves the proposed Project-Based Learning (PBL) and Scrum integration model. Contributing, mainly as a contribution to the line of knowledge generation in the scientific field of the implementation of Scrum for life with an academic-educational approach.

Project-Based Learning, *Scrum*, Strategy

Mechanical Design and Validation of an Auxiliary Active Device for Rehabilitation of the Knee and Quadriceps

Diseño Mecánico y Validación de un Dispositivo Activo Auxiliar en la Rehabilitación de Rodilla y Cuádriceps

GARCÍA-TORRES, Jorge Alfredo, GONZÁLEZ-MÉNDEZ, Agustín and HERNÁNDEZ-ZAVALA, Antonio

Mechanics Department, Escuela Superior de Ingeniería Mecánica y Eléctrica

ID 1st Author: *Alfredo, García* / **ORC ID**: 0000-0002-2333-3196, **CVU CONACYT ID:** 1086463

ID 1st Coauthor: *Agustín, González*

ID 2nd Coauthor: *Antonio, Zavala* / **ORC ID:** 0000-0002-0964-9522, **Researcher ID Thomson:** I-8506-2017, **CVU CONACYT ID:** 176452

Abstract

Motion difficulties, specifically the walk and displacement, are very common afflictions, mainly caused by some type of injury. The recurrent kind of rehabilitation treatments involve exercises of active and passive mobility. The success in the treatment and the early return to sports activity depends largely on the rehabilitation process. This should begin immediately after the production of the wound or the surgical process to repair the damage. The objective of this work is to develop a low-cost, easy manufacturing and assembly device, capable of providing exercises of active mobility. We designed an affordable and adaptable six-bar Watt linkage, coupled to a conventional leg extension machine. Structural and dynamic studies determine its safeness and its efficiency. The results of the kinematic and dynamic studies showed that the available range of motion for the different configurations goes from 24° to 109°. Its structural integrity was analyzed, pointing out that the weakest link had a Factor of Safety of 1.3, while the highest presents a value of 14.7, so that, the material overpasses the load needs. Based on the obtained results, a six-bar linkage is a viable option for the development of low-cost, therapeutic active devices.

Rehabilitation, Six Bar Linkage Mechanism, Active Exercise

The implementation of Augmented Reality as a support instrument in the training of predictive maintenance

La implementación de la Realidad Aumentada como un instrumento de apoyo en el adiestramiento del mantenimiento predictivo

RAMÍREZ-ULLOA, Sergio, FAUSTO-LEPE, Gabriela Margarita, BARRON-BALDERAS, Juan Jose and TORRES-NAVARRO, Joel

Universidad Tecnológica de Jalisco

ID 1st Author: Sergio, RAMÍREZ-ULLOA / **ORC ID:** 0000-0003-1445-4946, **CVU CONACYT ID:** 650582

ID 1st Coauthor: Gabriela Margarita, FAUSTO-LEPE / **ORC ID:** 0000-0002-7989-4814, **CVU CONACYT ID:** 585183

ID 2nd Coauthor: Juan Jose, BARRON-BALDERAS / **ORC ID:** 0000-0001-6167-8825, **CVU CONACYT ID:** 383182

ID 3rd Coauthor Joel, TORRES-NAVARRO / **ORC ID:** 0000-0003-3054-3148, **CVU CONACYT ID:** 653191

Abstract

Augmented Reality is an emerging technology, the use of which can complement the perception and interaction with the real world and allows the student to be in a real environment augmented with additional information generated by the computer. This technology is gradually being introduced into new areas of application such as, among others, the training of industrial process operators, marketing, virtual tours, among others. The academic world is not on the fringes of these initiatives and has also begun to introduce Augmented Reality technology in some of its disciplines. However, the knowledge and applicability of this technology in teaching is minimal; Among other reasons, it is due to the very nature and state of development of said technology, as well as its scarce presence in the daily spheres of society. The development of initiatives in the use of this technology in education and its dissemination will contribute to its extension in the teaching community and especially in helping the understanding of various topics where it is sometimes not possible to have expensive materials for students of maintenance races

Augmented Reality, Education, Predictive Maintenance

Proposal for application of overall equipment effectiveness indicator in a hot sauce company

Propuesta de aplicación del indicador de eficiencia general de los equipos en una empresa de salsas picantes

ROMERO-NAVARRETE, Jovana and CUAMEA-CRUZ, Guillermo

Universidad de Sonora, División de ingeniería.

ID 1st Author: *Jovana, Romero-Navarrete* / **ORC ID:** 0000-0001-9431-2248, **CVU CONACYT ID:** 1071329

ID 1st Coauthor: *Guillermo, Cuamea-Cruz* / **ORC ID:** 0000-0001-8884-6825, **CVU CONACYT ID:** 311414

Abstract

The use of indicators within companies is highly relevant to help manage their processes. Particularly for equipment and machinery, the indicator of overall equipment efficiency (OEE) is commonly used with the objective of measuring equipment inefficiency and identify losses. This helps to foster an environment of continuous improvement that leads to increased productivity. During this investigation, an adapted methodology is used, which highlights the use of lean manufacturing techniques, from which our OEE metric is derived. The purpose is to know the efficiency of the equipment in order to take actions that help reduce the waste presented in a production line of a hot sauce company. This article will contribute to the promotion of the use of new tools that lead to continuous improvement, since our intention is to simplify the way the company visualizes its problems, which will lead to finding solutions in a faster and more objective way.

OEE, Productivity, Wastes

Proposal of a process and tool for the management of quotations for a fiber optic assembly manufacturer

Propuesta de un proceso y herramienta para la gestión de cotizaciones de un fabricante de ensambles de fibra óptica

TOBIN-LITTLEWOOD, Jose Guillermo, SÁNCHEZ-SCHMITZ, Guzman Gerardo Alfonso and PEREZ-SOLTERO, Alonso

Universidad de Sonora, División de Ingeniería

ID 1st Author: *Jose Guillermo, Tobin-Littlewood* / **ORC ID:** 0000-0001-9680-3411, **CVU CONACYT ID:** 1071362

ID 1st Coauthor: *Guzman Gerardo Alfonso, Sánchez-Schmitz* / **ORC ID:** 0000-0002-9681-9736, **CVU CONACYT ID:** 401006, **SCOPUS ID:** 25722318300

ID 2nd Coauthor: *Alonso, Perez-Soltero* / **ORC ID:** 0000-0002-3175-6703, **CVU CONACYT ID:** 70789, **PUBLONS:** C-5572-2008

Abstract

The current process followed by a fiber optic assembly manufacturing company to quote its products fails to meet the expectations and requirements of both internal and external customers. There is poor document management, as well as problems regarding the flow of information used in the activities carried out in the Quoting department. This creates confusion and results in late deliveries for quotes. In addition to this, there is a lack of correct process measurement, so it is not possible to make a complete analysis. A new Quotation process is proposed as well as a management tool based on the PPAP practice contained within the APQP methodology. The objective is to increase the performance of the department's activities, improve the structure and organization of the knowledge generated during the Quotation process and obtain a platform for the collection of metrics for future process analysis. This will allow the company to meet customer expectations and perform analysis that allow continuous improvement of the process.

Quotation management, New Product Development, PPAP

Processor and memory performance with design patterns in a native Android application

Rendimiento del procesador y memoria con patrones de diseño en una aplicación nativa de Android

SAMPAYO-RODRÍGUEZ, Carmen Jeannette, GONZÁLEZ-AMBRIZ, Rosalba, GONZÁLEZ-MARTÍNEZ, Blanca Areli and ALDANA-HERRERA, Jonathan

Tecnológico Nacional de México/Instituto Tecnológico Superior de Huauchinango

ID 1stAuthor: *Carmen Jeannette, Sampayo-Rodriguez* / **ORC ID:** 0000-0001-8844-6055, **CVU CONACYT ID:** 951529

ID 1st Coauthor: *Rosalba, González-Ambriz* / **ORC ID:** 0000-0001-5400-9754, **CVU CONACYT ID:** 368433

ID 2nd Coauthor: *Blanca Areli, Gonzalez-Martinez* / **ORC ID:** 0000-0001-7313-4497, **CVU CONACYT ID:** 368551

ID 3rd Coauthor: *Jonathan, Aldana-Herrera* / **ORC ID:** 0000-0001-7992-529X, **CVU CONACYT ID:** 1234604

Abstract

The main objective of this article was to develop a native Android mobile application focused on local file storage, following different design patterns to compare the performance they had in processor and RAM memory consumption. To achieve this, the design patterns MVC, MVP and MVVM were taken as a sample, and for each one a native Android mobile application was developed to compare the performance they had when executed on the same device, thus concluding which design pattern consumed less processing resources and RAM memory. It was contributed to the area of software architecture and it was possible to test the hypothesis that the use of a software architecture design pattern applied in a native Android mobile application is a factor that influences the performance of use in CPU consumption and RAM memory. The pattern that least affects the device performance between MVC Pattern, MVP Pattern and MVVM Pattern is the MVVM with just a 3.5% increase in processor work and a record of a 17.5% increase in RAM consumption.

Patterns, Processing, Mobile, Application

Perception of the use of Blockchain and its impact on transparency in public institutions

Percepción del uso de Blockchain y su impacto en la transparencia de las instituciones

ZAMUDIO-GARCÍA, Víctor Manuel, SERRANO-FRANCO, Glendamira and SOLARES-SUSTAETA, Andrés

Universidad Politécnica Metropolitana de Hidalgo

ID 1st Author: *Víctor Manuel, Zamudio-García* / **ORC ID:** 0000-0002-4660-8025

ID 1st Coauthor: *Glendamira, Serrano-Franco* / **ORC ID:** 0000-0003-3176-3433

ID 2nd Coauthor: *Andrés, Solares-Sustaeta* / **ORC ID:** 0000-0002-8663-8800

Abstract

The arrival of Blockchain provides solutions to institutions in different sectors such as finance, also in other areas, such as accounting, audits, legal aspects, smart contracts, the supply chain and the transparency of institutions, which contributes in better management. Hence, this work was focused on investigating 2 objectives, the perception of Blockchain and its impact on the transparency of information in institutions, as well as the existing correlation of both variables. In this work, a descriptive and correlational analytical methodology was used, the sample was made up of 33 university professors and 142 students who have entered the labor sector through their internships and internship processes or are already working and are recent entrants. . The information was collected through a structured questionnaire, with alternatives of multiple answers. The findings showed regarding one of the objectives that the perception of Blockchain is acceptable, understanding its potential that it offers. Regarding the second objective, a correlation of 0.771 was evidenced at a significance level of 0.029, indicating that there is a high and statistically significant relationship between the perception variables on Blockchain and its impact on the transparency of information in institutions.

Transparency, Correlation, Findings

Didactic Prototype of a Robotic Manufacturing Cell to Program Welding Trajectories in a Frame

Prototipo Didáctico de una Celda de Manufactura Robotizada para Programar Trayectorias de Soldadura en un Chasis

MANDUJANO-NAVA, Arturo, PAZ-CABRERA, Mauro, SERRANO-RAMIREZ, Tomás and CHIHUAQUE-ALCANTAR, Jesús

Universidad Politécnica de Guanajuato, Ingeniería Automotriz

ID 1st Author: *Arturo, Mandujano-Nava* / **ORC ID:** 0000-0003-2022-4397, **CVU CONACYT ID:** 270254

ID 1st Coauthor: *Mauro, Paz-Cabrera* / **ORC ID**: 0000-0003-0728-7377, **CVU CONACYT ID:** 305750

ID 2nd Coauthor: *Tomás, Serrano-Ramirez* / **ORC ID:** 0000-0001-6118-3830, **Researcher ID Thomson:** G-6039-2018, **CVU CONACYT ID:** 493323

ID 3rd Coautor: *Jesús, Chihuaque-Alcantar* / **ORC ID**: 0000-0002-6718-6909, **CVU CONACYT ID:** 48887

Abstract

This project shows the integration of a didactic prototype of a robotic manufacturing cell for the programming of welding trajectories in a chassis. The purpose of this project is to integrate the robotic cell through the interaction of the controller of an industrial robot, a programmable logic controller (PLC) and a power transmission system for the positioning of a chassis for didactic purposes for students studying engineering in the area of Industrial Automation. To carry out the project, a scale chassis for a tractor and its support base was first manufactured, then the control of a stepper motor was carried out through a SIMATIC S7-1200 CPU 1214C PLC and a microstep driver module. The programming software COSIMIR from FESTO was also used to program the welding trajectories in a Mitsubishi RV-2AJ robot with 5 degrees of freedom that interacts with the PLC through input and output digital modules. Finally, it was possible to obtain a functional prototype of a robotic manufacturing cell that can be used for teaching robot trajectory programming and that is closely related to industrial machines.

Didatic, Integration, Prototype

Neural Sliding Mode Control of a Regenerative Braking System for Electric Vehicles

Control Neuronal por modos deslizantes para el frenado regenerativo de vehículos eléctricos

RUZ CANUL, Mario Antonio, DJILALI, Larbi, RUZ-HERNANDEZ, José Antonio and SANCHEZ-CAMPEROS, Edgar Nelson

Universidad Autónoma del Carmen, Facultad de Ingeniería.

ID 1st Author: *Mario Antonio, Ruz-Canul* / **ORC ID:** 0000-0003-0872-062X, **CVU CONACYT ID**: 1085717.

ID 1st Coauthor: *Larbi, Djilali* / **ORC ID:** 0000-0002-3594-5747, CVU **CONACYT ID:** 696839

ID 2nd Coauthor: *José Antonio, Ruz-Hernández* / **ORC ID**: 0000-0001-8332-4980, **CVU CONACYT ID**: 216374

ID 3rd Coauthor: *Edgar Nelson, Sánchez-Camperos* / **ORC ID:** 0000-0002-8695-7879, **CVU CONACYT ID**: 597

Abstract

This paper summarizes the work done on the development of a Neural Sliding Mode Controller (NSMC) for a regenerative braking system used in an electric vehicle (EV), which is composed of a Main Energy System (MES) and an Auxiliary Energy System (AES). This last one contains a buck-boost converter and a super-capacitor. The AES aims to recover the energy generated during braking that the MES cannot retrieve and use later during acceleration. A neural identifier trained with the Extended Kalman Filter (EKF) has been used to estimate the buck-boost converter real dynamics and to build up the NSMC, which is implemented to regulate the voltage and current dynamics in the AES. Simulation results, illustrate the effectiveness of the proposed control scheme to track time-varying references of the AES voltage and current dynamics measured at the buck-boost converter and ensure the charging and discharging operation modes of the super-capacitor. In addition, the proposed control scheme enhances the EV storage system efficiency and performance, when the regenerative braking system is employed.

Regenerative Braking, Sliding Mode Controller, Electrical Vehicle

Teaching of the subjects of Ecological Engineering and Air conditioning and refrigeration of the career of Electrical Mechanical Engineer of the FES Cuautitlán in the distance and mixed modality

Enseñanza de las asignaturas de Ingeniería ecológica y Aire acondicionado y refrigeración de la carrera de Ingeniero mecánico electricista de la FES Cuautitlán en la modalidad a distancia y mixta

HERNÁNDEZ-GÓMEZ, Víctor Hugo and CHAVARRÍA-ORTIZ, Gilberto

Universidad Nacional Autónoma de México, FES Cuautitlán, Estado de México, México

ID 1st Author: *Víctor Hugo, Hernández-Gómez* / **ORC ID:** 0000-0001-9315-5869, **Researcher ID Thomson:** S-6575-2018, **CVU CONACYT ID:** 122247

ID 1st Coauthor: *Gilberto, Chavarría-Ortiz* / **ORC ID:** 0000-0002-5358-4260, **CVU CONACYT ID:** 1204605

Abstract

This article describes the teaching method of the subjects of Ecological Engineering and Air Conditioning and Refrigeration of the Electrical Mechanical Engineer career at FES Cuautitlán, for the distance and mixed modality. New didactic resources were developed to improve the teaching-learning process, such as class videos, notes, videos and support texts, infographics, mind maps, word search puzzles, crossword puzzles, to name a few, for each topic of the subjects. To concentrate the information and make it available to students at any time of the day, virtual classrooms were created in Classroom and Moodle. A section of practical activities that can be done from home, using easy-to-find and even recycled materials, was included. The virtual classrooms were tested during the 2022-2 semester, giving good opinions from the students who took the subjects, since, although the class was taught by zoom, if they could not take the class for work reasons, they could be regularized with the videos. of the class and of support to the subject, in the moment that they had free.

Moodle, Classroom, Mixed teaching

Development of busbar differential protection algorithm on PSCAD

Desarrollo del algoritmo de protección diferencial barras en PSCAD

SHIH, Meng Yen, LEZAMA-ZÁRRAGA, Francisco Román, CHAN-GONZALEZ, Jorge de Jesús and SALAZAR-UITZ, Ricardo Rubén

Universidad Autónoma De Campeche

ID 1st Author: *Shih, Meng-Yen* / **ORC ID:** 0000-0001-7475-6458, **CVU CONACYT ID:** 408617

ID 1st Coauthor: *Francisco Román, Lezama-Zárraga* / **ORC ID:** 0000-0003-3397-7881, **Researcher ID Thomson:** U-1229-2018, **CVU CONACYT ID:** 205493

ID 2nd Coauthor: *Jorge de Jesus, Chan-Gonzalez* / **ORC ID:** 0000-0002-8638-1646

ID 3rd Coauthor: *Ricardo Rubén, Salazar-Uitz* / **ORC ID:** 0000-0003-2307-737X, **CVU CONACYT ID:** 416277

Abstract

This article analyzes the behavior of the fault currents by means of a numerical differential protection algorithm developed in a simulation program called PSCAD (Power System Computer Assisted Design). The protection algorithm does the current comparison in order to obtain a graph result which indicates the state of operation. The developed algorithm also has a variable fault control panel to activate several combinations of possible fault types. This differential protection algorithm is designed to protect only the internal faults for the busbar. Finally, the results are displayed by graphs from the response of applied faults. This can be used as simulation exercises for the undergraduate engineering students to better comprehend the operation of differential protection.

Busbar Protection, Differential Protection Fault Analysis, Internal and External Faults

MAC-based Artificial Neural Network for Voice Command Recognition

Red Neuronal Artificial basada en MAC para Reconocimiento de Comandos de Voz

RODRÍGUEZ-PONCE, Rafael

Universidad Politécnica de Guanajuato, Ingeniería en Robótica

ID 1st Author: *Rafael, Rodríguez-Ponce* / **ORC ID:** 0000-0001-5006-5580, **CVU CONACYT ID:** 209261

Abstract

Artificial neural networks are one of the most popular families of machine learning algorithms of this decade. Although they exist since the middle of the last century, until recent years with the improvement of technology, they are being widely used in fields such as character, image, and voice recognition. There is a large number of works implementing neural networks for speech recognition; however, the approach has usually been for operation on a personal computer, which is not suitable for mobile applications. This article presents a neural network for voice command recognition, implemented in a compact FPGA card with low computational resources. In addition, it uses a multiplication and accumulation unit, called MAC, with which it achieves a smaller size and higher speed. This paper will be of interest to students or researchers working on machine learning mobile applications.

Automatic speech recognition, Mel-frequency cepstral coefficients (MFCC), Field programmable gate array (FPGA)

Design and construction of a forced convection solar fruit dryer in the municipality of Durango

Diseño y construcción de un secador solar de fruta por convección forzada en el municipio de Durango

GARCÍA-ARÁMBULA, Cintia Germania, GARCÍA-GODINA, Luis Fernando, CARDOZA-CARRASCO, Martín David and ORTEGA-VALDEZ, Karla María

Universidad Tecnológica de Durango

ID 1st Author: *Cintia Germania, García-Arámbula* / **ORC ID:** 0000 0003 3702 1262, **CVU CONACYT ID:** 333144

ID 1st Coauthor: *Luis Fernando, García-Godina* / **ORC ID**: 0000-0001-8875-7531, **CVU CONACYT ID:** 827089

ID 2nd Coauthor: *Martín David, Cardoza-Carrasco* / **ORC ID:** 0000-0002-1980-3976, **CVU CONACYT ID:** 1218693

ID 3rd Coauthor: *Karla María, Ortega-Valdez* / **ORC ID:** 0000 0001 7736 9461, **CVU CONCYT ID:** 265592

Abstract

The main aim is the design and build of a Convection Forced Solar Dryer used to dry Spicy Pineapple. The prototype was designed using Inkscape 1.1.2 software with 60cm*44cm*44cm dimensions, having a Drying chamber of 5 trays, two air-circulation serpentine heaters on top and back of the drying chamber and two solar modules of 6v each to power some fans to force convection. The main material used was MDF laser cutted for assembly, then black paint was applied due to the absorption capability and finally water sealer for humidity protection. Finally tests were carried on in State of Durango with Mean Solar Radiation of 5.7 kWh/m^2*day been 6.5 the Peak Sun Hour on may, concluding on three days' time needed for drying 3 kilograms of Spicy Pineapple, average initial temperature of 28°C and 55°C max, humidity reduced from 55% to 24% inside the system.

Solar Dryer, Relative Humidity, Solar Radiation

Power quality analysis in Durango's sewage treatment plant

Análisis de la calidad de la energía en la depuradora de Durango

SIFUENTES-GODOY, David Alejandro

Universidad Tecnológica de Durango

ID 1 st Author: *David Alejandro, Sifuentes-Godoy* / **ORC ID:** 0000-0003-2527-2830, **CVU CONACYT ID:** 412253

Abstract

This energy study is developed within a wastewater treatment plant by aerated lagoons, where a series of problems such as activation of temperature protections, phase loss and thermal protections are presented. When analyzing the electrical installation and the constitution of each motor, the hypothesis of a possible presence of harmonics outside the established ranges that are producing distortion and increase of the voltage and current signal, as well as a possible resonance, was raised. For this reason, it is intended to carry out an Electrical energy quality analysis in electrical machines of the PTAR de Aguas del Municipio de Durango, through specialized equipment and based on international standards. The power quality analysis contemplates the analysis of: voltage, current, individual harmonic content, THDv, THDi. The methodology proposed by Dugan, McGranaghan, Santoso, & Beaty (2004) and the performance of energy diagnoses according to what was established by Sifuentes et al (2016) were used. As a result, the confirmation of the hypothesis is obtained where the motor that contains power electronics is a source of harmonics that are amplified by the capacitor bank.

Power quality, Sewage, Electricity

Non-homogeneity of energy density in a vertical wind profile for open-air laboratory tests

No-homogeneidad de densidad de energía en un perfil vertical de viento para pruebas de laboratorio a cielo abierto

SOTO-OSORNIO, Juan Emigdio, SUÁREZ-ROMERO, José Guadalupe, HERNÁNDEZ-ARRIAGA, Isaac and RODRÍGUEZ-ZALAPA, Omar

Tecnológico Nacional de México, Instituto Tecnológico de San Juan del Río

ID 1st Author: *Juan Emigdio, Soto-Osornio* / **ORC ID:** 0000-0002-8483-0102

ID 1st Coauthor: *José Guadalupe, Suárez-Romero* / **ORC ID:** 0000-0003-0461-0490

ID 2nd Coauthor: *Isaac, Hernández-Arriaga* / **ORC ID:** 0000-0002-8015-4338

ID 3rd Coauthor: *Omar, Rodríguez-Zalapa* / **ORC ID:** 0000-0001-8159-1751

Abstract

The research presents the calculation by numerical methods of the energy density for a typical vertical wind profile, which is obtained from data acquired by the Regional Center for Wind Technology (CERTE) in the region of Juchitán de Zaragoza, Oaxaca, Mexico. The vertical wind profile considered presents inhomogeneities in energy density and speed, unlike the controlled conditions in a laboratory with a wind tunnel. The energy density allows us to calculate correction factors on the measured parameters of a wind turbine when it is tested under free wind laboratory conditions. The correction factor for the power coefficient in a small wind turbine with a capacity to generate 30 kW of power, developed by CIATEQ AC Centro de Tecnología Avanzada, hypothetically measured under free wind conditions, is also shown. These correction factors can also be useful in estimating the power generated when laboratory conditions are not available.

Energy Density, Inhomogeneity, Numeric Method

Electronic Card Applied to the Disseminate and Collection of Information on SARS-Cov-2 in Marginalized Areas

Tarjeta Electrónica Aplicada a la Difusión y Recolección de Información sobre SARS-Cov-2 en Zonas Marginadas

GONZÁLEZ-SILVA, Marco Antonio

Universidad Autónoma de la Ciudad de México, Academia de Ingeniería en Sistemas Electrónicos y Telecomunicaciones

ID 1st Autor: *Marco Antonio, González-Silva* / **ORC ID:** 0000-0002-3327-8047, **Researcher ID Thomson:** U-8432-2018, **CVU CONACYT ID:** 173601

Abstract

According to the World Health Organization, misinformation is a threat to public health. In the case of the SARS-CoV-2 virus, not knowing and rejecting the use of vaccines makes people vulnerable and puts control at risk deaths from contagion in the communities. The information media that have been used to publicize the use of vaccines and other recommendations are mostly digital and radio communication such as Internet sites, mobile applications, radio, and television, which do not have enough coverage in many communities. The development of this project is aimed at showing a portable hardware prototype that allows the disseminating information on the use of vaccines and recommendations to reduce the effects of the SARS-CoV-2 virus in marginalized communities. For this, the design of an electronic card capable of reproducing audio in a chosen language or dialect is presented. The purpose of the audio is to include sectors of the population with communication problems such as illiteracy that could exist in these areas. In addition, the card allows you to save certain geographic data of the places where it is distributed and the possible contagions in it for later analysis.

Prototype, Disseminating, Geographic

Synthesis and characterization of Zinc Oxide thin films deposited by Spray Pyrolysis technique for possible applications in solar cells

Síntesis y caracterización de películas delgadas de óxido de Zinc depositadas por la técnica de Spray Pirolisis para su posible aplicación en celdas solares

VÁZQUEZ-VALERDI, Diana Elizabeth, LUNA-LÓPEZ, José Alberto, ABUNDIZ-CISNEROS, Noemí and JUAREZ-DÍAZ, Gabriel

Universidad Autónoma de Puebla (BUAP)

ID 1st Author: *Diana Elizabeth, Vázquez-Valerdi* / **ORC ID:** 0000-0002-8061-041X, **CVU CONACYT ID:** 266351

ID 1st Coauthor: *José Alberto, Luna-López* / **ORC ID:** 0000-0002-7647-3184, **CVU CONACYT ID:** 200808

ID 2nd Coauthor: *Noemí, Abundiz-Cisneros* / **ORC ID:** 0000-0002-0063-0884, **CVU CONACYT ID:** 206788

ID 3rd Coauthor: *Gabriel, Juarez-Díaz* / **ORC ID:** 0000-0001-5856-3285, **CVU CONACYT ID:** 43171

Abstract

En el presente estudio, se reporta la síntesis y caracterización de películas delgadas de ZnO depositadas a 300, 350 y 400°C mediante la técnica de Spray Pirolisis Ultrasónico, como posible candidato de capa transportadora de electrones (ETL) en celdas solares. El análisis de difracción de rayos X (XRD) reveló que las películas tienen una fase hexagonal wurtzita con una orientación preferencial (101) con una buena policristalinidad. Se calculó el tamaño medio de los cristalitos en base al modelo de Debye-Scherrer, indicando que el tamaño de los cristales disminuye a medida que aumenta la temperatura de depósito. La caracterización óptica del material mostró una alta transmitancia en la región visible (85-99%) con lo cual se determinó la banda prohibida óptica (3.06-3.29 eV). El espesor, la rugosidad de la superficie y las constantes ópticas (n y k) se determinaron mediante Elipsometría Espectroscópica utilizando el modelo de oscilador Gaussiano. Efecto Hall reveló una baja resistividad de 1-4 Ωcm y una alta movilidad de portadores de carga (304 cm2/Vs) en las películas. Por todas estas propiedades, el ZnO se considera un material idóneo para aplicaciones optoelectrónicas, así como un material con potencial para utilizarse como ETL en celdas solares.

Zno, Spray Pirolisis, Celda Solar

Design of an app for a module of practices of basic electrical installations

Diseño de una app para un módulo de prácticas de instalaciones eléctricas básicas

HERNANDEZ-SANCHEZ, Juan Fernando, CASTILLO-QUIROZ, Gregorio, LUNA-CARRASCO, Claudia Yadira and TORRES-JIMENEZ, Jacinto

Maestría en Tecnologías de la Información, Tecnológico Nacional de México/Instituto Tecnológico Superior de Huauchinango

ID 1st Author: *Juan Fernando, Hernández-Sánchez* / **ORC ID:** 0000-0002-4409-5174, **Researcher ID Thomson:** AAS2942-2021, **CVU CONACYT ID:** 937701

ID 1st Coauthor: *Gregorio, Castillo-Quiroz* / **ORC ID:** 0000-0002-1904-4172, **Researcher ID Thomson:** H-9402-2018, **CVU CONACYT ID:** 162009

ID 2nd Coauthor: *Claudia Yadira, Luna-Carrasco* / **ORC ID:** 0000-0002-4092-9987, **Researcher ID Thomson:** G-2892-2019, **CVU CONACYT ID:** 368419

ID 3rd Coauthor: *Jacinto, Torres-Jiménez* / **ORC ID:** 0000-0002-8006-6397, **CVU CONACYT ID:** 103469

Abstract

Currently, electrical installations of any kind must comply with minimum safety standards taken into account at the time of their construction and use. This article aims to present the design and construction of a series of practices as well as the design of a mobile application for the improvement of learning in the training of residential electrical installations of the "Mahatma Gandhi" High School of Xilocuautla, Huauchinango, Puebla, through a practice module "ElectriBasic App". The App will serve as a didactic support, since it is a graphic and technical instruction for students who wish to carry out practices related to residential electrical installations. With this module, students will be able to identify, through various previously organized practices, the types of connections and different types of accessory arrangements of a residential electrical installation, as well as identify concepts from basic to intermediate that they do not know within the topics of electricity.

Application, Tool, Teaching

Analysis of the behavior for polyethylene terephthalate (PET) in compression efforts for use in the masonry

Análisis del comportamiento del tereftalato de polietileno (PET) en esfuerzos de compresión para su uso en la mampostería

VEGA-GUTIÉRREZ, Rebeca Eloisa, MARTÍNEZ-CARRILO, Irma, JUÁREZ-TOLEDO, Carlos and JIMÉNEZ-BETANCOURT, Ramón Octavio

Universidad Autónoma del Estado de México-Unidad Académica Profesional Tianguistenco

ID 1 st Author: *Rebeca Eloisa, Vega-Gutierrez* / **ORC ID**: 0000-0003-3274-0743

ID 1st Coauthor: *Irma, Martínez-Carrillo* / **ORC ID**: 0000-0002-7952-4418, **Researcher ID Thomson**: B-9264-2016, **CVU CONACYT ID**: 39914

ID 2nd Coauthor: *Carlos, Juárez-Toledo* / **ORC ID**: 0000-0002-7440-3246, **Researcher ID Thomson**: C-1368-2016, **CVU CONACYT ID**: 39912

ID 3rd Coauthor: *Ramón Octavio, Jiménez-Betancourt* / **ORC ID**: 0000-0002-0171-7279, **CVU CONACYT ID**: 88193

Abstract

This article focuses on analysis and a study on the mechanical behavior of recycled plastic materials to manufacture bricks. The current proposal provides a viable alternative for the manufacture of bricks under its regulations, standards and care for the environment. Standardized tests for the study and analysis of the behavior of polyethylene terephthalate (PET) in compressive stresses also is showing. SolidWorks finite element analysis is used to validate the regulations of the bricks, where the results obtained show the values within the norm. The implementation of models is presented through simulations of the proposed brick based on these materials within the masonry. Finally, a methodology for the treatment of PET and its transformation process for the manufacture of partitions with polyethylene terephthalate is proposed. In addition, a methodology for the treatment of PET and its transformation process for the manufacture of partitions with polyethylene terephthalate is proposed.

Polyethylene Terephthalate (Pet), Compressive Stresses and Masonry

Software Engineering: The Mandatory Connection Between Deterministic and Probabilistic Engineering

Ingeniería del software: La conexión obligatoria entre la ingeniería determinista y la probabilística

MÁRQUEZ-DOMÍNGUEZ, Sergio, CARPIO-SANTAMARÍA, Franco Antonio, GONZÁLEZ-LÓPEZ, Gloria Inés and ZAMORA-HERNÁNDEZ, Abigail

Universidad Veracruzana, Institute of Engineering Veracruz-Boca del Río región

ID 1st Author: *Sergio, Márquez-Domínguez* / **ORC ID:** 0000-0002-4864-3238, **CVU CONACYT ID:** 166987

ID 1st Coauthor: *Franco Antonio, Carpio-Santamaría* / **ORC ID:** 0000-0002-2046-3104, **CVU CONACYT ID:** 277195

ID 2nd Coauthor: *Gloria, González-López* / **ORC ID:** 0000-0003-3383-1858, **CVU CONACYT ID:** 543314

ID 3rd Coauthor: *Abigail, Zamora-Hernández* / **ORC ID:** 0000-0002-8763-2128, **CVU CONACYT ID:** 203790

Abstract

This article analyzes 13 specialized applications in structural reliability, which show the determining role of Software Engineering in the evolution of Deterministic Engineering toward Probabilistic Engineering. This transition involves stochastic analysis in decision-making based on risks and structural security, focused on reducing the gap generated by the cost-benefit binomial. Deterministic engineering bases decision-making on rigid results without considering the randomness and risks involved in the environment; Probabilistic Engineering addresses them through stochastic models, to achieve optimal designs that integrate uncertainty and its impact over time. The applications, that were analyzed, are specialized in risk prediction, decision-making, and structural reliability, considering factors such as: academic impact, type of software license (commercial or free), its applicability and focus, country of origin, release date, access type, code, platform (operating systems), and implementation language. The results show the technological dependence of our country on foreign countries concerning this type of applications.

Probabilistic Engineering, Structural Reliability, Risk

Maintenance Management System for a Fleet of Official Vehicles in a Higher Education Institution

Sistema de Administración de Mantenimiento a Flotilla de Vehículos oficiales en una Institución de Educación Superior

FORNÉS RIVERA, René Daniel, CANO-CARRASCO, Adolfo, LÓPEZ-FIGUEROA, Julio César and ARMENTA-RAMOS, Juan Israel

Technological Institute of Sonora – Department of Industrial Engineering

ID 1st Author: *René Daniel, Fornés Rivera* / **ORC ID:** 0000-0002-7438-0056, **Researcher ID Thomson:** G-3906-2018, **CVU CONACYT ID:** 280435

ID 1st Coauthor: *Adolfo, Cano-Carrasco* / **ORC ID:** 0000-0002-3392-3667, **Researcher ID Thomson:** G-5035-2018, **CVU CONACYT ID:** 266064

ID 2nd Coauthor: *Julio César, López-Figueroa* / **ORC ID:** 0000-0002-4068-908X, **Researcher ID Thomson:** G-3925-2018, **CVU CONACYT ID:** 355930

ID 3rd Coauthor: *Juan Israel, Armenta-Ramos* / **ORC ID:** 0000-0001-7619-0152, **Researcher ID Thomson:** AHD-1017-2022

Abstract

This investigation is developed in a Higher Education Institution (IES), being the loan process of official vehicles of the fleet of the Technological Institute of Sonora (ITSON), administered by the Headquarters of the Department of General Services and Maintenance (JDSGyM), wich presents difficulties as the vehicles are not in optimal operating conditions in the provision of the transfer service between the different campuses, as well as departures to regional and international events of a cultural, sports, academic and research nature; as a result of mechanical and electrical failures, which are detected by the user already in the corresponding commission, putting their integrity and safety at risk; addressing this need through the Reliability Centered Maintenance (RCM) tool. The objective was to formulate a proposal for maintenance activities, through the RCM methodology, to have a relevant preventive maintenance program. The procedure was: Evaluate the object under study; collect data; identify actual and potential failures; proposal of a preventive maintenance program; design training protocol and delivery of results. These were: a pertinent preventive maintenance program (database) and a training program. This achieving the objective of this investigation.

Program, Maintenance, Fleet

Implementation of a workbench platform for the management of smart contracts in BlockChain nodes on Azure Cloud

Implementación de una plataforma workbench para la gestión de smart contracts en nodos de BlockChain sobre Azure Cloud

DANIEL-MARTÍNEZ, Wendy, SANTANA-VALADEZ, Luis Alejandro, ZAMUDIO-GARCÍA, Víctor Manuel and HERNÁNDEZ-PÉREZ, Faride

Universidad Politécnica Metropolitana de Hidalgo – Ingeniería en Tecnologías de Información

ID 1st Author: *Wendy, Daniel-Martínez* / **ORC ID:** 0000-0002-4455-940X, **CVU CONACYT ID:** 330244

ID 1st Coauthor: *Luis Alejandro, Santana-Valadez* / **ORC ID:** 0000-0003-1561-020X

ID 2nd Coauthor: *Víctor Manuel, Zamudio-García* / **ORC ID:** 0000-0002-4660-8025, **CVU CONACYT ID:** 482212

ID 3rd Coauthor: *Faride, Hernández-Pérez* / **ORC ID:** 0000-0001-9426-4944, **CVU CONACYT ID:** 557262

Abstract

Objectives. Analyze, design and build backend components (web API, XML web service and database) and frontend (website) with Microsoft technology that allow the integration of a functional workbench platform to automate the launch of compiled smart contracts in blockchain nodes hosted in Azure Cloud so that they can be used by companies in general. Methodology The SCRUM methodology was applied for the agile development of the technological products of the backend and frontend, because it adapted very well to the nature of this research, since in each iteration there was always an update of the tools, programming components, testing and configuring services to achieve goals. Contribution It is shown that the development platform integrated by the solidity language, Azure cloud blockchain, the Visual Studio .Net IDE and the SQL Server database manager allowed to design and build a blockchain workbench platform easily exploitable by companies to validate their processes and generate transparency in the handling of their information.

Blockchain, Backend, Frontend

Spur Gears with Contact Ratio Less than Unity

Engranes Rectos con Relación de Contacto Menor a la Unidad

JIMÉNEZ-RABIELA, Homero, VÁZQUEZ-GONZÁLEZ, Benjamín, RAMÍREZ-CRUZ, José Luis and BRAVO-ACOSTA, Adrian Gustavo

Universidad Autónoma Metropolitana

ID 1st Author: *Homero, Jiménez-Rabiela* / **ORC ID:** 0000-0002-1549-0853, **Researcher ID Thomson:** S-2299-2018, **CVU CONACYT ID:** 123386

ID 1st Coauthor: *Benjamín, Vázquez-González* / **ORC ID:** 0000-0002-9030-5662, **Researcher ID Thomson:** S-2417-2018, **CVU CONACYT ID:** 25749

ID 2nd Coauthor: *José Luis, Ramírez-Cruz* / **ORC ID:** 0000-0003-0762-2630, **Researcher ID Thomson:** G-3405-2019, **CVU CONACYT ID:** 921268

ID 3rd Coauthor: *Adrian Gustavo, Bravo-Acosta* / **ORC ID:** 0000-0001-57975317, **Researcher ID Thomson:** 2272-2018, **CVU CONACYT ID:** 334391

Abstract

The objective of this research is to evaluate the design of a pair of spur gears and another analogous pair with a contact ratio of less than unity. Considering two pairs of normalized gears with equal diametral pitches and pressure angles, as well as equal pitch radii in their driving gears and equal pitch radii in their driven gears. For the first pair of gears with normalized tooth numbers, the contact ratio greater than unity es obtained. For the second pair of gears, the number of teeth is proportionally reduced, consequently obtaining a contact ratio of less than one. For both pairs, the maximum Von Mises stresses are obtained using the finite element method. The pairs are compared qualitatively and quantitatively. This work contributes with novel elements of judgment for a better decision making of the industrialists interested in reducing the problems of normalized spur gears such as noise, abrasive wear, adhesive wear, temperature, and efforts induced by the overlapping relationship between coupled teeth; proposing them a practical solution that will open new avenues of research.

Noise, Temperature, Abrasion

Design and validation of a control for a BLDC motor to be applied on a solar water pump

Diseño y validación de un control para motor BLDC para aplicarse en una bomba solar de agua

HERRERA-VELÁZQUEZ, Rene, RODRIGUEZ-MEJIA, Jeovany Rafael, LÓPEZ-MÁRTINEZ, Alfonso and ARAIZA-ESQUIVEL, Ma. Auxiliadora

Unidad Académica de Ingeniería Eléctrica Universidad Autónoma de Zacatecas

ID 1st Author: *Rene, Herrera-Velázquez* / **ORC ID:** 0000-0003-2025-6882

ID 2st Coauthor: *Jeovany Rafael, Rodriguez-Mejia* / **ORC ID:** 0000-0003-4154-0778

ID 2nd Coauthor: *Alfonso, López-Mártinez* / **ORC ID:** 0000-0001-8547-9468

ID 3rd Coauthor: Ma. *Auxiliadora, Araiza-Esquivel* / **ORC ID:** 0000-0001-8052-7483

Abstract

This paper presents the design and implementation of a speed control for BLDC motors; This is considered a high-capacity actuator mainly because of its operation, power, and control characteristics. BLDC motors require digital tools for good practices in position and speed control; as well as the power electronics for optimal performance. In order to take better advantage of the characteristics in this type of motor, a control strategy is presented that allows integrating the internet of things, to monitor and satisfy the needs when applied to a BLDC motor, which will also allow driving a submersible pump. Based on these characteristics, it will be possible to have a greater range of operation of the same, consequently, a better regulation of the speed, so that the desired water flow can be provided in the application of solar pumping systems. The results obtained validate the control designed for speed regulation in the system.

BLDC Motors, Control, Arduino, IGBT

Design of a WEB application to create a repository of medicinal plants used by the Nahuas of the Huauchinango region

Diseño de una aplicación WEB para crear un repositorio de plantas medicinales usadas por los nahuas de la región de Huauchinango

TORRES-VERGARA, Francisco Alberto, CASTILLO-QUIROZ, Gregorio, SAMPAYO-RODRÍGUEZ, Carmen Jeannette and HERNANDEZ-LUNA, Aldo

Maestría en Tecnologías de la Información, Tecnológico Nacional de México/Instituto Tecnológico Superior de Huauchinango

ID 1st Author: *Francisco Alberto, Torres-Vergara* / **ORC ID:** 0000-0003-0351-2223, **CVU CONACYT ID:** 1192088

ID 1st Coauthor: *Gregorio, Castillo-Quiroz* / **ORC ID:** 0000-0002-1904-4172, **Researcher ID Thomson:** H-9402-2018, **CVU CONACYT ID:** 162009

ID 2nd Coauthor: *Carmen Jeannette, Sampayo-Rodríguez* / **ORC ID:** 0000-0001-8844-6055, **CVU CONACYT ID:** 951529

ID 3rd Coauthor: *Aldo, Hernández-Luna* / **ORC ID:** 0000-0002-7717-5314, **CVU CONACYT ID:** 441305

Abstract

The communication problem that the Nahua population of the state of Puebla currently have about medicinal herbs and alternative therapies is increasingly complicated, given that several cultural values are being lost, so it is an important opportunity to use digital media to rescue some remedies. The objective of this project is to develop an application to create and maintain a data repository that contains information on the medicinal plants used by the Nahua communities of the Huauchinango region. This project was born out of the need to communicate to future generations about the knowledge that is currently practiced in the Nahua communities about the properties of medicinal herbs in the region. The research work is carried out with the specialists of traditional peasant medicine with whom the diversity, use and management of medicinal plants classified by specialists of the Nahua peoples that they use to solve multiple diseases within their communities are documented. By having the system finished, the end user will be able to make queries about the medicinal plants, as well as the formula or recipe of the remedies. The administration of the repository can be done from a progressive WEB application.

Application, Repository, Medicinal Plants

Design proposal for manufacturing and assembly (dfma) of an electronic card to control the operation of an industrial dryer

Propuesta de diseño para manufactura Y ensamble (dfma) de una tarjeta electrónica para el control de funcionamiento de secadora industrial

CASTILLO-CASTILLO, Sandra Judith, LOYA-ESCALANTE, María Teresa, HUERTA-CHUA, Jesús and MORENO-RODRIGUEZ, Bertha María

Tecnológico Nacional de México/ ITS Poza Rica

ID 1st Author: *Sandra Judith, Castillo-Castillo* / **ORC ID:** 0000-0003-0535-7757, **CVU CONACYT ID:** 000000

ID 1st Coauthor: *María Teresa, Loya-Escalante* / **ORC ID:** 0000-0003-1515-4312, **CVU CONACYT ID:** 635849

ID 2nd Coauthor: *Jesús, Huerta-Chua* / **ORC ID:** 0000-0002-2803-0645, **CVU CONACYT ID:** 37663

ID 3rd Coauthor: *Bertha María, Moreno-Rodriguez* / **ORC ID:** 0000-0002-0598-7524, **CVU CONACYT ID:** 243865

Abstract

The following document describes the development of the design for manufacturing and assembly (DFMA) of an electronic circuit board for the operation control of an industrial type LP gas dryer. To optimize the clothes drying process inside the laundry module of the general hospital of zone No.24. The project is mainly focused on software and hardware design of the electronic control Board. This board consists of three stages, the first stage is the control panel that has digital inputs and an LCD screen to monitor the drying process. The second stage of the controller uses an ATMEGA328P microcontroller and, finally, the third stage of the circuit board is the power module, within the hardware design it also includes the design of the power supply for the same board. As for temperature control, the PT100 thermocouple type K temperature sensor is used, which will be used in the drying process. Measurements can be made as closely as possible during the drying cycle. For the design of the software and simulations the following programs were used; Proteus Design Suite and Arduino IDE. Obtaining correct results from the ON/OFF temperature and drying time control system, the hardware design is carried out, using Proteus Design Suite in the ARES interface, to carry out the PCB design of the electronic circuit board.

Electronic Design, Atmega328p, Industrial Dryer

Technological Adaptation Model; an integrated application process to the productive chain in MyPyMES

Modelo de Adaptación Tecnológica; un proceso de aplicación integrada a la cadena productiva en MyPyMES

PEÑA-MONTES DE OCA, Adriana Isela, OROZCO-MAGALLANES, Rubén Ulises and MACÍAS-BRAMBILA, Rubén Hassem

Universidad Tecnológica de Jalisco

ID 1st Author: *Adriana Isela, Peña-Montes De Oca* / **ORC ID**: 0001-8220-3108, **CVU CONACYT ID**: 70757

ID 1st Co-author: *Rubén Ulises, Orozco-Magallanes*

ID 2nd Co-author: *Hassem Rubén, Macías-Brambila* / **ORC ID**: 0000 0002-6540-7464, **CVU CONACYT ID**: 902812

Abstract

The purpose of this work is to develop a new analysis proposal an integrate the tools in the management of productive technological evolution projects in the industrial area, through a technological and procedural assurance plan for change management, focused on the creation of value and innovation, in order to face the challenges of globalized competition, respond to a productive logic with characteristics of the so-called smart factory and thus close the technological gap. Among the significant tasks, the review and analysis of the means of integration was developed, to associate them with the existing knowledge generated in the interaction, with practical purposes in decision-making activities, for the construction of strategies, and daring actions to face challenges, that promote the change to contemporary technologies, rapid methodologies, for the design and management of engineering and industrial automation projects, in order to generate competitive advantage in MyPyMES. The results allowed the construction of a Technological Adaptation Model that supports MyPyMES.

Industrial Evolution, Technologial Adaptation, Industrial Project

Advances in the design of an alternative power generation device using piezoelectric

Avances del diseño de un dispositivo de generación de energía alternativa por medio de piezoeléctricos

MUNGUÍA-NAHUÁCATL, Karen Jazmín and FRANCO-MARTÍNEZ, David

Centro Tecnológico, Facultad de Estudios Superiores Aragón, UNAM

ID 1er Author: *Karen Jazmín, Munguía-Nahuácatl* / **ORC ID:** 0000-0003-2200-3918, **CVU CONACYT ID:** 1104844

ID 1er Coauthor *David, Franco-Martínez* / **ORC ID:** 0000-0002-0464-8504, **CVU CONACYT ID:** 69978

Abstract

This article will give the progress of the project of design of a device of alternative energy generation using piezoelectric, applied in the improvement of the lighting of an urban dwelling. Giving the background of the piezoelectric effect, a diagnosis of the conditions of the housing unit in terms of the energy demand for lighting, its vehicular capacity and road conditions, as well as the proposed solution to the demand for electrical energy, indicating the necessary electronic components in the first proposal and ending with the initial design and technical analysis, to conclude with the results of the research project. It is also important to consider that within the 13 modules that are required to form the speed reducer when a vehicle passes it will not pass through the 13 modules, but only a few, so the energy generated will also have variations in the results; unless a way is sought that when the vehicle passes over the reducer, all modules are pressed at the same time.

Piezoelectric, Energy Harvesting, Alternative Energy

Web page of tourist attractions, history, culture and traditions of Acatlán de Osorio, Puebla, with location in google maps using augmented reality

Página web de atractivos turísticos, historia, cultura y tradiciones de Acatlán de Osorio, Puebla, con localización en google maps utilizando realidad aumentada

ROJAS-NANDO, Julio Cesar, NIETO-ROSALES, Ana Laura, FUENTES-CORTES, Miguel and GONZALEZ-SERRET, Mónica

Instituto Tecnológico Superior de Acatlán de Osorio, Puebla

ID 1st Author: *Julio Cesar, Rojas-Nando* / **ORC ID:** 0000-0002-1143-3982, **CVU CONACYT ID:** 453986

ID 1st Coauthor: *Ana Laura Nieto-Rosales* / **ORC ID:** 0000-0003-3059-9301, **CVU CONACYT ID:** 683557

ID 2nd Coauthor *Miguel, Fuentes-Cortes* / **ORC ID:** 0000-0002-7883-8941, **CVU CONACYT ID:** 1057527

ID 3rd Coauthor: *Mónica, González-Serret* / **ORC ID:** 0000-0002-5836-3037, **CVU CONACYT ID:** 000000

Abstract

The present work consists of informing the result of an investigation which consisted of developing a web page of the areas considered as tourist attractions, as well as containing the history, culture and traditions of the municipality of Acatlán de Osorio; on said page this information was captured to make the municipality known to tourists who seek to visit places enriched with culture such as said municipality, the web page will show the tourist place that is of the clienct's preference, as well as the geographic location of the place, a visualization in augmented reality, with an audio description of the place, which will attract more attention, encouraging the client to visit said place, this is a way to help improve the economy of the municipality. The results reflected in this document show that the tourist places of this municipality can already be consulted in an easy and attractive way for the client.

Website, Tourism, Augmented Reality

Mechanical characterization of spent- coffee-grounds briquettes

Caracterización Mecánica de Briquetas de Borra de Café

CHAMARRAVÍ-GUERRA, Oscar and MORENO-ARIAS, Claudio Alberto

Fundación Universidad de América,

ID 1st Author: *Oscar, Chamarraví-Guerra* / **ORC ID:** 0000-0002-6571-6814

ID 1st Coauthor: *Claudio, Alberto Moreno-Arias* / **ORC ID:** 0000-0001-6103-8238

Abstract

This article provides an overview of the manufacture of briquettes by mixing spent coffee grounds (SCG) and recycled newsprint (RNP), with some established compositions. Hollow cylindrical briquettes were used as samples for mechanical characterization for the research project *"Characterization of type 2 biomass briquettes as solid fuel alternative to firewood and coal in kitchens, restaurants and small businesses, based on the Colombian Technical Standard 2060"* carried out at the University of America in Bogotá, Colombia. Initially, the process of design and construction of a Peterson type press for the manufacture of briquettes was carried out. A universal testing machine was used for the mechanical compression tests. The shatter resistance was evaluated by launching the samples in free-fall from a height of 1 m several times until they got broken. Finally, and the abrasion resistance was measured using a ball-mill adapted to the proposed briquette size. All these tests were carried out to identify which of the proposed briquettes compositions has suitable mechanical properties to keep the shape, size and density in the actual processes of transport, handling and storage.

Briquettes, Spent Coffee Ground, Solid Biomass, Solid Biofuels

Application based on Machine Learning to obtain information on monuments and tourist areas (P-Search)

Aplicación basada en Machine Learning para obtención de información de monumentos y zonas turísticas (P-Search)

ARROYO-ALMAGUER, Marisol, GONZÁLEZ-MARTÍNEZ, Mary Carmen, CHÁVEZ-VIDAL, Eduardo Jesús and RODRÍGUEZ-VARGAS, María de Jesús

Universidad Tecnológica del Suroeste de Guanajuato

ID 1st Author: *Marisol, Arroyo-Almaguer* / **ORC ID:** 0000-0002-7360-8952, **CVU CONACYT ID:** 469149

ID 1st Coauthor: *Mary Carmen, González-Martínez* / **ORC ID:** 0000-0001-6028-0508

ID 2nd Coauthor: *Eduardo Jesús, Chávez-Vidal* / **ORC ID:** 0000-0002-5058-1654

ID 3rd Coauthor: *María de Jesús, Rodríguez-Vargas* / **ORC ID:** 0000-0002-3849-622X, **CVU CONACYT ID:** 509738

Abstract

Guanajuato seeks to boost the tourism sector, increasing the level of satisfaction in the experiences of visitors to the state, encouraging the use of technology and promoting its accessibility (Government of the state of Guanajuato, 2021). As a result of the use of new technologies, mainly through mobile devices, users want to obtain more information about their environment with the least possible effort. In this context, the P-Search application emerges, with the aim of improving the tourist experience by obtaining information about the monuments and places that the user visits, without the need for a tourist guide. By taking a photograph of the monument and / or place, the application will do the image recognition process and the user will be able to view the corresponding information. The application uses a Machine Learning algorithm and a data repository to perform image classification and maintain a history with the preferred categories for the user. The first version of the application continues to update the classification process, expanding the number and variety of images used for training and knowledge of the database, using optimization tools.

Machine Learning, KNN Algorithm, Tourism Sector

Energy audit in an ice factory in the city of San Francisco de Campeche, Mexico.

Análisis energético en una fábrica de hielo en la ciudad de San Francisco de Campeche, México

CHAN-GONZALEZ, Jorge J., SALAZAR-TORRES, Miguel, LANZ-GUTIÉRREZ DE VELASCO, Víctor and LEZAMA-ZÁRRAGA, Francisco

Universidad Autónoma De Campeche,

ID 1st Author: *Jorge J., Chan-Gonzalez* / **ORC ID:** 0000-0002-8638-1646, **CVU CONACYT ID:** 89415

ID 1 st Coauthor: *Miguel, Salazar-Torres* / **ORC ID:** 0000-0001-7271-6348

ID 2nd Coauthor: *Víctor, Lanz-Gutiérrez De Velasco* / **ORC ID:** 0000-0002-8185-1151

ID 3rd Coauthor: *Francisco, Lezama-Zárraga* / **ORC ID:** 0000-0001-7475-6458, **CVU CONACYT ID:** 205493

Abstract

The cost of electricity represents a high percentage of the operating expenses of a company. It is important to establish strategies and operational policies for the efficient use of energy and consequently obtain economic savings. This paper presents a strategy aimed at the efficient use of electrical energy in the equipment installed in an ice factory in the city of Campeche, Mexico to reduce and control electricity demand, particularly during times of higher energy costs (peak hours).–Optimize the operation of electrical equipment without affecting the production process, in such a way as to reduce operating costs and increase the company's profits. Some of the problems detected were: poor design of the plant and its electrical and control installations. Lack of maintenance (preventive, predictive and corrective). Lack of training of operating personnel. Poor prioritization of electrical loads and disconnection and reconnection times. Inadequate environmental conditions. On the other hand, it was found that it is cheaper to make 10 tons of ice with a 30-ton capacity machine than with a 20-ton one; the cost of energy per month is lower by a difference of $9,210.25 per month. It was also found that by placing thermal isolation in a flooded cooler, it has a decrease in its energy consumption by 56%.

Energy Analysis, Energy Efficiency, Ice Factory

Reliability modeling based on Maximum Entropy and non-central moments as an alternative for RCM schemes or replaceable systems

Modelización de la fiabilidad basada en la máxima entropía y los momentos no centrales como alternativa para los esquemas RCM o los sistemas reemplazables

PEREZ-GOMEZ GAONA, Octavio, VAZQUEZ-CARDONA, Vanessa, GONZALEZ-GONZALEZ, David and PRAGA-ALEJO, Rolando

Universidad Autónoma de Coahuila

ID 1 st Author: *Octavio, Perez-Gomez Gaona* / **ORC ID:** 0000-0003-1341-0589, **CVU CONACYT ID:** 889698

ID 1 st Coauthor: *Vanessa, Vazquez-Cardona* / **ORC ID:** 0000-0002-4199-3585

ID 2 nd Coauthor: *David, Gonzalez-Gonzalez* / **ORC ID:** 0000-0002-8135-4403, **CVU CONACYT ID:** 47846

ID 3 rd Coauthor: *Rolando, Praga-Alejo* / **ORC ID:** 0000-0001-5512-2732, **CVU CONACYT ID:** 48020

Abstract

This paper offers an alternative to determine reliability-centered maintenance (RCM) schemes for replaceable systems, when replacement times are censored and only the information that maintenance technicians, from the subjectivity of their experience, is available. Using differential entropy in information theory, and exploiting Lagrangian optimization algorithms, a Generalized Probability Density of Maximum Entropy (GPDME) is extracted. Lagrangian techniques provide a set of parameters that characterize the GPDME, the estimation of the parameters is done by first order perturbation of the integral of non-central moments, with which, the GPDME is typically built. In the emerging industry, RCM maintenance plans are not a common standard, in an attempt to put into practice, the benefits of RCM to this industrial segment, a case study, where the presented methodology was applied is provided. In the discussion and conclusions section, the areas of opportunity that are observed in the methodology presented in this work are adressed.

Rcm-Reliability, Entropy, Lagrangian

Animatronic system for promoting the learning of the nahuatl language

Sistema animatrónico para el fomento del aprendizaje de la lengua nahuatl

CASTILLO-QUIROZ, Gregorio, LIMON-DIAZ, Miguel Ángel, SAMPAYO-CARCAMO, Matilde and ROJAS-BALBUENA, Dorian

Ingeniería Mecatrónica, Tecnológico Nacional de México/Instituto Tecnológico Superior de Huauchinango

ID 1st Author: *Gregorio, Castillo-Quiroz* / **ORC ID:** 0000-0002-1904-4172, **Researcher ID Thomson**: H-9402-2018, **CVU CONACYT ID:** 162009

ID 1st Coauthor: *Miguel Angel, Limon-Diaz* / **ORC ID:** 0000-0002-7578-7077, **Researcher ID Thomson**: T-6486-2017, **CVU CONACYT ID:** 349952

ID 2nd Coauthor: *Matilde, Sampayo-Carcamo* / **ORC ID:** 0000-0003-4506-5396, **CVU CONACYT ID:** 368456

ID 3rd Coauthor: *Dorian, Rojas-Balbuena* / **ORC ID:** 0000-0002-4770-8669, **Researcher ID Thomson**: AAN-1530-2020, **CVU CONACYT ID:** 299726

Abstract

Currently, communication in the Nahuatl language in the Sierra Norte region of the State of Puebla is a minority language, that is to say, it is only spoken by adults and is mixed with Spanish words. The objective of this project is to develop an animatronic system as a didactic material for the diffusion and promotion of a native language "nahuatl", by means of an animatronic puppet in the shape of a child, which allows the user to identify himself with the attire and characteristics of a Nahua person of the region, it also has a sound emission in nahuatl language and Spanish: words, phrases and dialogues. The main part consists of various electromechanical systems that allow it to perform synchronized movements with the sounds emitted, providing an expressive, friendly and attractive communication. With the development of this project, the personification of a prototype for the teaching of the Nahuatl language was achieved in order to promote the learning of a language that was being lost.

Indigenous Population, Nahuatl, Teaching

Android application for tracking the garbage collection vehicle in Huauchinango Puebla

Aplicación Android para el rastreo del vehículo recolector de basura en Huauchinango Puebla

BARRON-CASTILLO, Jorge Alfredo, HERNÁNDEZ-LUNA, Aldo, TORRES-JIMÉNEZ, Jacinto and LUNA-CARRASCO, Claudia Yadira

Tecnológico Nacional de México/Instituto Tecnológico Superior de Huauchinango, México.

ID 1st Author: *Jorge Alfredo, Barrón-Castillo* / **ORC ID**: 0000-0001-8055-3892, **CVU CONACYT ID**: 1162160

ID 1st Coauthor: *Aldo, Hernández-Luna* / **ORC ID**: 0000-0002-7717-5314, **CVU CONACYT ID**: 441305

ID 2nd Coauthor: *Jacinto, Torres-Jiménez* / **ORC ID**: 0000-0002-8006-6397, **CVU CONACYT ID**: 103469

ID 3rd Coauthor: *Claudia Yadira, Luna-Carrasco* / **ORC ID**: 0000-0002-4092-9987, **CVU CONACYT ID**: 368419

Abstract

The present investigation deals with the development of an application for Android devices to monitor in real time the garbage collection vehicle in the municipality of Huauchinango Puebla, the objective of this is to propose a solution for the collection problems in the city of Huauchinango Puebla, and thus be able to avoid sources of infection, bad appearance and accumulation of animals that can be dangerous for the general public. The application will be developed in Android Studio, using the extreme programming methodology for its development. The satellite tracking will be through an Android application which will constantly send the geolocation of the vehicle to a server that in turn will be accessed by a second application to indicate the location of the vehicle, as well as this will show the warnings when the collection vehicle does not Make your route, go late, when you are close and at what time you will be arriving at the collection area in order to remove the waste in a timely manner.

Android, Geolocation, Collection, Application

Thermodynamic Analysis of a Stirling Cycle with Nuclear Heat Source for Aerospace Applications

Análisis Termodinámico de un Ciclo Stirling con Fuente de Calor Nuclear para Aplicaciones Aeroespaciales

DIAZ-ESPINOZA, Gerardo, GALLARDO-VILLARREAL, José Manuel and VALLE HERNANDEZ, Julio

Universidad Politécnica Metropolitana de Hidalgo

ID 1st Author: *Gerardo, Diaz Espinoza* / **ORC ID:** 0000-0003-1293-0275**, CVU CONACYT ID:** 926199

ID 1st Coauthor: *José Manuel, Gallardo Villarreal* / **ORC ID:** 0000-0002-7578-7229, **CVU CONACYT ID:** 366394

ID 2nd Coauthor: *Julio, Valle Hernandez* / **ORC ID:** 0000-0001-8957-0066, **CVU CONACYT ID:** 210743

Abstract

The main requirement for the development of aerospace missions is the energy supply, for example, 10 kWe would be required for the day and 9 kWe for the night during the first phase of construction of a human settlement on the moon. To satisfy the energy demand, it was proposed the use of heat due to a nuclear fission reaction, coupled to a Stirling engine as a dynamic power converter. The Stirling engine is used since it has less mass, a smaller heat sink area and a longer useful life compared to another type of power converter, thus being the most suitable for coupling with the Optimized Evolutionary Growth Lunar nuclear reactor, which will be the thermal power source of the electrical power generation system presented in this article. In this article, it is shown the thermodynamic analysis that involves the transport of heat from the nuclear reactor to helium as the working fluid of the dynamic power converter. The initial parameters are obtained for the analysis: temperature, pressures and volumes, which will allow us to carry out the mathematical modeling of the Stirling Method (Ideal). As results, a comparison is presented between the variations of proposed parameters with the purpose of determining the behavior of the useful work and the electrical power in the system, evaluating the compression ratio, the angular velocity and the initial pressure.

Stirling Engine, Nuclear Reactor, Thermodynamic Analysis

Graphical user interface for a PLC programming implemented in an ARM Cortex-M4 microcontroller

Interfaz para la programación gráfica de un PLC implementado en un microcontrolador ARM Cortex-M4

EUSEBIO-GRANDE, Raúl, IBARRA-BONILLA, Mariana Natalia, AMARO-BALANZAR, Jovanni and SÁNCHEZ-TEXIS, Fernando

Tecnológico Nacional de México–Instituto Tecnológico Superior de Atlixco.

ID 1st Author: *Raúl, Eusebio-Grande* / **ORC ID:** 0000-0001-7062-3244, **CVU CONACYT ID:** 1000358

ID 1st Coauthor: *Mariana Natalia, Ibarra-Bonilla* / **ORC ID:** 0000-0001-7123-9105, **CVU CONACYT ID:** 237756

ID 2nd Coauthor: *Jovanni, Amaro-Balanzar* / **ORC ID:** 0000-0002-2646-7659

ID 3rd Coauthor: *Fernando, Sánchez-Texis* / **ORC ID:** 0000-0001-8964-1039, **CVU CONACYT ID:** 233888

Abstract

This paper presents the design of a Programmable Logic Controller (PLC) using an ARM Cortex-M4 microcontroller, model STM32F407, which allows integrating the OS-Micropython operating system. To controlling the PLC hardware, the development of a graphical or visual type-programming interface is presented that is easy to use for the operator and incorporates power control functions, such as control of digital inputs/outputs, analog channels readings, timers and counters. The interface communicates with the PLC microcontroller through the UART serial protocol. The firmware microcontroller and the graphical interface were programmed in Python language. Two validation tests for the interface are presented, that probe the correct performance. This work is part of one of the stages of development of a clay sifter- lump-breaker-type machine, which will be operated by ceramic producers in the Cohuecan region in the state of Puebla, Mexico, where it is expected to automate the pottery process and influence the economic reactivation of the region.

Interface, PLC, ARM Microcontroller, Python

Energy Efficiency of a stones and minerals breaker plant in Campeche State to comply with the process Procedimiento de Evaluación de Conformidad (PEC) de la NOM-001- SEDE-2012

Eficiencia energética en una Quebradora de piedra y minerales en el Estado de Campeche para cumplir con el Procedimiento de Evaluación de Conformidad (PEC) de la NOM-001-SEDE-2012

LEZAMA-ZÁRRAGA, Francisco Román, SHIH, Meng Yen, CHAN-GONZALEZ, Jorge de Jesús and SALAZAR-UITZ, Ricardo Rubén

Universidad Autónoma De Campeche

ID 1st Author: Francisco Román LEZAMA-ZÁRRAGA / **ORC ID:** 0000-0003-3397-7881, **Researcher ID Thomson:** U-1229-2018, **CVU CONACYT ID:** 205493

ID 1st Coauthor: *Meng Yen, Shih* / **ORC ID:** 0000-0001-7475-6458, **CVU CONACYT ID:** 408617

ID 2nd Coauthor: *Jorge De Jesús, Chan-Gonzalez* / **ORC ID:** 0000-0002-8638-1646, **CVU CONACYT ID:** 84196

ID 3rd Coauthor: *Ricardo Rubén, Salazar-Uitz* / **ORC ID:** 0000-0003-2307-737X, **CVU CONACYT ID:** 416277

Abstract

This article presents an energy efficiency study for a stone and mineral breaker plant that meets the requirements for the interconnection of a Load Center to the medium voltage distribution network of the National Electric System in accordance with the provisions of the Procedimiento de Evaluación de Conformidad (PEC) de la NOM-001-SEDE-2012. Through an energy diagnosis, the operating conditions of low-voltage electrical installations are evaluated, verifying the voltage and current levels, demand and consumption, in addition to monitoring the level of load imbalance in the three-phase system. In addition, it is visualized that conductors, conduits, protections and connected equipment are adequate to maintain said installations in safe and reliable conditions in such a way that when an electrical installation verification unit (UVIE) arrives, it provides the Load Center with the Verification Opinion of Electrical Installations signing in accordance and in which it certifies that it is complying with the applicable provisions of NOM-001-SEDE-2012, Instalaciones Eléctricas (utilización).

Energy Diagnosis, Load Center, Verification Unit

Design and construction of a token vending machine for wireless internet connection

Diseño y construcción de máquina expendedora de fichas para conectarse a internet inalámbrico

SAMPAYO-RODRIGUEZ, Carmen Jeannette, CASTILLO-QUIROZ, Gregorio, HERNANDEZ-LUNA, Aldo and CABRERA-HERNANDEZ, Iberio

Tecnológico Nacional de México / Instituto Tecnológico Superior de Huauchinango

ID 1st Author: *Carmen Jeannette, Sampayo Rodriguez* / **ORC ID:** 0000-0001-8844-6055, **CVU CONACYT ID:** 951529

ID 1st Coauthor: *Gregorio, Castillo-Quiroz* / **ORC ID:** 0000-0002-1904-4172, **Researcher ID Thomson:** H-9402-2018, **CVU CONACYT ID:** 162009

ID 2nd Coauthor: *Aldo, Hernández-Luna* / **ORC ID**: 0000-0002-7717-5314, CVU CONACYT ID: 441305.

ID 3rd Coauthor: *Iberio, Cabrera-Hernández* / **ORC ID:** 0000-0002-3359-3848

Abstract

This paper presents the design and construction of a machine that automates the process of selling access credentials to a wireless network. For its construction, the V methodology for project management was followed. The machine consists of a closed box with two buttons on the outside to indicate the start and end of the transaction, a 16x2 LCD screen with an I2c conversion interface to show transaction, user and password indications, a multi-currency purse and four LED lights that serve as indicators of the amount entered. Internally the machine consists of an ESP-8266-E development board, an Mb102 breadboard source module, a 12V 2.5A eliminator, a 5.0 V universal charger cube and a breadboard. Logically, the web-based spreadsheet (Google sheets), Google apps script and the Arduino integrated development environment were used. The result is a low-cost prototype, which provides controlled internet access credentials for multiple users.

Prototype, Credentials, User, Automation, Process

Development of a virtual reality driving experience of a Formula SAE-type vehicle

Desarrollo de una experiencia de manejo en realidad virtual de un vehículo tipo Formula SAE

SOLIS-ARRIAGA, Everth Rafael, CORDERO-GURIDI, José de Jesús, VELAZQUEZ-MENDEZ, Andrés and PÉREZ-REYES, Karol Josafat

Universidad Popular Autónoma del Estado de Puebla

ID 1st Author: *Everth Rafael, Solis-Arriaga* / **ORC ID:** 0000-0002-1757-4997

ID 1st Coauthor: *José de Jesús, Cordero-Guridi* / **ORC ID:** 0000-0001-5201-1906

ID 2nd Coauthor: *Andrés, Velazquez-Mendez* / **ORC ID:** 0000-0002-3007-9632

ID 3 rd Coauthor: *Karol Josafat, Pérez-Reyes* / **ORC ID:** 0000-0002-9350-6830

Abstract

The objective of this work was to develop a virtual environment with the purpose of developing a driving experience in a FORMULA SAE type vehicle. The use of virtual reality has not only the purpose of entertainment, but also many more applications. From the different software tools for virtual reality, the use of the video game engine software Unity was essential. It is shown the development of a simulator that allows experiencing the movement of a Formula SAE-type vehicle through a simulated F1 track. To achieve this, we use a Formula SAE model designed by the UPAEP university. The results obtained showed different effects and sensations, including physiological effects such as dizziness depending on the variables of the simulator. However, it is a way to experience driving conditions in a Formula SAE-type vehicle. The simulator was validated by a group of engineering students and participants of the Formula SAE project, discovering results and findings from the simulation experience that allow the project to grow.

Virtual Reality, Formula SAE, Unity, Driving experience

Evaluation of a Refrigerated Container using Photovoltaic Solar Energy for its Implementation in the Mayan Train

Evaluación de un Contenedor Refrigerado mediante Energía Solar Fotovoltaica Para su Implementación en el Tren Maya

VALLE-HERNANDEZ, Julio, CANSECO-SANDOVAL, Karen, APARICIO-BURGOS, José Esteban and TORRES-MENDOZA Galilea

Universidad Autónoma del Estado de Hidalgo, Escuela Superior de Apan.

ID 1st Author: *Julio, Valle-Hernández* / **ORC ID:** 0000-0001-8957-0066, **Researcher ID Thomson:** O-7339-2018, **CVU CONACYT ID:** 210743

ID 1st Coautor: *Karen, Canseco-Sandoval* / **ORC ID:** 0000-0002-6353-1824, **Researcher ID Thomson:** AGB-0910-2022

ID 2nd Coautor: *José Esteban, Aparicio-Burgos* / **ORC ID:** 0000-0002-7611-7825, **Researcher ID Thomson:** C-5019-2017, **CVU CNACYT ID:** 224034

ID 3rd Coautor: *Galilea, Torres-Mendoza* / **ORC ID:** 0000-0003-4542-5144

Abstract

In this work, the energy evaluation of a refrigerated container is carried out for the transport of perishable products produced in the Southeast of Mexico, through the Mayan Train, for this design meat, products were considered. The design of the container is carried out through the selection of materials for its construction, the calculation of thermal loads, which are obtained from the climatic conditions of the place, and the properties of the meat that will be transported. Therefore, the refrigeration system used for this design is a simple vapor compression system, using R152a as refrigerant. For the sizing of the autonomous photovoltaic system, the amount of energy supplied is determined from the area available in the container, and the analysis of irradiation, over the last 10 years, in the states proposed by the Mayan Train route; Quintana Roo, Yucatan, Campeche, Chiapas and Tabasco. As a result, the power of the compressor, the COP coefficient of performance was obtained and a comparison is made with the energy required by the refrigeration cycle, along the proposed route.

Meat, Solar energy, Photovoltaic system, Refrigerated container, Mayan Train, Energy performance

Nuclear energy as backup to renewable energies

Energía nuclear como respaldo a las energías renovables

JIMÉNEZ-ROANO, Guadalupe, CRUZ-GÓMEZ, Marco Antonio, MEJÍA-PÉREZ, José Alfredo and JUÁREZ-ZERÓN, Tomás Aarón

Benemérita Universidad Autónoma de Puebla

ID 1st Author: *Guadalupe, Jiménez-Roano* / **ORC ID:** 0000-0001-7316-5015, **Researcher ID Thomson:** AGC-4811-2022, **CVU CONACYT ID:** 1190772

ID 1st Coauthor: *Marco Antonio, Cruz-Gómez* / **ORC ID:** 0000-0003-1091-8133, **Researcher ID Thomson**: S-3098-2018, **CVU CONACYT ID:** 349626

ID 2nd Coauthor: *José Alfredo, Mejía-Pérez* / **ORC ID:** 0000-0002-4090-8828, **Researcher ID Thomson:** G-3354-2019

ID 3rd Coauthor: *Tomás Aarón, Juárez-Zerón* / **ORC ID:** 0000-0002-9796-0540, **Researcher ID Thomson:** S-3099-2018, **CVU CONACYT ID:** 295058

Abstract

Due to climate change, the use of nuclear energy for electricity production has been presented as a backup alternative to renewable powers to reduce CO2 emissions while maintaining energy stability. Currently, the carbon dioxide emissions produced related to the energy sector increased by 6% by 2021, reaching 36.3 billion tons (their highest level in history), the cause of this event is due to the global economic recovery after the COVID-19 crisis, which relied heavily on coal to fuel its increase. The main problem with nuclear energy lies in the waste produced by the nuclear fission reaction, therefore, the objective of this research was to gather information on why nuclear energy is considered clean energy, the current management of nuclear waste, and public opinion, with information obtained from the most recent articles on the production of electrical energy through nuclear energy.

Nuclear power, Fission, Clean energy

Design of a simulator for the energy evaluation of cold rooms

Diseño de un simulador para la evaluación energética de cámaras frigoríficas

VALLE-HERNANDEZ, Julio, DE SANTIAGO-HERRERA, Maria Guadalupe, MANZANO-MUÑOZ Meily Yoselin and ROMÁN-AGUILAR, Raúl

Universidad Autónoma del Estado de Hidalgo- Escuela Superior de Apan

ID 1st Author: *Julio, Valle-Hernandez* / **ORC ID:** 0000-0001-89570066, **Researcher ID Thomson:** 0-7339-2018, **CVU CONACYT ID:** 210743

ID 1st Coauthor: *Maria Guadalupe, De Santiago-Herrera* **/ ORC ID:** 0000-0002-5105-6835, **Researcher ID Thomson:** AGO-7442-2022

ID 2nd Coauthor: *Meily Yoselin, Manzano-Muñoz* / **ORC ID:** 0000-0002-2851-7998

ID 3rd Coauthor: *Raúl, Román-Aguilar* / **ORC ID:** 0000-0003-0753-2352, **CVU CONACYT ID:** 165332

Abstract

This paper presents the design of a simulator to evaluate the performance of cold rooms, which allows to determine the feasibility of its implementation. The design is based on the selection of construction materials and the dimensions of the cold rooms, to later determine the thermal loads that allow estimating the heat to be removed from the product. From the thermal loads, the modeling of the thermodynamic cycle, simple steam compression cycle, is obtained the work of the compressor and the coefficient of performance of the system are obtained. The evaluation of the performance of the simulator was carried out for climatic conditions of the municipality of Apan Hidalgo, where the storage of poultry meat in a range of 0°C to 4°C was considered. The proposed cold room can store a maximum capacity of 500 birds. As a result, the simulator obtains the thermal loads associated with the cooling process, the behavior of the cooling cycle, the heat removed by the system, the work of the compressor, the number of cycles per day, the behavior of the temperature of the product inside the cold rooms and the energy consumed by the system.

Cold Room, Poultry Conservation, Energy Consumption

Technical feasibility for a service company through the systematic planning method for plant distribution (SLP)

Factibilidad técnica para una empresa de servicios a través del método de planeación sistemática para la distribución de planta (SLP)

CRUZ-SOLÍS, Edgar Jesús, MARTÍNEZ-HERNÁNDEZ, Julio Cesar, QUIROGA-HERNÁNDEZ, Celina and HERNÁNDEZ-LUNA, Aldo

Tecnológico Nacional de México/ ITS Huauchinango

ID 1st Author: *Edgar Jesús, Cruz-Solís* / **ORC ID:** 0000-0003-4083-0888, **CVU CONACYT ID:** 904718

ID 1st Coauthor: *Julio Cesar, Martínez-Hernández* / **ORC ID:** 0000-0001-9528-156X, **CVU CONACYT ID:** 904537

ID 2nd Coauthor: *Celina, Quiroga Hernández* / **ORC ID:** 0000-0002-5685-7391, **CVU CONACYT ID:** 1221103

ID 3rd Coauthor: *Aldo, Hernández-Luna* / **ORC ID:** 0000-0002-7717-5314, **CVU CONACYT ID:** 441305

Abstract

The SLP method (Systematic Layout Planning), is an organized technique for planning a distribution, made up of four phases, in a series of procedures to identify, evaluate and visualize the elements and areas to be distributed. The following case study proposes a new installation of Mathfer Services based on the SLP methodology for the optimization of resources with an efficient and safe handling of electrical materials, considering the dimensions and characteristics of the projects, through macrolocation and microlocation, the selection of equipment for handling raw materials and electrical supplies, the analysis and representation of the interaction of activities, the determination of spaces and general distribution, ending with the design and detailed presentation of the new installation of Mathfer Services through AutoCAD software and the presentation of the renderings of the modeling of the installation in the SketchUp software. Emphasizing that the design of an installation is not exclusive to the manufacturing industry, it is applicable to all types of spaces, as in this case, services.

Planning, Modeling, Interaction

Design and construction of pressure leak testers through the analysis of the filling level for the detection of defects in the nozzle of plastic containers

Diseño y construcción de probadoras de fugas de presión por medio del análisis del nivel de llenado para la detección de defectos en la boquilla de envases plásticos

MENDOZA-OLIVARES, José David, MARTÍNEZ-CARRILLO, Irma, JUÁREZ-TOLEDO, Carlos and BAROCIO-ESPEJO, Emilio

Universidad Autónoma del Estado de México-Unidad Académica Profesional Tianguistenco

ID 1st Author: *José David, Mendoza-Olivares* / **ORC ID**: 0000-0003-4665-9612

ID 1st Coauthor: *Irma, Martínez-Carrillo* / **ORC ID**: 0000-0002-7952-4418, **Researcher ID Thomson**: B-9264-2016, **CVU CONACYT ID**: 39914

ID 2nd Coauthor: *Carlos, Juárez-Toledo* / **ORC ID**: 0000-0002-7440-3246, **Researcher ID Thomson**: C-1368-2016, **CVU CONACYT ID**: 39912

ID 3rd Coauthor: *Emilio, Barocio-Espejo* / **ORC ID**: 0000-0003-2311-7765, **CVU CONACYT ID**: 30951

Abstract

Plastic Container Manufacturing Process, many equipment has been developed for the detection of defects, for example: vision cameras, pressure test leak testers, colorimeters, hermeticity cameras, etc. each form is designed to detect a specific defect, it is updated as technology improves. Currently, the industry has opted for the use of microcontrollers that help automate industrial processes, one of the most used micros is Arduino due to its simplicity of programming and low cost of operation. The objective of this work is to apply an Arduino system for the monitoring of pressure leak testers in plastic containers. Finally, the paper shows the possible change of a particular system based on PLC with ladder logic language, by a simple system based on microcontrollers.

Upgrading Of Pressure Leak Testers, Plastic Containers, Microcontroller Programming

Organic packaging proposal of biopolymer base starch-exudate tree *Capparis scabrida* for blueberry's conservation

Propuesta de embalaje ecológico de biopolímero base almidón-exudado de árbol *Capparis scabrida* para la conservación de blueberries

LAGOS-LÓPEZ, Lorena, CRUZ-GÓMEZ, Marco Antonio, TEUTLI-LEÓN, María Maura Margarita and LÓPEZ-AGUILAR, Genaro Roberto

Benemérita Universidad Autónoma de Puebla

ID 1st Author: *Lorena, Lagos-López* / **ORC ID:** 0000-0002-7865-6443, **Researcher ID Thomson:** AFR-3376-2022, **CVU CONACYT ID:** 1190369

ID 1st Coauthor: *Marco Antonio, Cruz-Gómez* / **ORC ID:** 0000-0003-1091-8133, **Researcher ID Thomson:** S-3098-2018, **CVU CONACYT ID:** 349626

ID 2nd Coauthor: *María Maura Margarita, Teutli-León* / **ORC ID:** 0000-0002-8799-8891, **Researcher ID Thomson:** AAL-8481-2021, **CVU CONACYT ID:** 120326

ID 3rd Coauthor: *Genaro Roberto, López-Aguilar* / **ORC ID:** 0000-0003-0140-7163, **Researcher ID Thomson:** AAN-6708-2021, **CVU CONACYT ID:** 504343

Abstract

The current need to reduce environmental degradation and seek environmentally friendly packaging alternatives has encouraged research into new products based on biological resources such as biopolymers (polysaccharides), such as the starch in potatoes. The objective of this research was to identify the properties of potato peel joined with a natural plasticizer obtained from tree exudate *Capparis scabrida* as a blueberry packaging alternative, which presents sensitivity to deterioration, a suitable packaging with an abundance of starch can delay this phenomenon, on the other hand, synthetic polymer packaging deteriorates the product. A mixed analysis was performed, applying the quantification and estimation of the biopolymer for the packaging's development according to the control variables such as biodegradability, functionality, breathing rate, and weight loss of the fruit. The technical data obtained from the biopolymer were the basis of the decision-making process for the implementation of packaging as a replacement for existing synthetic polymers. The characterization will be the reason for future works for its optimization.

Biopolymers, Packaging, Blueberries

Brake systems tribological analysis and their evolution in sustainable characterization

Análisis tribológico de sistemas de frenos y su evolución en la caracterización sustentable

LAGOS-LÓPEZ, Lorena, CRUZ-GOMEZ, Marco Antonio, MEJÍA-PÉREZ, José Alfredo and ESPINOSA-CARRASCO, María del Rosario

Benemérita Universidad Autónoma de Puebla

ID 1st Author: *Lorena, Lagos-López* / **ORC ID:** 0000-0002-7865-6443, **Researcher ID Thomson:** AFR-3376-2022, **CVU CONACIT ID:** 1190369

ID 1st Coauthor: *Marco Antonio, Cruz-Gómez* **/ ORC ID**: 0000-0003-1091-8133, **Researcher ID Thomson**: S-3098-2018, **CVU CONACYT ID**: 349626

ID 2nd Coauthor: *José Alfredo, Mejía-Pérez* / **ORC ID:** 0000-0002-4090-8828, **Researcher ID Thomson:** G-3354-2019

ID 3rd Coauthor: *María del Rosario, Espinosa-Carrasco* / **ORC ID:** 0000-0002-5094-2800, **Researcher ID Thomson:** AAP-2965-2020, **CVU CONACYT ID:** 1018747

Abstract

This research aimed to analyze the different brake systems using tribology as a tool for the optimization of controlled systems. Automotive braking systems in high-tech technology were analyzed to identify the variables involved and relate them to the results of the different tribological studies. Traditional braking systems were compared with respect to the regenerative ones used in high-end hybrid and electric cars, in order to identify the technologies applied in tribological systems and their evolution. The variables analyzed were force, contact area, friction coefficient, force cyclical variation, rpm, time, acoustic emission, sliding speed, torque, temperature, and surface misalignment, among others. The results of the different case studies determined that regenerative brake systems are prototypes in continuous sustainable evolution and tribology, together with electronics, contributes with analyzes to achieve more precise controlled systems.

Sustainable braking technology, Tribological studies, Regenerative brake systems

Two Axis Solar Tracker Monitoring

Monitoreo de Seguidor Solar de Dos Ejes Tipo Monoposte

SANTANA-CRUZ, Rene Francisco; OLIVO-FLORES, Marco Antonio; OCAMPO-MARTÍNEZ, Rafael and SOTELO-MATÍNEZ, Samuel

Laboratorio de Innovación Energética y Agricultura Inteligente y Sostenible (LEIISA), Universidad Tecnológica de San Juan del Río

ID 1st Author: *Rene, Santana-Cruz* / **ORC ID:** 0000-0003-3176-7100, **Researcher ID Thomson**: GLS-6949-2022

ID 1st Coauthor: *Marco Antonio, Olivo-Flores* / **ORC ID:** 0000-0002-8165-5062, **Researcher ID Thomson**: S-4865-2018, CVU CONACYT ID: 585138

ID 2nd Coauthor: *Rafael, Ocampo-Martínez* / **ORC ID:** 0000-0002-5201-9040, **Researcher ID Thomson**: S-476-2018, **CVU CONACYT ID**: 288191

ID 3rd Coauthor: *Samuel, Sotelo-Martínez* / **ORC ID:** 0000-0003-0245-4789; **CVU CONACYT ID:** 684525

Abstract

Solar trackers have emerged as an alternative for increased solar energy collection for photovoltaic panels (PV). However, PV trackers could eventually fail or have unexpected changes during tracking, requiring continuous knowledge of the solar tracker parameters at any time. It is possible to accomplish with IoT communication, which consists of implementing microcontrollers, embedded computers and network communication to transmit the information to a server. This paper presents a monitoring scheme for two-axis single pole solar trackers. In contrast to the published papers in the state of the art, it has more functionality and greater flexibility, employing a Wi-Fi connection with the Raspberry PI 4B. This monitoring scheme has been experimentally tested using the motors for a two-axis single pole solar tracker, resulting in an excellent performance along their trajectories.

Monitoring, Solar Tracker, Solar Panels

Proposal for an energy sustainability strategy for the Technological University of Aguascalientes

Propuesta de Estrategia de sustentabilidad energética para la Universidad Tecnológica de Aguascalientes

CASTILLO-ZÁRATE, Ma. Alicia

Universidad Tecnológica de Aguascalientes, México

ID 1st Author: *Ma. Alicia, Castillo-Zarate* / **ORC ID:** 0000-0003-0812-1125

Abstract

Due to the high consumption of electrical energy that the Technological University of Aguascalientes has had during the last 5 years and the interest of moving towards a sustainable university campus, a strategy with an environmental approach is presented that addresses this problem, to reduce the consumption of electrical energy from campus. The work is developed from a meeting with representatives of the Rectory, the Directorate of Administration and Finance and the undersigned, in academic representation of the Renewable Energies career Solar Area of the Institution, to identify the impacts derived from this problem. From the investigation process of the Energy Reform regarding the tariff scheme of the Federal Electricity Commission (CFE) network as of 2017, as well as the calculation procedures for the cost of energy consumed in the High Demand Medium Voltage Hourly rate (GDMTH), an analysis is carried out and the behavior of the costs generated by the energy demand in base, intermediate and peak hours, as well as the consumption for summer and winter hours, is identified. The information from the Single Line Diagram of the Institution allows detecting the supply network and the areas with the highest energy consumption in the Institution. Based on this internal analysis and following the SR-Sustainable methodology, the strategic plan of the proposal is drawn up in the lines of action efficient energy, infrastructure for energy sustainability and Alternatives for energy generation: Sizing, design and installation of sources power generators.

Sustainability, Strategy, Energy

Secure MQTT emergency messaging system for C-V2X networks based on IoT

Sistema seguro de mensajería de emergencia MQTT para redes C-V2X basado en IoT

PALOS-ANGULO, Francisco Antonio and RUIZ-IBARRA, Erica Cecilia

Instituto Tecnológico de Sonora.

ID 1st Author: *Francisco Antonio, Palos-Angulo* / **ORC ID:** 0000-0002-4766-8644, **CVU CONACYT ID:** 1076458

ID 1st Coauthor: *Erica Cecilia, Ruiz-Ibarra* / **ORC ID:** 0000-0002-7020-4960, **CVU CONACYT ID:** 86862

Abstract

Currently in Mexico in some road sections, there are still areas of non-coverage where the infrastructure does not supply communication alerts or dangerous situations to the population through telecommunication technologies, this is one of the problems faced by emergency services by the authorities. Given this scenario, the present project develops a system based on IoT that provides a secure means of real-time communication of messages under the AES 128 algorithm, obtained through hardware implementation, through the MQTT protocol under a C-V2X system, which is oriented for experimental scenarios where the intensity of the signal can generate communication losses. The proposed system has been designed to achieve greater coverage on road sections and meet emergency demands by citizens with the least possible delay, without compromising the security of messages of this nature under conditions of low signal intensity and avoiding possible attacks.

VANET, AES128, MQTT, ESP32, C-V2X, IoT

Development of a Virtual Experience for the Evaluation of the concept of a Vehicle Type Baja and Formula SAE

Desarrollo de una Experiencia Virtual de Evaluación del concepto de un Vehículo Tipo Baja y Formula SAE

CORONA-FLORES, Mario Eduardo, CUAUTLE-GUTIÉRREZ, Luis, GARCÍA-TEPOX, José Domingo and ALFARO-APANGO, Miguel Ángel

Universidad Popular Autónoma del Estado de Puebla

ID 1st Author: *Mario Eduardo, Corona-Flores* / **ORC ID:** 0000-0002-1202-6748

ID 1st Coauthor: *Luis, Cuautle-Gutiérrez* / **ORC ID:** 0000-0003-2424-2381

ID 2nd Coauthor: *José Domingo, García-Tépox* / **ORC ID**: 0000-0001-7030-7735

ID 3rd Coauthor: *Miguel Ángel, Alfaro-Apango* / **ORC ID:** 0000-0002-2375-4345

Abstract

Technological growth focused on virtual reality has allowed us to develop new processes and tools that allow us to incorporate simulation methodologies in a virtual environment for the launch of any prototype, in such a way that the first physical models for testing are built after complex analysis. in 3D. The research shown below focuses on analyzing the different possibilities of virtual reality concerning the visualization and dimensional validation of a Baja and Formula SAE-type vehicle, to improve vehicle development processes through the application of this tool, optimize the experience of those in charge of design, saving time and increasing operational efficiency. With the help of a VR team and special software for 3D visualization (VRED), the quality offered by the virtual environment was evaluated, as well as the different tools offered by the software to make the virtual experience as close to reality as possible. The results obtained in this research will allow the reader to know the tools that were used during the process to create a virtual environment and have the ability to interact with the model and the created environment.

Baja SAE, Formula SAE, Validation, VRED, Visualization, Virtual Reality

Structural analysis of stresses and deformations of a lump-sifting machine

Análisis estructural de esfuerzos y deformaciones de una máquina desterronadora – cernidora

AMARO-BALANZAR, Jovanni, SÁNCHEZ-TEXIS, Fernando, IBARRA-BONILLA, Mariana Natalia and EUSEBIO-GRANDE, Raúl

Tecnológico Nacional de México. Instituto Tecnológico Superior de Atlixco.

ID 1st Author: *Jovanni, Amaro-Balanzar* / **ORC ID:** 0000-0002-2646-7659, **CVU CONACYT ID:** 515242

ID 1st Coauthor: *Fernando, Sanchez-Texis* / **ORC ID:** 0000-0002-1792-8855, **CVU CONACYT ID:** 95289

ID 2nd Coauthor: *Mariana Natalia, Ibarra-Bonilla* / **ORC ID:** 0000-0001-7123-9105, **CVU CONACYT ID:** 237756

ID 3rd Coauthor: *Raul, Eusebio-Grande* / **ORC ID:** 0000-0001-7062-3244, **CVU CONACYT ID:** 1000358

Abstract

In this paper, the 3D modeling and structural analysis of a lump-sieving machine is presented, using the Von Mises maximum distortion energy criteria. The study is carried out by the finite element method using the CAD design software SolidWorks. The objective of the study focuses on analyzing the structure of the machine, the blades, and the rotation axis of the clay lump breaker. The results show that the efforts and deformation in the trituration elements, the square axis of rotation and the structure of the machine, in addition to the resistive forces generated by the raw material which, in this case, is clay. According to the results obtained by the CAD software, the elements satisfy a safety factor greater than 1.5, it is verified that the pieces will not fail under normal working conditions. Therefore, the development of this machine will contribute to improving the process (time and quality of raw material) and reducing the physical exhaustion and tear carried out by the artisans of the municipality of Cohuecan.

Von Mises, Modeling, Structural Analysis

Analysis and diagnosis of electric power quality at ITSH facilities

Análisis y diagnóstico en la calidad de la energía eléctrica en las instalaciones del ITSH

TELLEZ-CUEVAS, Pedro, HERNÁNDEZ-SANCHEZ, Juan Fernando and GARCIA-MARQUEZ, Kevin

Instituto Tecnológico Superior de Huauchinango

ID 1st Author: *Pedro, Tellez-Cuevas* / **ORC ID:** 0000-0002-3235-1898, **Researcher ID Thomson:** G-2875-2019, **CVU CONACYT ID:** 342839

ID 1st Coauthor: *Juan Fernando, Hernández-Sanchez* / **ORC ID:** 0000-0002-4409-5174, **Researcher ID Thomson:** AAS2942-2021**, CVU CONACYT ID:** 937701

ID 2nd Coauthor: *Kevin, Garcia-Marquez* / **ORC ID:** 0000-0001-5499-9882, **CVU CONACYT ID:** 1192438

Abstract

This article presents the study and diagnosis of power quality in the internal electrical network of Building J, within the facilities of the Instituto Tecnológico Superior de Huauchinango that arises from internal research Project in which parameters such as maximum and minimum voltage and current values, frequency, harmonic level are analized, as well as apparent power, active power and reactive power. With the support of the network analyzer of the HIOKI brand, model 3197, the measurements were carried out with the protection protocols (use of gloves, glasses, helmet, etc.), and the results obtained revealed that the values of the electrical parameters of the aforementioned power quality were within the limits allowed by the current standards, also these parameters were plotted with which it was possible to observe the maximum demand of the hours of service, demonstrating that there is a good quality of energy.

Power Quality, Voltaje, Current, Harmonics

Temperature control based on Fuzzy Logic using Maximum Center Method

Control de la temperatura basado en la lógica difusa mediante el método del centro máximo

CASTAÑEDA-DELGADO, Jaime, ESQUIVEL-SALAS, Abraham, SALAS-GUZMÁN, Manuel Ignacio and MOTA-GARCIA, Juana

Instituto Tecnológico Superior Zacatecas Norte, Departamento deInformática y Sistemas Computacionales

ID 1st Author: *Jaime, Castañeda -Delgado* / **ORC ID**: 0000-0001-9786-4128, **CVU CONACYT ID**: 252889

ID 1st Coauthor: *Abraham, Esquivel-Salas* / **ORC ID**: 0000-0001-8258-8837, **CVU CONACYT ID:** 252850

ID 2nd Coauthor: *Manuel Ignacio, Salas-Guzmán* / **ORC ID**: 0000-0002-7039-2703, **CVU CONACYT ID**: 316159

ID 3rd Coauthor: *Maria Juana, Mota-García* / **ORC ID**: 0000-0003-1127-1116, **CVU CONACYT ID**: 636080

Abstract

There is a close relationship between crop growth and the control of environmental variables, as well as irrigation and fertilizers supplied. This article presents a system for collecting a greenhouse temperature, capable of acting in the opening or closing window system as a regulator of this environmental variable. Controlling the temperature acting on the opening or closing of the windows is convenient, since it does not require additional fuel, resulting in an economical alternative. Regarding control algorithm, Fuzzy Logic was used as a correction temperature technique. The proposal can be a good option for greenhouses that are not automated yet, saving costs by moving from human-assisted monitoring to automatic temperature monitoring.

Diffuse control, Temperature control, Protected agriculture

Comparative Study of Fat and Oil Contaminants in the localities of the Grijalva river basin in the years 2019 and 2020 in Surface Waters of Frontera, Centla, Tabasco

Estudio comparativo de los Contaminantes grasas y aceites de las localidades de la cuenca del rio Grijalva de los años 2019 y 2020 en agua superficial de Frontera, Centla, Tabasco

REYES-HERNANDEZ, Guadalupe, SUAREZ-GARCÍA, Sandra Manuela, VAZQUEZ-AGUILAR, Clotilde and ZARATE, Marco Antonio

Instituto Tecnológico Superior de Centla

ID 1st Author: *Guadalupe, Reyes-Hernandez* / **ORC ID:** 0000-0003-4393-4383, **CVU CONACYT ID:** 549693

ID 1st Coauthor: *Sandra, Manuela Suarez-García* / **ORC ID:** 0000-0002-8573-6409, **CVU CONACYT ID:** 565464

ID 2nd Coauthor: *Clotilde, Vazquez-Aguilar* / **ORC ID:** 0000-0002-5801-2114, **CVU CONACYT ID:** 549515

ID 3rd Coauthor: *Marco Antonio, Zarate* / **ORC ID:** 0000-0002-3977-5394**, CVU CONACYT ID:** 549508

Abstract

At a global level, rivers serve as receptors for large amounts of waste generated by human activities such as agriculture, industrial activity and domestic activities, on the other hand, they are an important source of water supply for both agricultural, industrial and domestic. Therefore, in recent years, receptors have been affected by pollutants, in the case of Contamination by fats and oils is a problem caused by activities such as: the existence of outboard motor repair shops, boat landings, discharges of water from houses-rooms, gas stations, public markets, yards, among others. The effects of these pollutants affect the public health of the population living outside the Grijalva basin, with the respiratory and skin conditions when in direct contact with these chemicals, even causing various types of cancer. For all of the above, the development of this research project was motivated, which will allow knowing the levels of contamination of fats and oils in the years 2019 and 2020 in the study area, being Arroyo Polo 1st and 3rd sections of Frontera, Centla, Tabasco, based on the comparison of the maximum permissible limits (LMP) of the NOM-001-SEMARNAT-1996. To evaluate the behavior and projection of the data, the Minitab version 18 software was used, where the analyzed data of the years 2019 and 2020 were taken to be able to indicate if there is a significant increase in later years. A trend towards an increase in contaminating fats and oils was observed. In the first sampling, the average concentrations of fats and oil were 5.23 mg/L. In the second sampling, the concentration of fats and oils was the lowest of 5.02 mg/L and the highest concentration was 6.23 mg/L. of the third and fifth sampling point, it is observed in both cases that there is a tendency towards an increase in contaminants. At the fourth sampling point, It is observed that there is a tendency towards the decrease of this contaminant. In both samples, the concentrations of fats and oils are below what is established by NOM-001-SEMARNAT-1996, since said norm establishes the maximum permissible limit of 25 mg/L per month.

Fats and oils, Physicochemical parameters, Water pollution

Design of a quality management system for a pharmaceutical company

Diseño de un sistema de gestión de la calidad para una empresa farmacéutica

CANO-CARRASCO, Adolfo, GONZÁLEZ-MENDIVIL, Manuel Antonio, LÓPEZ-FIGUEROA, Julio César and PERAZA-ARAUJO, Lee Erick

Instituto Tecnológico de Sonora.

ID 1st Author: *Adolfo, Cano-Carrasco* / **ORC ID:** 0000-0002-3392-3667, **Researcher ID Thomson:** G-5035-2018, **CVU CONACYT ID:** 266064

ID 1st Coauthor: *Manuel Antonio, González-Mendivil* / **ORC ID:** 0000-0001-6610-2809

ID 2nd Coauthor: *Julio César, López-Figueroa* / **ORC ID:** 0000-0002-4068-908X, **Researcher ID Thomson:** g-3925-2018

ID 3rd Coauthor: *Lee Erick, Peraza-Araujo* / **ORC ID:** 0000-0002-5258-3207

Abstract

This project was carried out in a company that sells and distributes medicines, it is striving to improve the quality of the service, which is why it is aiming to design the quality management system based on the processes approach and compliance with ISO 9001:2015 regulatory requirements. To fulfill the objective, the following activities were carried out: processes mapping, context analysis, risk identification, stakeholder mapping, establishment of quality policy and objectives, and development of a control plan. The results indicate the following key processes: purchases, inventories and sales, strategic prospecting, supply and support; management of human resources, technology and finance. Most influential stakeholders; in the client category, the Instituto Mexicano del Seguro Social, private hospitals and laboratories; in the provider category, PISA laboratory and independent drug distributors, in addition, the scope of the management system, policy and quality objectives were established, as well as a control plan for the system's risk management. Critical risks include not having developed mechanisms for electronic commerce and the lack of a Quality Management System. The countermeasures consider creating and designing an e-commerce store and implementing the Quality management system.

Process Approach, Quality, Iso9001

Tool design with augmented reality for the reactivation of regional museums

Diseño de herramienta con realidad aumentada para reactivación de museos regionales

TOVAR-ROSAS, Claudia Rocio, SERRANO-MACHADO, Ana Cristina, AGUILAR-ARELLANO, Felisa Josefina and RODRÍGUEZ-ALANIS, Francisco De Borja

Universidad Politécnica de Gómez Palacio, Investigadora del INAH y presidenta del Consejo de Paleontología

ID 1st Author: *Claudia Rocio, Tovar-Rosas* / **ORC ID:** 0000-0002-8238-7493, **CVU CONACYT ID:** 745074

ID 1st Coauthor: *Ana Cristina, Serrano-Machado* / **ORC ID:** 0000-0003-3222-0254, **CVU CONACYT ID:** 835121

ID 2nd Coauthor: *Felisa Josefina, Aguilar-Arellano* / **ORC ID:** 0000-0003-24060772, **CVU CONACYT ID:** 100174

ID 3rd Coauthor: *Francisco De Borja, Rodríguez-Alanis* / **ORC ID:** 0000-0002-29491785, **CVU CONACYT ID:** 719064

Abstract

Museums always motivate users to observe and analyze past situations with which circumstances that gave way to current or future events are evoked, from them future scenarios are analyzed in addition to offering a service to society that currently knows the heritage that is protected in them. Currently, with the pandemic caused by COVID - 19, daily activities were restricted, and people stayed inside their homes, this brought with it the impossibility of carrying out activities such as attending events, and visiting places far from the local area, among others. All this caused some activities such as visits to museums to be restricted and therefore some had to close their doors permanently or suffered from budget cuts for their maintenance, which is why the design of a tool that promotes remote assistance is sought. towards some regional museums, to be profitable and not disappear due to lack of resources, in addition to trying to maintain the current facilities and improve the quality of service, to achieve greater dissemination of its exhibitions, conservation, and future works.

Augmented Reality, Innovation, Legacy

Defect study of Adidas Chimpunes sneakers using the DMAIC method

Estudio de defecto de los tenis Chimpunes Adidas utilizando el método DMAIC

NAVARRO-ENRÍQUEZ, Laura, RIVERA-MOJICA, Denisse, TOVAR-VÁSQUEZ, Amado and CHAVEZ-MONTELONGO, Ana Lorena

Universidad Tecnológica Paso del Norte-Procesos Industriales

ID 1 st Author: *Laura, Navarro-Enríquez* / **ORC ID:** 0000-0001-6969-7529, **CVU CONACYT ID:** 775111

ID 1 st Coauthor: *Denisse, Rivera-Mojica* / **ORC ID:** 0000-0003-4382-2197, **CVU CONACYT ID:** 214879

ID 2 nd Coauthor: *Amado, Tovar-Vásquez* / **ORC ID:** 0000-0002-7734-0631, **CVU CONACYT ID:** 775112

ID 3 rd Coauthor: *Ana Lorena, Chavéz-Montelongo* / **ORC ID:** 0000-0003-2794-5672

Abstract

In recent years, errors have changed in such a way that a strategy must always be in place to avoid them so that if they are detected they can be counteracted, but for this there are very useful tools that were created to solve errors and why they occur. created the DMAIC method so that there is improvement after having solved a separate error is an interactive tool that helps Define, Measure, Analyze, Control and Verify. The study will be structured in two sections. The first defines the process. Then the measure where is used, the tool will be used to determine the current performance of the process and finally it will be analyzed to see how ineffective the current process is, to later propose improvements. Thanks to this tool, it was possible to detect an error associated with a machine that is a fundamental part of assembling tennis shoes, as well as poor efficiency with some workers. In addition, solutions could be proposed to counteract these problems, and prevention measures were created to prevent show up again. And finally the last section is the conclusions to know what was learned from the method**.**

DMAIC, Assembling, Define, Performance, Improvements

WMS computer tool of the company "Comunicación Telefónica de Antequera"

Herramienta informática WMS de la empresa “Comunicación Telefónica de Antequera”

ALTAMIRANO-CABRERA, Marisol, BENITEZ-QUECHA, Claribel, TORAL-ENRIQUEZ, Fernando and JIMENEZ-HALLA, Johann Francisco

Tecnológico Nacional De México – Instituto Tecnologico De Oaxaca

ID 1st Author: *Marisol, Altamirano-Cabrera* / **ORC ID:** 0000-0001-5800-9655, **CVU CONACYT ID:** IT16B817

ID 1st Coauthor: *Claribel, Benitez-Quecha* / **ORC ID:** 0000-0001-6516-5760, **CVU CONACYT ID:** IT16B874

ID 2nd Coauthor: *Fernando, Toral-Enriquez* / **ORC ID:** 0000-0002-5144-8839, **CVU CONACYT ID:** IT18C169

ID 3rd Coauthor: *Johann Francisco, Jimenez-Halla* / **ORC ID:** 0000-0003-4104-8126, **CVU CONACYT ID:** IT16E621

Abstract

The project presented is based on the implementation of an application for the management of the warehouse of the company Telefónica de Antequera Communication; that will allow to manage the inventory that includes: registration of entries and exits of products in a detailed manner through the PEPS method, logistics operations of suppliers and clients, the existence (stock) of articles guaranteeing the coordination of the actors of the process and the optimization of Your activities. It is integrated in this first phase in five modules: Products, Clients, Suppliers, Warehouse and Reports. The application requires a web server that will be in charge of storing the data and providing the interface within the network and the MySQL database manager. For the development, the incremental methodology was used, coding with JavaScript, with an execution environment in Node.js. PM2 was also chosen as the production process manager who will keep the services active. This application will have a positive impact on the company since it will improve warehouse operations from the purchase of the item to the final sale at the counter, including returns due to changes or damage to them. This will allow managers to make the best decisions through relevant consultations

Application, Coordination, Existence, Logistics, Methodology

Solar concentrating and redirecting systems for application in an agricultural construction

Sistemas de concentración y redireccionamiento solar para su aplicación en una construcción agropecuaria

BETANZOS-CASTILLO, Francisco, DE ANDA-LÓPEZ, Rosa María, FUENTES-CASTAÑEDA, Pilar and CORTEZ-SOLIS, Reynaldo

Tecnológico Nacional de México/TES Valle de Bravo

ID 1st Author: *Francisco, Betanzos-Castillo* / **ORC ID:** 0000-0002-7245-703X, **CVU CONACYT ID:** 206209

ID 1st Coauthor: *Rosa María, de Anda-López*/ **ORC ID:** 0000-0003-3326-252, **Researcher ID Thomson:** C-7103-2019, **CVU CONACYT ID:** 596793

ID 2nd Coauthor: *Pilar, Fuentes-Castañeda* / **ORC ID:** 0000-0001-6567-9614, **CVU CONACYT ID:** 428699

ID 3rd Coauthor: *Reynaldo, Cortez-Solis* / **ORC ID:** 0000-0001-7519-1815, **CVU CONACYT ID:** 1113392

Abstract

This work deals with the design and evaluation of a concentrator-luminoduct system for daylighting. A concentrator with a truncated cone profile was designed to capture, transfer and diffuse sunlight, which was concentrated and transported by reflection along the walls of the system and finally projected to the interior of an agricultural building. The illuminance achieved by the system with and without concentration was compared and a significant difference in illumination levels was found. The concentrator obtained concentration factors between 1.7 and 3.6. The critical aspects that determined the concentration of natural light were the angle of acceptance (45.68º), the orientation (45º and 90º) and the reflectance of the material used (95%), in addition, it was possible to reduce the dimensions of these systems, conserving the illuminance. It was proven that this system increased the illumination of the interior space where the light did not reach naturally, improving the illuminance levels (300-500 lx), according to CIE (Commission Internationale l'Eclarige). It was demonstrated that the system represents a viable and adaptable solution for naturally illuminating buildings.

Agricultural, Reflectance, Concentrated, Illumination, Solar Collection

Unbalance identification method based on SINDy applied to an SFD rotordynamic system

Método de identificación de desbalance basado en SINDy aplicado a un sistema rotodinámico soportado por un SFD

ZIRION-FLORES, Maximiliano, ESCOBEDO-ALVA, Jonathan Omega, TORRES-CEDILLO, Sergio Guillermo and REYES-SOLIS, Alberto

SEPI-ESIME TIC. IPN

ID 1st Author: *Maximiliano, Zirion-Flores* / **ORC ID:** 0000-0002-0621-6182, **CVU CONACYT ID:** 1109407

ID 1st Coauthor: *Jonathan Omega, Escobedo-Alva* / **ORC ID:** 0000-0001-8429-0591, **CVU CONACYT ID:** 230868

ID 2nd Coauthor: *Sergio Guillermo, Torres-Cedillo* / **ORC ID:** 0000-0002-3297-6409, **CVU CONACYT ID:** 229481

ID 3rd Coauthor: *Alberto, Reyes-Solís* / **ORC ID:** 0000-0002-5208-8919

Abstract

In recent years, there has been an increasing interest in Data Science and Machine Learning in different topics like financial and health, this have led to start using these methods on engineer applications. This paper is focus on identify the equivalent unbalance on Squeeze Film Damper – SFD bearing using a recent machine learning technique "Sparse Identification of Nonlinear Dynamics – SINDy". Four different cases will be examined from Bonello's work, all of which we introduce 4 different conditions of noise to the acceleration of the system. The data for this work was obtained via a simulation of the SFD system reported on Bonello's thesis. From the simulation only the last 20 cycles were used to feed the SINDy. This study uses a combinatorial polynomial search space over preselected functions with the purpose to identify the equivalent imbalances. Both hyperparameters: the degree of the combinatory k and the threshold value λ remaining static during all the study. There was no error between the original equations and the identified system.

Sparse Identification of Nonlinear dynamics, Squeeze Film Damper, Equivalent unbalance

Erosion reduction in beach dunes, through the technological implementation for the sand-dead pelagic sargassum mixture treatment

Reducción de erosión en dunas de playa, mediante la implementación tecnológica para el tratamiento de la mezcla arena - sargazo muerto pelágico

JIMÉNEZ-ROANO, Guadalupe, CRUZ-GOMEZ, Marco Antonio, MEJÍA-PÉREZ, José Alfredo and FLOREZ-MARTINEZ, Guillermo

Benemérita Universidad Autónoma de Puebla

ID 1st Author: Guadalupe, *Jiménez Roano* / **ORC ID**: 0000-0001-7316-5015, **Researcher ID Thomson:** AGC-4811-2022, **CVU CONACYT ID:** 1190772

ID 1st Coauthor: *Marco Antonio, Cruz-Gómez* / **ORC ID**: 0000-0003-1091-8133, **Researcher ID Thomson**: S-3098-2018, **CVU CONACYT ID**: 349626

ID 2nd Coauthor: *José Alfredo, Mejía-Pérez* / **ORC ID:** 0000-0002-4090-8828, **Researcher ID Thomson:** G-3354-2019

ID 3rd Coauthor: *Guillermo, Flores-Martinez* / **ORC ID:** 0000-0002-2243-2379, **Researcher ID Thomson:** G-3384-2019, **CVU CONACYT ID:** 169853.

Abstract

The invasive presence of pelagic sargassum on the coasts has increased disproportionately in the last decade, causing great damage to the ecosystems of coastal and marine flora, and fauna, as well as the tourism sector, dueto the fact that the sargassum when it enters into decomposition generates fetid odors, detachments of Ammonium concentrations and Hydrogen Sulfide H_2S that together with hypoxic conditions were the mass deathcause of species, therefore it is necessary to clean affectedareas. The aim of this research was to analyze how to reduce erosion in beach dunes, through the technological implementation for the treatment of the mixture sand - dead pelagic sargassum. The methodology had a mixed approach to propose the application of centrifugation and precipitation technologies to significantly reduce beach dunes erosion. However, the machines that do not have this process present a sand-sargassum mixture as residue that, when removed, erodes the dunes. The results obtained were the proposal for the implementation of a new complementary process to those carried out by beachcleaning machines to reduce erosion, in addition to compacting the sargassum for its transfer optimization.

Pelagic Sargassum, Beach Dune Erosion,Beach Cleaning

Automated notification management: Case study Advertising Agency CC2México

Gestión automatizada de notificaciones: Caso de estudio Agencia De Publicidad CC2México

ALTAMIRANO-CABRERA, Marisol, JIMENEZ-HALLA, Johann Francisco, DIAZ-LARA, Carlos Alberto and ZARAGOZA-FARRERA, Luis Angel

Tecnológico Nacional De México – Instituto Tecnologico De Oaxaca

ID 1st Author: *Marisol, Altamirano-Cabrera* / **ORC ID:** 0000-0001-5800-9655, **CVU CONACYT ID:** 657390

ID 1st Coauthor: *Johann Francisco, Jimenez-Halla* / **ORC ID:** 0000-0003-4104-8126, **CVU CONACYT ID:** IT16E621

ID 2nd Coauthor: *Carlos Alberto, Diaz-Lara* / **ORC ID:** 0000-0002-1782-1900

ID 3rd Coauthor: *Luis Angel, Zaragoza-Farrera* / **ORC ID:** 0000-0003-3904-5567

Abstract

The project presented is based on the implementation of a web system with a mobile application for the management of work orders in the CC2México Advertising Agency. Which it will allow customers to register, learn about the services offered and set up a customized service (at no cost, for a limited time) and in which they can generate their ODTs by this means. Once the period is over, a company advisor will follow up with the client, offering various plans. It is considered an innovative project due to the incorporation of technology through five modules that streamline the entire management process, guaranteeing the coordination of the actors in the process and the optimization of their activities. For the development, the incremental agile methodology was used, coding with a JavaScript and Ionic framework for the development of hybrid applications. The added value in this project is the integration of a RestFull API software architecture that will allow this application to connect to the rest of the CC2 Mexico corporate ecosystem and to third parties in a secure manner to continue exchanging data. This application will have a positive impact on the company and will allow managers to make the best decisions through relevant consultations.

Web System, ODT, Automation, Development, Coordination

Analysis of the electrical power generated by a thermoelectric system for application in the Ingenuity Drone from a nuclear heat source

Análisis de la potencia eléctrica generada por un sistema termoeléctrico para su aplicación en el Dron Ingenuity a partir de una fuente de calor nuclear

RODRIGUEZ-AVILA, Jesus, VALLE-HERNANDEZ, Julio and GALLARDO-VILLARREAL, José Manuel

Universidad Politécnica Metropolitana de Hidalgo

ID 1st Author: *Jesus, Rodriguez-Avila* / **ORC ID:** 0000-0002-4124-2159, **CVU CONACYT ID:** 1148513

ID 1st Coauthor: *Julio, Valle-Hernandez* / **ORC ID:** 0000-0001-8957-0066, **CVU CONACYT ID:** 210743

ID 2nd Coauthor: *José Manuel, Gallardo Villarreal* / **ORC ID:** 0000-0002-7578-7229, **CVU CONACYT ID:** 366394

Abstract

The aerospace sector has made great strides in the development of electrical power generation in space exploration missions. The ingenity drone is a technological demonstration of flight on the planet Mars, using a solar panel as a source of electrical power generation, however, obtaining power is limited to the atmospheric conditions of Mars and climatic changes such as sandstorms. Thermoelectrics are a good option for power generation in the ingenuity drone since they do not require sunlight to generate electricity, thermoelectrics require a temperature differential to generate a voltage differential this physical phenomenon is known as the seebeck effect. The use of thermoelectrics is exploited by a source of nuclear heat that can reach high temperatures due to the disintegration of radioactive isotopes, so it is necessary that thermoelectrics have a high temperature range. Some thermoelectricals proposed for this work are Bi_2 Te_3, PbTe and SiGe according to their operating characteristics at high temperatures, can be exploited by a source of nuclear heat for the generation of electricity. For this the electrical power required for an axial or stationary flight is calculated, so it is necessary to know some characteristics of the ingenuity drone, as well as the atmospheric conditions of the planet Mars. According to the temperature range of the selected thermoelectrics are determined some properties such as the seececk coefficient, thermal conductivity and electrical resistivity, with these properties is calculated the electrical power required for axial flight and the amount required. According to the electrical power of each thermoelectric is calculated the thermal power required for operation of a source of nuclear heat in its application in the drone.

Drone Ingenuity, Thermoelectric, Nuclear Heat Source

Enclosure maximum capacity control in pandemic time, using artificial vision

Control de aforo máximo de recintos en tiempos de pandemia, utilizando visión artificial

HERNANDEZ-VILLANUEVA, Mario Alejandro, MORALES-HERNANDEZ, Maricela, CASTELLANOS-BALTAZAR, Roberto Tamar and RAFAEL-PEREZ, Eva

Universidad Tecnológica de los Valles Centrales de Oaxaca

ID 1st Author: *Mario Alejandro, Hernández-Villanueva* / **ORC ID:** 0000-0002-0097-3756, **CVU CONACYT ID:** 1230408

ID 1st Coauthor: *Maricela, Morales-Hernández* / **ORC ID:** 0000-0002-3521-2041, **CVU CONACYT ID:** 731036

ID 2nd Coauthor: *Roberto Tamar, Castellanos-Baltazar* / **ORC ID:** 0000-0002-3733-0711

ID 3rd Coauthor: *Eva, Rafael-Pérez* / **ORC ID:** 0000-0003-2793-1254, **CVU CONACYT ID:** 905268

Abstract

The article's objective is to show the results of the development of a prototype capable of counting people, using artificial vision tools, in order to maintain a maximum capacity allowed in any closed space and thus be able to maintain a healthy distance, taking into account to the health protocols established in our country by the competent health authorities. It is used an own methodology, taking aspects and combining the cascade and prototype model.The new normality requires maintaining a health protocol. According to the Undersecretary of Health, Dr. Hugo López Gatell declared in a virtual meeting with governors on June 17, 2021, that the capacity restriction in the tourist infrastructure, restaurant, bars, recreational centers and different public spaces would allow a rapid economic reactivation and a reduction in the risk of contagion (Health Secretary, 2021). By obtaining a functional prototype, it is helping to face the problems that have occurred with the current global COVID pandemic. The prototype was programmed in Python 3, using a Raspberry board with the Raspberry Pi operating system.

Covid, Venue Capacity, Artificial vision

Identification of the human-machine interaction process through the generation of a grammar based on automata theory, by means of a practical case

Identificación del proceso de interacción hombre-máquina a través de la generación de una gramática basada en teoría de autómatas, mediante un caso práctico

BENÍTEZ-QUECHA, Claribel, ALTAMIRANO-CABRERA, Marisol, MÉNDEZ-LÓPEZ, Minerva Donají and SANTIAGO-APARICIO, Nallely Elizabeth

Tecnológico Nacional de México, Campus Oaxaca, México

ID 1st Author: *Claribel, Benítez-Quecha* / **ORC ID**: 0000-0001-6516-5760, **CVU CONACYT ID**: 657582

ID 1st Coauthor: *Marisol, Altamirano-Cabrera* / **ORC ID**: 0000-0001-5800-9655, **CVU CONACYT ID**: 657390

ID 2nd Coauthor: *Minerva Donají, Méndez-López* / **ORC ID**: 0000-0001-5336-1772

ID 3rd Coauthor: *Nallely Elizabeth, Santiago-Aparicio* / **ORC ID**: 0000-0001-6142-9626

Abstract

This project shows how the Automata Theory is a viable option for the process of defining the inputs and outputs that allow the design of a human-machine interface (HMI). In this case, it is applied to the design of a device that allows the "intelligent" control of a traffic light. For this purpose, the work is divided into an Introduction, a Theoretical Framework, a description of the Development, Results, and Conclusions. Objectives General: To apply the automata theory to identify the input processes in a human-machine interface. Specific: Identification of the functionalities of the device, Formulation of Alphabet, Language, and Grammar, Creation of the automata. Methodology: The methodology followed is that of the Automata Theory, which defines the points mentioned in the specific objectives of this text. Contribution: To show how to apply Automata Theory in situations different from the development of compilers, as in this case to a process of implementation of the interface for human-machine interaction.

Grammar, Interface, Process

Characterization of a parabolic solar cooker made from recycled materials

Caracterización de una cocina solar parabólica elaborada con materiales reciclados

MARROQUÍN-DE JESÚS, Ángel, GALVÁN-MONDRAGÓN, Mayola, CASTILLO-MARTÍNEZ, Luz Carmen and OLIVARES-RAMÍREZ, Juan Manuel

Universidad Tecnológica de San Juan del Río

ID 1st Author: *Ángel Marroquín-de Jesús* / **ORC ID:** 0000-0001-7425-0625, **CVU CONACYT ID:** 81204

ID 1st Coauthor: *Mayola, Galván-Mondragón* / **ORC ID:** 0000-0001-5228-5237, **CVU CONACYT ID:** 713895

ID 2nd Coauthor: *L.C. Castillo Martínez* / **ORC ID:** 0000-0001-6544-5279, **CVU CONACYT ID:** 412614

ID 3rd Coauthor: *J. M Olivares-Ramírez* / **ORC ID:** 0000-0003-2427-6936, **CVU CONACYT ID:** 80711

Abstract

Currently, in some communities, firewood is still used to cook or conserve heat; this action generates great problems for health and the environment, one of them is the great risk of fires and/or asphyxiation due to smoke inhalation, another is the deforestation that is carried out to obtain firewood and, finally, the generation of methane, ozone precursors and carbon dioxide when burning any of these. This work proposes the use of a parabolic solar stove, made from recycled materials, such as cardboard, self-adhesive contact paper as reflective material, Masking tape®, which allows reducing manufacturing costs, helping low-income families and being environmentally friendly. The results obtained with respect to the time required for cooking various foods, the temperatures reached throughout the process, as well as information on meteorological variables obtained from the IQUERETA29 meteorological station located at the Technological University of San Juan del Río and administered by the Querétaro State Water Commission are shown.

Solar Stove, Satellite Dish, Recycled Materials, Cardboard

Analysis of a Web System for the management of professional practices in a Higher Education Institution

Análisis de un Sistema Web para la gestión de las prácticas profesionales en una Institución de Educación Superior

DÍAZ-SARMIENTO, Bibiana, SÁNCHEZ-JIMÉNEZ, Daniel Antonio, AGUILAR-ORTIZ, Gabriela and MORALES-HERNÁNDEZ, Maricela

Instituto Tecnológico de Oaxaca

ID 1st Author: *Bibiana, Díaz-Sarmiento* / **ORC ID**: 0000-0003-4350-6311, **CVU CONACYT ID**: 820776

ID 1st Coauthor: *Daniel Antonio, Sánchez-Jiménez* / **ORC ID:** 0000-0003-4386-8291, **CVU CONACYT ID:** 1148683

ID 2nd Coauthor: *Gabriela, Aguilar-Ortíz* / **ORC ID:** 0000-0003-3055-5712, **CVU CONACYT ID:** 730590

ID 3rd Coauthor: *Maricela, Morales-Hernández* / **ORC ID:** 0000-0002-3521-2041, **CVU CONACYT ID:** 731036

Abstract

Students of Higher Education Institutions (IES), to finish their degree must carry out professional practices (professional residence), getting into practice the knowledge acquired during the degree, developing a project for the benefit of the company and IES. The development of a Web System for the management of professional practices in an HEI aims to implement a Web System that manages the professional practices of Engineering in Technological Innovation of an IES. The methodology for the development of the Web System is Incremental considering the stages: Communication, Planning, Modeling, Construction and Deployment. This article allows the reader to identify the steps, know the development methodology, analyze the activities developed and the implementation of the aforementioned Web System. You can also identify the contribution that the article has for the HEIs where in many cases the process of professional practices is carried out by hand, there is no control of the activities carried out by the student, the procedure is slow, the process is unknown, the importance of this last subject or activity to finish the degree is not given, being a requirement on many occasions to be titled.

Practices, Methodology, IES

Measurement of Degradation of Solar Panels Induced by Damp Heat

Medición de la Degradación de Paneles Solares Inducida por Calor Húmedo

SALAZAR-PERALTA, Araceli, PICHARDO-SALAZAR, José Alfredo, PICHARDO-SALAZAR, Ulises and CHÁVEZ, Rosa Hilda

Tecnológico de Estudios Superiores de Jocotitlán

ID 1st Author: *Araceli, Salazar-Peralta* / **ORC ID:** 0000-0001-5861-3748, **Researcher ID Thomson:** U-2933-2018, **CVU CONACYT ID:** 30 0357

ID 1st Author: *José Alfredo, Pichardo-Salazar* / **ORC ID:** 0000-0002-8939-9921

ID 2ndAuthor: *Ulises, Pichardo-Salazar* / **ORC ID:** 0000-0002-3758-2038

ID 3rd Author: *Rosa Hilda, Chávez* / **ORC ID:** 0000-0002-2460-3346

Abstract

Currently the generation of electricity is carried out, mainly, from the combustion of fossil fuels; which contributes to the emission of pollutants such as SOx, NOx, CO, PM10, PM2.5 and volatile organic compounds (VOC) that affect air quality. Solar energy is an alternative for the generation of clean energy through the use of solar panels, which convert the energy they receive from sunlight into electrical energy for human use. It is cheaper and more viable, since the sun is readily available. Solar panels are built from an element called silicon, which is involved in the process of creating electrical energy. The objective of this study was to characterize the resistance to degradation of solar panels exposed to the damp heat test using the IEC 61646 Standard. The results obtained contribute to the quality assurance of the solar panel manufacturing process, which is of vital importance. and knowledge of their useful life**.**

Solar Panel, Degradation, Assurance Manufacturing

Dimensioning of a hybrid system boiler - solar collector of evacuated tubes, for the defrosting of fish

Dimensionamiento de un sistema híbrido caldera–colector solar de tubos evacuados, para el descongelamiento de pescado

OVANDO-SIERRA, Juan, CAMACHO-UC, Giovanni, HUCHIN-MISS, Mauricio and UC-RIOS, Carlos

Universidad Autónoma de Campeche, Facultad de Ingeniería

ID 1st Author: *Juan, Ovando-Sierra* / **ORC ID:** 0000-0003-4358-6657, **Researcher ID Thomson:** S-2357-2018, **CVU CONACYT ID:** 358434

ID 1st Coauthor: *Giovanni, Camacho-Uc* / **ORC ID:** 0000-0002-1563-0035, **CVU CONACYT ID:** 1227136

ID 2nd Coauthor: *Mauricio, Huchin-Miss* / **ORC ID:** 0000-0002-5669-9098, **Researcher ID Thomson:** S-2354-2018, **CVU CONACYT ID:** 917567

ID 3rd Coauthor: *Carlos, Uc-Rios* / **ORC ID:** 0000-0003-1321-019X, **Researcher ID Thomson:** K-6624-2018, **CVU CONACYT ID:** 88147

Abstract

The fishing sector, better known as the fishing industry, is part of the primary sector, which is why it is an important economic activity in the world, as it is part of the human diet and industrial processes. The processing of fish in industries requires defrosting, this is achieved by superheated steam produced in a boiler which uses fuel oil as primary energy, this increases production costs. This work aims to design a hybrid defrost system that is efficient, reduces costs and takes advantage of solar energy for water preheating. The purpose of the system is to reduce fuel oil consumption by taking advantage of solar thermal energy through evacuated tubes, for which the system is analyzed using the first law of thermodynamics. From the reduction of fuel oil consumption, the amount of CO2 emitted into the environment will decrease, as well as production costs.

Fish, Hybrid And Thermodynamic

Data acquisition module for the operation of the Neural Network for crop rotation and soil analysis in a Greenhouse

Módulo de adquisición de datos para el funcionamiento de la Red Neuronal para la rotación de cultivos y análisis de suelo en un Invernadero

RAFAEL-PÉREZ, Eva, MORALES-HERNÁNDEZ, Maricela, NAVARRETE-INFANTE, Nestor Manuel and RIOS-MALDONADO, Vicenta

Tecnológico Nacional de México/ Instituto Tecnológico de Oaxaca

ID 1st Author: *Eva, Rafael-Pérez* / **ORC ID:** 0000-0003-2793-1254, **CVU CONACYT ID:** 905268

ID 1st Coauthor: *Maricela, Morales-Hernández* / **ORC ID:** 0000-0002-3521-2041, **CVU CONACYT ID:** 731036

ID 2nd Coauthor: *Nestor Manuel, Navarrete-Infante* / **ORC ID:** 0000-0002-0170-5622, **CVU CONACYT ID**: 337188

ID 3rd Coauthor: *Vicenta, Rios-Maldonado* / **ORC ID**: 0000-0002-1049-6631, **CVU CONACYT ID:** 90238

Abstract

Currently, with the technological advances applied in various sectors, they have changed the way they operate in the control of their processes. In the agricultural sector, the automation of processes increases productivity and improves the quality of products. In the production crops using greenhouses, these protect the different plants from excess cold at certain times of the year, allowing control of temperature, humidity and other environmental factors that favor plant growth. This project describes the function of the data acquisition module, which aims to obtain or generate values of the variables of humidity, ambient temperature and soil pH, through electronic devices such as sensors and the arduino for the operation of the neural network for crop rotation and soil analysis. Through an interface, it is linked to the expert system that shows the values and results generated by the neural network on the ideal type of crop to plant. For the development of the project, the model in Prototypes was used

Data Acquisition, Sensors, Soil Analysis

Mobile application: Social network for the search for missing persons

Aplicación móvil: Red social para la búsqueda de personas desaparecidas

RAFAEL-PÉREZ, Eva, MARTÍNEZ-CASTELLANOS, Francisco Emmanuel, MORALES-HERNÁNDEZ, Maricela and MINGÜER-ALLEC, Luz María

Tecnológico Nacional de México/ Instituto Tecnológico de Oaxaca

ID 1st Author: *Eva, Rafael-Pérez* / **ORC ID:** 0000-0003-2793-1254, **CVU CONACYT ID:** 905268

ID 1st Coauthor: *Francisco Emmanuel, Martínez-Castellanos,* / **ORC ID:** 0000-0003-0759-6495, **CVU CONACYT ID**: 1244671

ID 2nd Coauthor: *Maricela, Morales-Hernández* / **ORC ID:** 0000-0002-3521-2041, **CVU CONACYT ID:** 731036

ID 3rd Coauthor: *Luz María, Mingüer-Allec,* / **ORC ID**: 0000-0003-2954-1815, **CVU CONACYT ID:** 786966

Abstract

Today, mobile applications have become more relevant than ever, they have changed the way of life of people in all sectors of society. The mobile application: Social network for the search for missing persons, is an application under Android developed with the aim of helping to find missing persons through the format of a social network. Mexico is going through a security crisis that has not only been defined by violence, homicides, kidnappings, extortion or robberies, but also by the high rates of missing or unidentified people that have impacted our daily lives. The mobile application aims to give a space to the publications of missing persons, prevention of cybercrime, streamline the process of publishing unofficial alerts and create a community under the format of a social network to share information with users that helps find missing persons. The development methodology for this application was the incremental model using the Dart programming language.

Mobile Application, Missing Persons, Social Network

Cost-effective automatic winder machine for optical fiber filament

Devanadora automática de bajo costo y precisión para filamento de fibra óptica

GUTIERREZ-VILLALOBOS, José Marcelino, TALAVERA-VELÁZQUEZ, Dimas, MEJÍA-BELTRÁN, Efraín and RAMÍREZ-HERNÁNDEZ, Miguel Ángel

Universidad de Guanajuato

ID 1st Author: *José Marcelino, Gutierrez-Villalobos* / **ORC ID**: 0000-0001-5947-1489, **Researcher ID Thomson**: S-7666-2018, **CVU CONACYT ID:** 173461

ID 1st Coauthor: *Dimas, Talavera-Velazquez* / **ORC ID**: 0000-0002-8074-1647, CVU CONACYT ID: 85034

ID 2nd Coauthor: *Efrain Mejia-Beltran* / **ORC ID**: 0000-0001-8960-6604, CVU CONACYT ID: 20998

ID 3rd Coauthor: *Miguel Ángel, Ramirez-Hernandez* / **ORC ID**: 0000-0002-6093-090X, **CVU CONACYT ID:** 742457

Abstract

In the market of equipements to wind optical fiber, there are winding machines, which are usually expensive and the ones that are not expensive, can present an important error at the moment to make large fiber rolls in the order of kilometers, these rolls cab be used for selling, storage or for instrumentation applications (in this case, using the optical fiber as sensor to measure some variables such as structure deformation, etc). That is way is necessary to have an equipment, that allow to wind large stretches of fiber at a low cost and effectivity. A propose of a small error winding is presented in this work, a good alternative is shown in this project by using a low-cost micro controller and semiconductors.

Optical Fiber Inovation, Instrumentation, Automation, Winding Machine Alternative

Control system for automation of a didactic testbench water canal

Sistema de control para automatización de un canal de agua para pruebas didáctico

GUTIERREZ-VILLALOBOS, José Marcelino, MARTÍNEZ-CENTENO, Juan Manuel, CHÁVEZ-CÁRDENAS, Xavier and TALAVERA-VELÁZQUEZ, Dimas

Universidad de Guanajuato

ID 1st Author: *José Marcelino, Gutierrez-Villalobos* / **ORC ID**: 0000-0001-5947-1489, **Researcher ID Thomson**: S-7666-2018, **CVU CONACYT ID:** 173461

ID 1st Coauthor: *Juan Manuel, Martínez-Centeno* / **ORC ID**: 0000-0003-3376-0498

ID 2nd Coauthor: *Xavier Cardenas- Chavez* / **ORC ID**: 0000-0001-6691-4380, **Researcher ID Thomson**: F-3210-2018, **CVU CONACYT ID:** 269911

ID 3rd Coauthor: *Dimas, Talavera-Velázquez* / **ORC ID**: 0000-0002-8074-1647, **CVU CONACYT ID:** 85034

Abstract

Didactic testbench water canals are a great tool to teach students in several subjects, for example hydraulics and hydrostatic, with their help to explain phenomena such as waves, drag, erosion and water flow. Many of these systems are sold by manufactures, but they are defined in several versions such as basic and full equipements, which basic model is used to teach basic practices during classes; whether a more complete system is required, the cost of these devises is considerably increased. For all that, many educational institutions have no possibilities to obtain full version test bench canals. An automation system design for a didactic canal is presented in this work, which allows to control slope preset by means of a gyroscope and a mobile application. In the same way, water flow can be known that has been running through the pipes of the equipment due to the flowmeter installed, which leads the students to validate their math calculations comparing it to the display reading in real time, at low cost and effectivity.

Canal Application, Automation, Hydraulics

Adjustable testbench system to stretch optical fiber

Plataforma de pruebas ajustable para estrechar fibra óptica

TALAVERA-VELÁZQUEZ, Dimas, MARTÍNEZ-TELLO, Josué, GUTIERREZ-VILLALOBOS, José Marcelino and RIVAS-ARAIZA, Edgar Alejandro

Universidad de Guanajuato

ID 1st Author: *Dimas, Talavera-Velázquez* / **ORC ID**: 0000-0002-8074-1647, **CVU CONACYT ID:** 85034

ID 1st Coauthor: *Josué, Martinez-Tello* / **ORC ID**: 0000-0001-6014-4995

ID 2nd Coauthor: *José Marcelino, Gutierrez-Villalobos* / **ORC ID**: 0000-0001-5947-1489, **Researcher ID Thomson**: S-7666-2018, **CVU CONACYT ID:** 173461

ID 3rd Coauthor: *Edgar Alejandro, Rivas-Araiza* / **ORC ID**: 0000-0001, **Researcher ID Thomson**: S-7666-2018, **CVU CONACYT ID:** 44036

Abstract

Actually, the use of optical fiber has been extended to several applications, not only its use for telecommunications; nowadays, optical fiber is used for sensor construction and instrumentation. For that reason, modifications and deformations in optical fiber sections are required and in order to observe how light transition is performed through to the fiber. The construction of this platform has the main objective to accomplish stretching test with different tensions on the fiber, different exposition terms to the electric arc and finally the gap between electrical electrodes to modify the affectations on the fiber, that are applied on the fiber. The different parts this system is conformed with, are presented in this work and the main features of each stage.

Intrumentation, Optical fiber stretching, Tensions, Tensions, Deformations

Aligning system for a pick-and-place BGA soldering equipment

Sistema de alineación para un equipo de selección y colocación componentes BGA para un equipo de soldar

TALAVERA-VELÁZQUEZ, Dimas, GUTIERREZ-VILLALOBOS, José Marcelino, RIVAS-ARAIZA, Edgar Alejandro and MEJÍA-BELTRÁN, Efraín

Universidad de Guanajuato

ID 1st Author: *Dimas, Talavera-Velázquez* / **ORC ID**: 0000-0002-8074-1647, **CVU CONACYT ID:** 85034

ID 1st Coauthor: *José Marcelino, Gutierrez-Villalobos* / **ORC ID**: 0000-0001-5947-1489, **Researcher ID Thomson**: S-7666-2018, **CVU CONACYT ID:** 173461

ID 2nd Coauthor: *Edgar Alejandro, Rivas-Araiza* / **ORC ID**: 0000-0001-, **Researcher ID Thomson**: S-7666-2018, **CVU CONACYT ID:** 44036

ID 3rd Coauthor: *Efrain, Mejia-Beltran* / **ORC ID**: 0000-0001-8960-6604, **CVU CONACYT ID:** 20998

Abstract

The necessity to have semiconductor components inside mobile, thinner and lighter devices, has created a new form to solder these electronics components to their main boards. This work for soldering superficial mounting semiconductors has become a precision task. For that reason, nowadays, the construction of equipements to pick and place semiconductors, has got an important attention. A high accuracy aligning systems are required in those equipements. In this work, an aligning prototype for superficial soldering systems is presented, using a laser devise with a set of mirrors, and an aligning mechanic system, which is low-cost, modular and upgradeable.

Superficial Mounting, Aligning System, Automation Prototype

Operational innovation in the performance of the anti-corrosive protection process

Innovación operativa en el desempeño del proceso de protección anticorrosiva

RAMÍREZ-ROMÁN, Adolfo, RODRÍGUEZ-RODRÍGUEZ, Luis Alberto, CHABAT-URANGA, Jacqueline and SUÁREZ-ÁLVAREZ, Ángel

Universidad Veracruzana, Facultad de Ingeniería Mecánica y Ciencias Navales

ID 1st Author: *Adolfo, Ramírez-Román* / **ORC ID:** 0000-0002-3820-8582, **Researcher ID Thomson:** S-5868-2018, **CVU CONACYT ID**: 244749

ID 1st Coauthor: *Luis Alberto, Rodríguez-Rodríguez* / **ORC ID:** 0000-0002-6118-040X, **Researcher ID Thomson:** W-9316-2019, **CVU CONACYT ID:** 1011993

ID 2nd Coauthor: *Jacqueline, Chabat-Uranga* / **ORC ID:** 0000-0003-2202-1032, **CVU CONACYT ID:** 464993

ID 3rd Coauthor: *Ángel, Suárez-Álvarez* / **ORC ID:** 0000-0002-0726-9630**, CVU CONACYT ID:** 946964

Abstract

The present research is a study developed in corrosion protection operations with the use of chemical treatments, which consist of the transformation of steel corrosion products into more stable oxides, an alternative to protect against corrosion in materials that have already begun to degrade avoiding mechanical cleaning, in order to present the results of the experimental study generated in the factory laboratory, which consists of the analysis of the solution of the oxide converter, of the sealing substance and their respective photographic representations of the application, for the chemical development of an oxide converter generator against the deterioration of the metal by minimising the cleaning effort, improving the aesthetics of the affected surface of the metal by the phenomenon of corrosion for its domestic and industrial use in the field of innovation of the corrosion protection of technological services.

Industrial, Experimental, Innovation

Web application with smart interface

Aplicación web con interfaz inteligente

QUIÑONES-GARCÍA, Pedro Eduardo, GONZÁLEZ-RAMÍREZ, Claudia Teresa, VIÑAS-ALVAREZ, Samuel and GARNICA-PATRICIO, Mariana

Instituto Tecnológico de México campus Zitácuaro

ID 1st Author: *Pedro Eduardo, Quiñones-García* / **ORC ID:** 0000-0003-3812-8838

ID 1st Coauthor: *Claudia Teresa, González-Ramírez* / **ORC ID:** 0000-0002-4106-4583, **Researcher ID Thomson:** G-6313-2019

ID 2nd Coauthor: *Samuel, Viñas-Álvarez* / **ORC ID:** 0000-0001-5891-2801

ID 3rd Coauthor: *Mariana, Garnica-Patricia* / **ORC ID:** 0000-0002-2692-6093

Abstract

In order to compete in the business world, it is necessary to implement a strategy that involves different channels: Web, social media, digital communities and, recently, mobile phones. People currently in their daily work are already implicitly using an intelligent cell phone, since they already have their agendas, email accounts, bank accounts and much more. Therefore, it is more than convenient that your brand has a presence on these devices. Technology such as FLUTTER, MYSQL, NODE JS. and ANDROID, support the creation and implementation of web applications. Using web applications saves money, optimizes time, thus not having to deal with learning to handle new programs, and you can carry out activities from anywhere, Zitácuaro, Michoacán is no exception in being immersed in the use of technologies, as in the large cities, is not exclusive, giving all businesses the opportunity to enhance their daily activities, such as the sale of food through a web application.

Web Application, Empower, Technology

Optimal active yaw control for a wind turbine

Control de guiñada activo óptimo para un aerogenerador

VILLAFUERTE-ALTÚZAR, Eugenio, GURUBEL-TUN, Kelly Joel and HARO-FALCÓN, Nicolás

University Center of Tonalá, University of Guadalajara

ID 1st Autor: *Eugenio Villafuerte-Altúzar* / **ORC ID:** 0000-0001-5813-5272, **CVU CONACYT ID:** 1116767

ID 1st Coauthor: *Kelly Joel Gurubel-Tun* / **ORC ID:** 0000-0001-9999-9018, **CVU CONACYT ID:** 227777

ID 2nd Coauthor: *Nicolás Haro-Falcón* / **ORC ID:** 0000-0002-7139-7733**, CVU CONACYT ID:** 388519

Abstract

In this work a control strategy based on the mathematical model of an active yaw system for a 20 KW horizontal axis wind turbine is proposed. It allows to increase its efficiency in the presence of changes in the intensity and direction of the wind. The inverse optimal control strategy is implemented based on the mathematical model using the equations of state that represent the dynamics of the yaw system, whose model was obtained with the FAST program, specialized software for modeling wind turbines, which allows obtaining the mathematical model of the orientation system in a more precise way. The results are presented via simulation, where the control strategy is validated in the presence of disturbances. The contribution of this work lies in the application of the optimal control strategy and the tuning parameter search strategy of the control law.

Inverse Optimal Control, Parameter Search Strategy, Yaw Control

Carbon footprint of heavy machinery in Paving construction processes

Huella de carbono de maquinaria pesada en procesos constructivos de Pavimentación

ACEVES-GUTIÉRREZ, Humberto, LÓPEZ-CHÁVEZ, Oscar, CAMPOY-SALGUERO, José Manuel and MERCADO-IBARRA, Santa Magdalena

Instituto Tecnológico de Sonora

ID 1st Author: *Humberto, Aceves-Gutiérrez* / **ORC ID:** 0000-0001-9916-3114, **Researcher ID Thomson:** F-8970-2018, **CVU CONACYT ID:** 2811581

ID 1st Coauthor: *Oscar, López-Chávez* / **ORC ID:** 0000-0002-1415-6116

ID 2nd Coauthor: *José Manuel, Campoy*-Salguero / **ORC ID:** 0000-0002-7110-3256

ID 3rd Coauthor: *Santa Magdalena, Mercado-Ibarra* / **ORC ID:** 0000-0002-4417-0736, **Researcher ID Thomson**: H-3386-2018, **CVU CONACYT ID**: 258533

Abstract

Climate change is a current phenomenon and represents one of the most important environmental, social and economic threats to the planet and is defined as a significant and lasting change in local and global weather patterns caused by natural or human-caused global warming. The construction of works related to earthworks such as paving of streets, parking lots, roads, highways, dams, canals, among others, generate pollution because they use heavy machinery which is a major consumer of non-renewable fossil fuels that are transformed into emissions of Carbon Dioxide (CO_2). The present work, takes as a case study the paving of a subdivision in the City of Obregon Sonora (Mexico) to determine the carbon footprint in Kg of CO_2eq/m2 generated in the machinery, using the methodology of the carbon footprint from the quantities of work of the construction process, the selection and hourly performance of the appropriate equipment, the determination of the volumes of fuel used and the emission factor in Kg-CO_2eq for the fuel used. The results obtained were 165,742.02 Kg-CO_2eq in a surface of 128,049.59 m2 of paving, equivalent to 1.29 Kg-CO_2eq/m2.

CO_2, Global warming, Construction

Automation of a horizontal electrospinning system to obtain polymeric nanofibers at low cost

Automatización de un sistema de electrohilado horizontal para obtención de nanofibras poliméricas a bajo costo

ROSALES-DAVALOS, Jaime, ENRIQUEZ-PEREZ, Ma. de los Ángeles, RAMIREZ-LOPÉZ, Roberto and MASTACHE-MASTACHE, Jorge Edmundo

Tecnológico de Estudios Superiores de Jocotitlán

ID 1st Author: *Jaime, Rosales-Davalos* / **ORC ID:** 0000-0002-9059-6093, **CVU CONACYT ID:** 812961

ID 1st Coauthor: *Ma. de los Ángeles, Enríquez-Pérez* / **ORC ID:** 0000-0002-2280-0661, **Researcher ID Thomson:** H-9399-2018

ID 2nd Coauthor: *Roberto, López-Ramírez* / **ORC ID:** 0000-0001-8341-3684, **CVU CONACYT ID:** 233228

ID 3rd Coauthor: *Jorge Edmundo, Mastache-Mastache* / **ORC ID:** 0000-0001-6104-6764, **Researcher ID Thomson:** H1187-2018, **CVU CONACYT ID:** 544943

Abstract

The objective of this research is to automate the horizontal electrospinning system to obtain nanofibers with polymeric solutions. The open loop system was designed and implemented for the electromechanical system of the horizontal electrospinning machine to control the speed of injection, distribution and storage of the polymeric solution and the control of the distance between the capillary and collector, and the display of the temperature at through a human-machine interface. The control system is made up of the reference value, control, correction and process stages, in other words, in the reference value the desired values of each of the variables to be controlled are assigned, in the control stage decision making and send the signals to the correction stage to make the changes and maintain the desired value and the process is where the physical variables are controlled, it was carried out with the LabView software and the ATMega 2560 microcontroller. With the automation of the horizontal electrospinning system, they will determine the conditions of the process and environmental parameters for obtaining nanofibers from different polymer solutions for use in the area of catalysis and biomaterials.

Automation, Horizontal Electrospinning, Variables

Indoor CO_2 monitoring system using a microcontroller via Bluetooth for coronavirus prevention

Sistema de monitoreo de CO_2 para interiores utilizando microcontrolador vía Bluetooth para la prevención de coronavirus

MARTÍNEZ-HERNÁNDEZ, Haydee Patricia, CORTES-MALDONADO, Raúl, MORALES-CAPORAL, Roberto and ISLAS-CERÓN Alejandro

Departamento de Ingeniería Eléctrica y Electrónica

ID 1st Author: *Haydee Patricia, Martínez-Hernández* / **ORC ID:** 0000-0001-8863-4689, **CVU CONACYT ID**: 353253

ID 1st Coauthor: *Raúl, Cortés-Maldonado* / **ORC ID:** 0000-0001-8463-1325, **CVU COANCYT ID:** 335473

ID 2nd Coauthor: *Roberto, Morales-Caporal* / **ORC ID:** 0000-0002-6115-0454, **CVU CONACYT ID:** 93093

ID 3rd Coauthor: *Alejandro, Islas-Cerón* / **ORC ID:** 0000-0003-2726-720X, **CVU CONACYT ID:** 1079594

Abstract

This work describes the design and implementation of the CO_2 meter, operated with the PIC18F45K50 microcontroller; which detects the concentration of the gas in parts per thousand (ppm); also, this instrument has an-App downloaded on a mobile device with Android operating system, communicating with the microcontroller via Bluetooth. This to measure the concentration of CO_2 which is a colorless gas compound of carbon and oxygen. The measurement of CO_2 concentration is a strategy that can warn of the risk of COVID-19 contagion in an enclosed place where a group of people are gathered. In the return to classroom, because the risk of contagion by COVID-19, which is spread through CO_2, persists. Also, there are very crowded places due to the daily activities developed by the human being, so now it is not a luxury to take care of the air we breathe to have a healthy life.

CO_2 Sensor, Microcontroller, Bluetooth, App

Mobile robot guided by detection of circular objects using artificial vision

Robot móvil guiado por detección de objetos circulares mediante visión artificial

PACHECO-ALVARADO, Luis Kevin, TORRES-ARREOLA, León Guillermo and PIÑA-ALCANTARA Henry Christopher

Tecnológico de Estudios Superiores de Jilotepec, México

ID 1st Author: *Luis Kevin, Pacheco-Alvarado* / **ORC ID:** 0000-0002-0722-1346, **CVU CONACYT ID**: 883154

ID 1st Coauthor: *León Guillermo, Torres-Arreola* / **ORC ID:** 0000-0002-7694-9613, **CVU CONACYT ID:** 1205387

ID 2nd Coauthor: *Henry Christopher, Piña-Alcantara* / **ORC ID:** 0000-0001-5726-2915, **CVU CONACYT ID:** 719620

Abstract

In the present work, the development and implementation of a control system through artificial vision for the guidance of mobile robots with differential conditions, using the detection of objects with circular characteristics, is shown. This document describes the design of the robot using a 3D CAD design software, in addition to performing the calculations to determine the traction system by means of four wheels, a power stage by means of a high current IBT2 H-bridge driver for driving direct current motors and a control system that uses artificial vision techniques through a low-cost computer such as the Raspberry Pi 3B+. Finally, the performance parameters of starting power and current consumption of the mobile robot are disclosed, as well as the analysis of the detection of circumferences in uncontrolled environments.

Robot, Artificial vision, Detection

Evaluation of modal frequencies obtained with the impact hammer technique on an epoxy matrix composite material reinforced with glass fibers

Evaluación de las frecuencias modales obtenidas con la técnica del martillo de impacto en un material compuesto de matriz epóxica reforzado con fibras de vidrio

COCA-GONZALEZ, Juan Manuel, AVILA-HERNÁNDEZ, Sergio Albano, REYES-SOLÍS, Alberto and TORRES-CEDILLO, Sergio Guillermo

SEPI-ESIME TIC. IPN

ID 1st Author: *Juan Manuel, Coca-Gonzalez* / **ORC ID:** 0000-0002-2463-9509, **CVU CONACYT ID:** 1082229

ID 1st Coauthor: *Sergio Albano, Avila-Hernández* / **ORC ID:** 0000-0002-1903-7730, **CVU CONACYT ID:** 335126.

ID 2nd Coauthor: *Alberto, Reyes-Solís* / **ORC ID:** 0000-0002-5208-8919

ID 3rd Coauthor: *Sergio Guillermo, Torres Cedillo* / **ORC ID:** 0000-0002-3297-6409, **CVU CONACYT ID:** 229481

Abstract

A numerical-experimental methodology is presented to obtain the modal frequencies of polymeric composite materials reinforced with unidirectional fibers (glass fiber and epoxy resin) for possible aeronautical applications. The objective of this study is to compare the behavior of an isotropic material with an orthotropic one. This comparison is to observe the influence of the material properties on its performance under dynamic conditions, where the modal frequencies of a material can directly affect the performance of each element of a structure. The first case describes the numerical and experimental identification of the modal frequencies of an isotropic material (6065 T5 aluminum). The second case study is presented to show how this methodology is adapted to the composite material. The experimental results are obtained by applying the impact hammer testing method. The comparison provides new insights into the modal behavior of vibrations in composite materials. A significant finding of this work is to provide a detailed analysis of the behavior of a unidirectional composite material in terms of the fiber's orientation. Then, this work would be established the fundamentals of the composite material performance for rotative elements applications.

Modal Frequencies, Composite Materials, Modal Analysis

Development of a Web Application for the management of Georeferential Information regarding Biological Traps against the Fall Armyworm of the Center for Innovation and Technological Development of the Mezquital Valley

Desarrollo de una Aplicación Web para la gestión de Información Georreferencial referente a Trampas Biológicas contra el Gusano Cogollero del Centro de Innovación y Desarrollo Tecnológico del Valle del Mezquital

HERNÁNDEZ-GARCÍA, Héctor Daniel; AGUILAR-OJEDA, Cristy Elizabeth and PAREDES-REYES, Eliud

Instituto Tecnológico Superior del Occidente del Estado de Hidalgo, División de Ingeniería en Sistemas Computacionales, Mexico

ID 1st Author: *Héctor Daniel, Hernández-García* / **ORC ID:** 0000-0001-5261-8353, **Researcher ID Thomson:** P-4823-2018, **CVU CONACYT ID:** 208146

ID 1st Coauthor: *Cristy Elizabeth, Aguilar-Ojeda* / **ORC ID:** 0000-0002-6814-6378, **CVU CONACYT ID:** 853247

ID 2nd Coauthor: *Eliud, Paredes-Reyes* / **ORC ID:** 0000-0003-4621-2589, **CVU CONACYT ID:** 638197

Abstract

Today information technologies in the agricultural sector are widely used and this paper presents the development of a Web application that aims to manage the information generated by the application of biological traps that are installed in plots contaminated by the worm plague. armyworm (Spodoptera Frugiperda), these are developed by the Center for Innovation and Technological Development (CiDT) and distributed to corn producers in the Mezquital Valley to combat the plague. The Web application was developed with the agile development methodology called incremental, PHP technology, the MySQL Database Management System and the Here® WeGO API for manipulating georeferenced maps. To guarantee the functionality of the Web application, unit tests were implemented, defining use cases with information provided by CiDT. This Web application represents the first stage of a Hybrid Information System whose goal is to serve CiDT as a tool for monitoring and analyzing the behavior of the fall armyworm plague.

Web Application, Precision Agriculture, Spodoptera Frugiperda

Plastic grow kit design Project

Proyecto de kit de cultivo de plástico

DÍAZ-BARRIGA RODRÍGUEZ, Elisa, MARROQUÍN-DE JESÚS, Ángel, ANGUENOT, Clemént and DUMOND, Kévin

University of Savoie Mont Blanc

ID 1st Author: *Elisa, Díaz-Barriga Rodríguez* / **ORC ID:** 0000-0002-2949-3406

ID 1st Coauthor: *Ángel, Marroquín-De Jesús* / **ORC ID:** 0000-0001-7425-0625, **CVU CONACYT ID:** 81204

ID 2nd Coauthor: *Clemént, Anguenot* / **ORC ID:** 0000-0003-1361-176X

ID 3rd Coauthor: *Kévin, Dumond* / **ORC ID:** 0000-0002-8836-1278

Abstract

Objectif: The development of a product aimed at the recreation sector such as toys for children can represent many obstacles due to the public to which it is addressed and the problems that come to reflect with the efficiency of the plastic material and how that can affect the product itself. Method: Our starting point in this project was to make research about products that were already made, we had to became familiar with the materials commonly used for the invention of toys, know its properties until we find the ideal material for our product which in the end it turned out to be the HDPE of SABIC. Then based of previous knowledge we wrote the functional analysis of the product to characterize the functions offered by our product to satisfy the needs of our users. Next, we capture the ideas in a pulse sketch to be able to later make an electronic sketch with the help of a SolidWorks to make the idea tangible and do the necessary changes to the problems that progressively presented themselves to us. In fact, the invention of the toy evolved as we went along, this was precisely the strongest barrier of the whole assignment. Furthermore, we decide based on our judgment and research that the best method to make our culture kit was through injection, because it benefits us in the aspects of time and cost of the process. Consequently, we had the task of carrying out mechanical resistance tests in the Mold Flow software to ensure that our design was practical. Contribution: Finally, we had to obtain the approximate cost of machinery in the production invested on our piece, which gave us a cost of about 4.938 €. And that helped us to obtain countable results from simulations, such as the cycle time.

Plastic Material, Injection, Costs

Diagnosis of Technostress, its causes and repercussions in the teaching staff of the Higher Technological Institute of the Sierra Norte de Puebla

Diagnóstico de Tecnoestrés, sus causas y repercusiones en la planta docente del Instituto Tecnológico Superior de la Sierra Norte de Puebla

LEGUIZAMO-HERNÁNDEZ, Miriam, PÉREZ-ESTEBAN, Guillermo, VERA-UGARTE, Ricardo Iván and HERNÁNDEZ-HERRERA, Fátima

Instituto Tecnológico Superiror de la Sierra Norte de Puebla

ID 1st Author: *Miriam, Leguizamo-Hernández* / **ORC ID:** 0000-0002-8399-0411, **Researcher ID Thomson:** P-5243-2018, **CVU CONACYT ID:** 514557

ID 1st Coauthor: *Guillermo, Pérez-Esteban* / **ORC ID:** 0000-0002-1093-4566, **CVU CONACYT ID:** 621521

ID 2nd Coauthor: *Ricardo Iván, Vera-Ugarte* / **ORC ID:** 0000-0002-6210-7722, **CVU CANACYT ID:** 421763

ID 3rd Coauthor: *Fátima, Hernández-Herrera* / **ORC ID:** 0000-0002-0204-9401, **Researcher ID Thomson:** GLR-6325-2022

Abstract

The objective of this study has been to diagnose the psychosocial damage of Technostress, caused by technodemands and technoresources; as well as the psychological, psychosomatic and physical repercussions on the teaching staff of the ITSSNP (Higher Technological Institute of the Sierra Norte de Puebla). In a sample of 80 teachers (men and women); Through a questionnaire, topics related to the types of Technostress, its dimensions, causes and physical effects have been explored. The methodological aspects used in this research are based on a qualitative and quantitative research approach. I approach a type of Case Study research, the Sequential Exploratory design (DESXPLOS) was applied. The type of research is non-experimental. The design is Transversal (transsectional). The objective or scope in this study is Explanatory - Correlational (Hernández et al, 2010). For the statistical analysis, variance (ANOVA) was applied. Statistically, the results show the existence of Technostress in ITSSNP teachers in 2019 and 2020, with an increase in the period of the COVID 19 pandemic. The predominant types of technostress in the pandemic are technofatigue and technoanxiety; The causes are work overload (techno-demands) and the state and availability of computer equipment and internet service (techno-resources). Women teachers presented higher levels of technostress in a pandemic due to work overload (technodemands) and by the state, as well as availability of computer equipment and internet service.

Technostress, Teachers, Physical Effects. This work has been funded by PROMEP [F-PROMEP-93/REV-03 SEP-23-005

User interface Design and object segmentation applied to Autominy platform.

Diseño de interfaz de usuario y segmentación de objetos implementado en la plataforma Autominy

LÓPEZ-PÉREZ, Manuel Aarón, SANDOVAL-GIO, Jesús, IX-ANDRADE, Freddy Antonio and MOLINA-CÉSPEDES, Julio

Tecnológico Nacional de México / I.T. de Mérida, Departamento de Ingeniería Eléctrica y Electrónica(DIEE)

ID 1st Author: *Manuel Aarón, López-Pérez* / **ORC ID:** 0000-0001-5659-1848, **CVU CONACYT ID:** 1082426

ID 1st Coauthor: *Jesús, Sandoval-Gío* / **ORCID ID:** 0000-0001-5847-3669, **Researcher Id Thompson:** V-1930-2018, **CVU CONACYT ID:** 297308

ID 2nd Coauthor: *Freddy Antonio, Ix-Andrade* / **ORC ID:** 0000-0003-2420-4879, **CVU CONACYT ID:** 470127

ID 3rd Coauthor: *Julio César, Molina-Céspedes* / **ORC ID:** 0000-0002-6705-5976, **CVU CONACYT ID:** 597664

Abstract

This work proposes to design and implement a user interface to the Autominy platform, which is used for teaching robotics at the Universidad Politécnica de Yucatán. In addition, implementing an object segmentation algorithm improves the robot's environment perception. For the development of the user interface, a framework called KivyMD based on the Python language was used. As far as the segmentation code is concerned, The Point Cloud Library (PCL) is a library which facilitates the management of a large amount of point cloud processing. These are theoretically supported by OcTree sample reduction and by finding the nearest neighbor using K-d Trees. Both techniques are written to create a ROS (Robotic Operating System) Node to improve communication between the actuators of the Autominy robot. In addition to providing an application with which the mobile robot can be manually controlled, a different method for obstacle perception is proposed for autonomous or manual navigation.

Framework, Autonomous, Reduction, Segmentation, Perception, Processing, Actuators, Application

Lighting study at the Technological University of Aguascalientes

Estudio de Iluminación en la Universidad Tecnológica de Aguascalientes

ACOSTA-GONZÁLEZ, Yanid, DELGADO-GÓMEZ, Gilberto, SALAS-DOMÍNGUEZ, Mario Iván and HERRERA-RODRÍGUEZ, Samanta

Universidad Tecnológica de Aguascalientes

ID 1st Author: *Yanid, Acosta-González* / **ORC ID:** 0000-0001-9112-7872, **Researcher ID Thomson:** S-5620-2018, **CVU CONACYT ID:** 449264

ID 1st Coauthor: *Gilberto, Delgado-Gómez* / **ORC ID:** 0000-0001-5213-9432, **CVU CONACYT ID:** 998195

ID 2nd Coauthor: *Mario Iván Salas Domínguez* / **ORC ID:** 0000-0003-2779-8932, **CVU CONACYT ID:** 998197

ID 3rd Coauthor: *Samanta Herrera Rodríguez* / **ORC ID:** 0000-0002-9434-6963, **CVU CONACYT ID:** 1204322

Abstract

In the present job, the objective is to carry out an evaluation of the level of illumination in each building of the Technological University of Aguascalientes (UTA), taking as a reference the NOM-025 -STPS-2008 that is focused on ilumination conditions in the work centers. The project has two parts: firsttly counting and verifying the types of lighting, until the last lamp and to determinate, how much watts each building, consumes. Subsequently, an analysis was carried out with the lux meter and to be able to verify versus the parameters indicated in the NOM-025-STPS-2008 to subsequently make recommendations.

Lighting, Evaluation Points, Lux, Meter, Nom-025-2008

Construction of adiabatic chamber to determine thermal resistance of architectural roofs

Construcción de cámara adiabática para determinar resistencia térmica de cubiertas arquitectónicas

FRANCO-MARTÍNEZ, David, ESPINOSA-HERNÁNDEZ, Leslie Jocelyn and MECALCO-MARTÍNEZ, Erick Iván

Centro Tecnológico, Facultad de Estudios Superiores Aragón, UNAM

ID 1st Author: *David, Franco-Martínez* / **ORC ID:** 0000-0002-0464-8504, **CVU CONACYT ID:** 69978

ID 1st Coauthor: *Leslie Jocelyn, Espinosa-Hernández* / **ORC ID:** 0000-0003-3429-5567

ID 2nd Coauthor: *Erick Iván, Mecalco-Martínez* / **ORC ID:** 0000-0002-6021-652X

Abstract

The objective of this work was the construction of an adiabatic chamber for the estimation of the coefficient of thermal transmission (k), of new materials for construction, which are being developed in the postgraduate degree in architecture of the Faculty of Higher Studies Aragon, of the UNAM. To carry out the construction of the chamber, the methodology of the ASTM C-177 and C-518 standards was used as a reference, using as a polystyrene material 10 cm thick, to obtain the shape of the box. For the taking of readings, temperature control modules were used placed each face and inside. Then the losses in each of the faces were calculated, as well as the power occupied in the system, then the tests were done on different materials of which their thermal conductivity was already known and in that way to know if the adiabatic chamber worked properly. The results obtained with the test materials allow that when creating new construction materials, their coefficient of thermal transmission can be known, since it is a physical property of great relevance in this area. Resulting in a camera that lends itself to improving its design and mainly to obtain the coefficient of thermal transmission in a functional way and lower cost.

Adiabatic Chamber, Coefficient, Thermal Conductivity

Rogowski coil simulation methodology in LTspice

Metodología para simulación de bobina Rogowski en LTspice

ALFARO-JIMENEZ, Andrea Itzel, GALLARDO-GARCIA, Omar, TRASLOSHEROS-MICHEL, Alberto and RAMIREZ-VILLA, Goretti

Universidad Aeronáutica en Querétaro

ID 1st Author: *Andrea Itzel, Alfaro-Jimenez* / **ORC ID:** 0000-0001-9997-8858, **CVU CONACYT ID:** 1246660

ID 1st Coauthor: *Omar, Gallardo-Garcia* / **ORC ID:** 0000-0002-4439-4094, **CVU CONACYT ID:** 663628

ID 2nd Coauthor: *Alberto, Traslosheros-Michel* / **ORC ID:** 0000-0002-9857-7777, **CVU CONACYT ID:** 103311

ID 3rd Coauthor: *Goretti, Ramirez-Villa* / **ORC ID:** 0000-0003-3442-8294, **CVU CONACYT ID:** 772578

Abstract

A Rogowski coil is an air-core winding that is built around the conductor on a diamagnetic material. The magnetic field produced by the current induces a proportional voltage in the coil. They are devices widely used in the measurement of current with high frequencies due to the advantages that their use represents, such as linearity and bandwidth. In aeronautics, Rogowski coils are used in various applications. However, its embedded application on a printed circuit board (PCB) is much smaller. The simulation of these coils is not as well documented since the documents found focus more on the development of prototypes. However, a correct and complete simulation facilitates the study and development of Rogowski coils. For this reason, the entire design and development process of the simulation will be documented, from the calculation of the parameters to the configurations of the different stages of the circuit. Objectives. Design the equivalent circuit of the Rogowski coil by calculating the component values. Design the necessary integrator circuit for the coil to operate over the full bandwidth producing a voltage output proportional to the measured current. Define the dimensions of the PCB for your future application. Perform an evaluation of the simulation results and determine if the feasible for the application. Methodology. Investigation of the theory that supports the operation of the Rogowski coil and the integrator circuit. Definition of the most suitable measurements for the PCB prototype that cover the entire bandwidth, but with small measurements and weight. Calculation of the resistances, inductances and capacitance of the equivalent circuit of the Rogowski coil.Selection of the integrating circuit and calculation of the appropriate resistors and capacitors for the bandwidth. Research and calculation of coupling, filtering and amplification circuits. Implementation of the complete circuit. Measurement of the different stages of the circuit. Application of different frequencies to evaluate the performance of the simulations in all the bandwidth. Comparison and conclusions of the simulations. Contribution. Correct and complete simulation of a Rogowski coil with its integrating circuit, its coupling stages and the amplifier circuit. From the calculation of the values of the components to the configurations of the different stages.

Inductor, Integrate, Simulations

Electrical system simulation of an aircraft through ANSYS Electronics Desktop

Simulación del sistema eléctrico de una aeronave a través de ANSYS Electronics Desktop

REGALADO-RANGEL, Karina, GASTELLUM-MICHEL, Filiberto, TORRES-RIVERA, Moisés and TRASLOSHEROS-MICHEL, Alberto

Universidad Aeronáutica en Querétaro

ID 1st Author: *Karina, Regalado-Rangel* / **ORC ID:** 0000-0002-4497-665X

ID 1st Coauthor: *Filiberto, Gastellum-Michel* / **ORC ID:** 0000-0001-6668-2903, **CVU CONACYT ID:** 634138

ID 2nd Coauthor: *Moisés, Torres-Rivera*

ID 3rd Coauthor: *Alberto, Traslosheros-Michel* / **ORC ID:** 0000-0002-9857-7777, **CVU CONACYT ID:** 103311

Abstract

More Electric Aircraft is a new technology that allows the aeronautical sector to innovate in the electrical part when it comes to implementing it, that is, it consists of replacing part of the current pneumatic, hydraulic and mechanical systems that make up an aircraft, with electrical systems, for this reason, the main purpose is to design and develop a simulation model in ANSYS Electronics Desktop of the Boeing 777 architecture to analyze all the parameters such as: the voltage, current and power of each subsystem, so for the development, they are simulated one by one and later, they are joined based on the electrical diagram of the aircraft in order to be able to test them in normal and abnormal conditions, and make the comparison of when they are simulated individually, in this way, it creates an impact when rebuilding the electrical system, generating advantages that benefit those companies in this sector for the contribution of their innovations.

Power Electronics, Aircraft, Simulation

Structural analysis, simulation and validation as a strategy for product design

Análisis, simulación y validación estructural como estrategia para diseño de producto

OJEDA-ESCOTO, Pedro Agustín

Universidad Tecnológica de Aguascalientes

ID 1st Author: *Pedro Agustín, Ojeda-Escoto* / **ORC ID:** 0000-0001-7282-4672, **CVU CONACYT ID:** 50027

Abstract

In the process of developing products to meet specific needs or requirements, it is crucial, in terms of functionality, to achieve the interaction of two strategies: on the one hand, end-user feedback and, on the other hand, architectural optimization by applying finite element analysis (FEA). Seeking the consolidation of a new product and identifying opportunities for improvement, this article presents the results of an FEA study applied to a multicultivator (case study) in which the premises were: 1) validation of the design proposal; 2) evaluation of areas detected as "critical"; and 3) optimization of geometry to reduce weight and manufacturing costs. The procedure used to structure the design of the multicultivator under the approaches of architecture validation, production quality improvement and cost reduction is also presented in a simplified manner.

Design, Functionality, Optimization

Mobile application to traceability of corn production in the Valle del Mezquital

Aplicación móvil para la trazabilidad de la producción de maíz en el Valle del Mezquital

PEREZ-BAUTISTA, Mario, NAVARRETE-ARIAS, Dulce Jazmin and HERNANDEZ-GARCIA, Héctor Daniel

Tecnológico Nacional de México, Instituto Tecnológico Superior del Occidente del Estado de Hidalgo

ID 1st Author: *Mario, Pérez-Bautista* / **ORC ID:** 0000-0002-3260-906X, **CVU CONACYT ID:** 638669

ID 1st Coauthor: *Dulce J., Navarrete-Arias* / **ORC ID:** 0000-0002-7915-068X, **Researcher ID Thomson:** AAR-8785-2021, **CVU CONACYT ID:** 366071

ID 2nd Coauthor: *Héctor Daniel, Hernández-García* / **ORC ID:** 0000-0001-5261-8353, **CVU CONACYT ID:** 208146

Abstract

This work presents the development in Android Studio of three mobile applications and a web service in php that allows the agronomists of Centro de innovación y Desarrollo Tecnológico del Valle del Mezquital (CiDT) to manage the traceability logs of corn production in the field. from the preparation of the soil, sowing, irrigation, applications to the harvest, and that this serves so that the final consumers know the process of the product that they acquire only by scanning the QR code printed on the sack. In this way, the CiDT seeks to give added value to the production of the farmers of the Valle del Mezquital, offering food certainty to its buyers. The scrum methodology was used to organize the user stories, the client server architecture was implemented to establish communication between the database and the mobile devices, after the development an empirical evaluation of usability was applied with the Agronomist in charge to identify his point of view about the ease of use, security, error rate, satisfaction and graphical interface, with 70 points in his perception of usability.

Android, Corn, Traceability

Microcontroller lab with remote connectivity and control of virtual instruments

Laboratorio de Microcontroladores con conectividad remota y control de instrumentos virtuales

ISLAS-CERÓN, Alejandro, MARTÍNEZ-HERNÁNDEZ, Haydee Patricia, CORTES-MALDONADO, Raúl and MORALES-CAPORAL, Roberto

Departamento de Ingeniería Eléctrica y Electrónica, Tecnológico Nacional de México/Instituto Tecnológico de Apizaco

ID 1st Autor: *Alejandro, Islas-Cerón* / **ORC ID:** 0000-0003-2726-720X, **CVU CONACYT ID**: 1079594

ID 1st Coautor: *Haydee Patricia, Martínez-Hernández* / **ORC ID:** 0000-0001-8863-4689, **CVU CONACYT ID**: 353253

ID 2nd Coautor: *Raúl, Cortés-Maldonado* / **ORC ID:** 0000-0001-8463-1325, **CVU CONACYT ID:** 335473

ID 3rd Coautor: *Roberto, Morales-Caporal* / **ORC ID:** 0000-0002-6115-0454, **CVU CONACYT ID:** 93093

Abstract

This article shows a learning alternative for undergraduate engineering students, who due to force majeure do not attend their practices or projects in a face-to-face manner in the subject of microcontrollers. This guarantees a hybrid teaching-learning process, where students can interact remotely with control boards located in laboratories and workshops. To achieve this task, the syllabus of this subject was consulted, a series of practices were selected and with them the use of graphical interfaces for visualization and control of virtual instruments was developed, which through a USB-Serial RS232 adapter communicates with the transmission (Tx) and reception of data (Rx) ports of the PIC18f4550 microcontroller, thus allowing control actions on output actuators. Finally, the remote connection is made, through the NodeMCU development board based on the ESP8266 chip and a mobile application developed in Blynk, allowing the student to learn in a more didactic way. The implementation of this type of alternative is intended to ensure quality education at the higher level, in situations where students do not have the availability to attend the facilities of their academic institution.

Virtual Control, Remote Connectivity, Microcontrollers, RS232, Nodemcu Esp 8266, Blynk

Electricity generation with a Microbial Fuel Cell fed cheese whey

Generación de electricidad en una celda de combustible microbiana alimentada con suero de leche

HERNÁNDEZ-BARRALES, Jesús, RIVERA-ÁLVAREZ, Anselmo, HERNÁNDEZ-OCHOA, León Raúl and SANDOVAL-SALAS, Fabiola

Laboratorio de Investigación. Tecnológico Nacional de México

ID 1st Author: *Jesús, Hernández-Barrales* / **ORC ID:** 0000-0003-3423-9928

ID 1st Coauthor: *Anselmo, Rivera-Álvarez* / **ORC ID:** 0000-0002-9377-2549

ID 2nd Coauthor: *León Raúl, Hernández Ochoa* / **ORC ID:** 0000-0002-5886-8617, **Researcher ID Thomson:** I-1384-2015

ID 3rd Coauthor: *Fabiola, Sandoval-Salas* / **ORC ID:** 0000-0001-9267-4974, **CVU CONACYT ID:** 71814

Abstract

Energy production from renewable sources has become a strategy for exploiting other systems' waste reducing polluting gas emissions. Microbial Fuel Cell (MFC) technology is a sustainable alternative for electric power generation directly from waste without the need of mechanical parts. This study compared the electric power generation of two types of membranes (Nafion® and agar) and two types of electrodes (aluminum and graphite) in a double-chamber MFC. The system was fed with a sodium acetate and cheese whey solution; in the anode chamber sludges coming from a pork industry wastewater treatment plant were used. Results showed that the highest level of energy generation was obtained with a combination of Nafion® membrane and aluminum plate electrode (0.144 mW/h with 100 Ω and 0.497 mW/h with 300 Ω resitance) compared to other combinations. Therefore, MFC technology is an alternative for electric power generation from organic substrates.

MFC, Nafion, Cheese Whey

Analysis and comparison of thermal lag in material of finishes type in dwellings of social interest in the city of Mexicali, Baja California

Análisis y comparación de retraso térmico en material tipo acabado en viviendas de interés social en la ciudad de Mexicali, Baja California

AGUILAR-ALVARADO, Alejandro Jefté, MURGUIA-TOSTADO, Luisa Paola, CURIEL-SÁNCHEZ, Francisco Gibranny and CAMACHO-IXTA, Ixchel Astrid

Facultad de Arquitectura y Diseño, Universidad Autónoma de Baja California

ID 1st Author: *Alejandro Jefté, Aguilar Alvarado* / **ORC ID:** 0000-0003-3054-6162, **Researcher ID Thomson:** GLR-6175-2022, **CVU CONACYT ID:** 1221188

ID 1st Coauthor: *Luisa Paola, Murguía Tostado* / **ORC ID:** 0000-0003-2226-2629, **Researcher ID Thomson:** GLN-5389-2022, **CVU CONACYT ID:** 1158925

ID 2nd Coauthor: *Francisco Gibranny, Curiel Sánchez* / **ORC ID:** 0000-0003-0521-5177, **Researcher ID Thomson**: G-3529- 2019, **CVU CONACYT ID:** 973114

ID 3rd Coauthor: *Ixchel Astrid, Camacho Ixta* / **ORC ID:** 0000-0002-2985-6705, **Researcher ID Thomson:** G-3112-2018, **CVU CONACYT ID:** 893810

Abstract

The global temperatures have shown the tendency of global warming and climate change continues, that is why, the need is to search alternatives that are effective inthe thermic reinforcement of the envelope of the dwelling. In consequence, the objective of the present investigation was to analyze the thermal behavior of a material that promises thermal lag qualities effective in comparison to the traditional finishes. This text was worked under a monitoring scheme and analysis of the results through a unit difference. The results indicate that the material of finishes studied favors the thermal lag between superficial temperatures and stability in thermal oscillation from the interior side of the wall and the roof analized. This article works as a divulgation and invitation to other investigations that share the objective to analyze materials that favor the thermal lag and energetic efficiency in the envelopes of the buildings.

Finish material, Thermic lag, Surface temperature

Effect of simultaneous microwave-ultrasound irradiation on the synthesis of hydrotalcite-derived mixed oxides for As(III) removal

Efecto de la irradiación simultánea de microondas-ultrasonido en la síntesis de óxidos mixtos derivados de hidrotalcita para la eliminación de As(III)

GARZÓN-PÉREZ, Amanda Stephanie, PAREDES-CARRERA, Silvia Patricia, VELÁZQUEZ-HERRERA, Franchescoli Didier and ZARAZUA-AGUILAR, Yohuali

Instituto de Metalurgia, Universidad Autónoma de San Luis Potosí

ID 1 st Author: *Amanda Stephanie, Garzón-Pérez* / **ORC ID:** 0000-0002-2349-7115, **CVU CONACYT ID:** 742764

ID 1 st Coauthor: *Silvia Patricia, Paredes-Carrera* / **ORC ID:** 0000-0002-5388-7982, **CVU CONACYT ID:** 37605

ID 2 nd Coauthor: *Franchescoli Didier, Velázquez-Herrera* / **ORC ID:** 0000-0001-6011-055X, **CVU CONACYT ID:** 488215

ID 3 rd Coauthor: *Yohuali, Zarazua-Aguilar* / **ORC ID:** 0000-0003-3788-4682, **CVU CONACYT ID:** 447394

Abstract

Inorganic arsenic water contamination turns out to be a serious problem worldwide. According to the World Health Organization (WHO), more than 140 million people worldwide consume water with high levels of arsenic, causing diseases such as cancer. Arsenic is found as As^{3+} ($As(OH)_3$) mainly in surface water effluents, which increases the interest in its removal with low-cost materials and regeneration capacity. For this reason, in this chapter, the study of As(III) adsorption on hydrotalcite-derived mixed oxides ZnAl, synthesized by an alternative simultaneous microwave/ultrasound irradiation method, followed by the formation of mixed oxides by calcination. The specific surface area of the calcined sample obtained by simultaneous irradiation was about 59 m^2/g, being higher compared to the individually irradiated materials, ultrasound, and microwaves, 20 and 50 m^2 /g, respectively. This indicated that the increase in the specific surface area was attributed to a synergistic effect promoted by combining the irradiation methods (microwaves-ultrasound). SEM images show that the morphology of the mixed oxides also depends on the irradiation mode used during the hydrotalcite synthesis, generating an arrangement of two phases of particles. Simultaneous irradiation provides a simple way to obtain materials with better textural properties in a short synthesis time and favors a high adsorption capacity (0.52 mg/g), compared to individually irradiated materials.

Synergistic, Synthesis, Mixed Oxides, Arsenite, Simultaneous Irradiation

Detection of minor stoppages in the packaging area of a brewing company in the town of Tecate B.C.

Detección de paros menores en el área de envasado, de una empresa cervecera de la localidad de Tecate B.C.

GARAMBULLO, Adriana, ACOSTA-MARTÍNEZ, Alejandro, PLAZOLA-RIVERA, Teresa and APODACA-DEL ANGEL, Lourdes

Faculty of Engineering, Administrative and Social Sciences, Autonomous University of Baja California, Mexico

ID 1st Author: *Adriana Isabel, Garambullo* / **ORC ID:** 0000-0002-1440-2276, **CVU CONACYT ID**: CVU 397642

ID 1st Coauthor: *Alejandro, Acosta-Martínez* / **ORC ID:** 0000-0001-5440-034X

ID 2nd Coauthor: *Teresa de Jesús, Plazola-Rivera* / **ORC ID:** 0000-0002-5266-7021, **CVU CONACYT ID:** 277923

ID 3rd Coauthor: *Lourdes Evelyn, Apodaca-del Angel* / **ORC ID:** 0000-0001-9349-7754, **CVU CONACYT ID:** 215689

Abstract

The present research consisted of analyzing the packaging area of a brewery company in the town of Tecate BC, in order to detect the root cause of the minor stoppages that occur more frequently in the sub-areas where glass bottles pass through, and thus generate a corrective measure at the specific point where the process stops, since this has a direct impact on the useful time of annual beer production in this presentation. This project consisted of developing a series of activities that allowed planning how to attack the previously explained problem. With the help of the Deming Cycle methodology, Kaizen and quality tools such as Pareto Diagrams, Check Sheets and Standard Operation Sheets, to provide an optimal solution to this problem. The results show that with the tools provided, 91% of the 285.15 minutes that to date are accumulated by minor stoppages were eradicated and notably decreased, this is equivalent to an economic saving of $ 76,990.50 pesos m.n., taking into account that currently each minute of production is valued at $ 270 pesos m.n.

Minor Stoppages, Enterprise, Production Engineering

Implementation of quality control tools in the inspection-receipt area to reduce raw material rejections in electromechanical industries

Implementación de herramientas de control de calidad en el área de inspección-recibo para disminuir los rechazos de materia prima en industrias electromecánicas

SOTO-LEYVA, Yasmin, BONES-MARTÍNEZ, Rosalía and SANTOS-OSORIO, Arturo

Tecnológico Nacional de México/Instituto Tecnológico Superior de Huauchinango

ID 1st Author: *Yasmin, Soto-Leyva* / **ORC ID:** 0000-0003-2652-7065, **CVU CONACYT ID:** 951464

ID 1st Coauthor: *Rosalía, Bones Martínez* / **ORC ID:** 0000-0001-8829-9737, **CVU CONACYT ID:** 368744

ID 2nd Coauthor: *Arturo, Santos-Osorio* / **ORC ID:** 0000-0003-3643-5770, **CVU CONACYT ID:** 951024

Abstract

The metalworking industry turns out to be a starting point for the manufacture of assemblies, subassemblies and circuits that are imported or exported to other work environments; these organizations contribute to the technological growth of the country in which they are established, for the case presented below, the electromechanical industry is evident, which is identified by showing quality problems in the manufactured products, derived from a null control in the inspection-receipt area, which is in charge of receiving supplies and shipments to the warehouse area. According to the project carried out, it is identified that the main cause is the lack of standardization of the activities carried out by the quality department, being of vital importance the implementation of an assertive methodology that ensures that suppliers supply the organization with top quality materials. The applied quality control methodology is based on three stages: 1) Information gathering, 2) Quantitative and qualitative analysis of variables, 3) Solution implementation, 4) Measurement of solution effectiveness, are developed using the following techniques: Internal audit, Check List, Ishikawa Diagram, input control of raw materials and supplies and labeling of materials. The results obtained were beneficial, reducing raw material rejections by 7% and identifying through the traffic light technique the suppliers that meet the requested requirements, which will be maintained for future purchases, in the same way the economic benefit achieved after the project is $358,506.94 being a considerable amount for members of senior management.

Electromechanical industry, Inspection-receipt, Quality control, Quantitative

Meliponiculture in communities as a business unit for indigenous women

La meliponicultura en las comunidades como unidad de negocio para las mujeres indígenas

GONZAGA-LICONA, Elisa, GONZÁLEZ-MUÑOZ, Lilian and AHUACATITLA-PÉREZ, José Miguel

Instituto Tecnológico Superior de Huauchinango, Huauchinango, Pue.

ID 1st Author: *Elisa, Gonzaga-Licona* / **ORC ID:** 0000-0002-7970-7855, **CVU CONACYT ID:** 904035

ID 1st Coauthor: *Lilian, González-Muñoz* / **ORC ID:** 0000-0003-2575-0740, **CVU CONACYT ID:** 962092

ID 2nd Coauthor: *José Miguel, Ahucatitla-Pérez* / **ORC ID:** 0000-0001-5336-8966, **CVU CONACYT ID:** 951466

Abstract

Meliponiculture or breeding of native stingless bees (escaptotrigona) is an activity that economically benefits those who sell honey, as well as the generation of new colonies of melipona bees, it can also be an alternative medicinal source and good quality food. Rational management of domesticated hives, based on knowledge of the biology of the species, can increase honey production, thus improving the economic income of indigenous women in marginalized areas of the northern highlands of Puebla, since these ancient insects are not dangerous. A short and medium term project is proposed aimed at indigenous women as a business unit, meliponiculture is an ancestral activity and Mexican heritage, in which women will be the main authorsin the development of this interesting project, having an environmental, social, educational impact , economic and cultural for the northern mountains of Puebla.

Meliponas , Bees, Scaptotrigona , Honey, Pollen, Meliponario

Technological Implementation for rainwater harvesting

Implementación tecnológica para la captación de agua de lluvia

BONES-MARTINEZ, Rosalía, SOTO-LEYVA, Yasmin and SANTOS-OSORIO, Arturo

Tecnológico Nacional de México/Instituto Tecnológico Superior de Huauchinango

ID 1st Author*: Rosalía, Bones-Martínez* / **ORC ID:** 0000-0001-8829-9737, **CVU CONACYT ID:** 368744

ID 1st Coauthor: *Yasmin, Soto-Leyva* / **ORC ID:** 0000-0003-2652-7065, **CVU CONACYT ID:** 951464

ID 2nd Coauthor: *Arturo, Santos-Osorio* / **ORC ID:** 0000-0003-3643-5770, **CVU CONACYT ID:** 951024

Abstract

This project presents the collection and use of rainwater at the Higher Technological Institute of Huauchinango based on a physical model of water collection, with which water is collected and stored directly outdoors, providing real data on a daily. On the basis that rainwater can be used as an alternative to supply the water demand, in some of the daily activities. Primarily, the physical model of rainwater capture and collection is implemented, then it is stored in a water tank and from this data was collected in liters, during a period of time of 30 days, during this period of time different samples were taken, before and after passing through the filter, to determine some of its physical and chemical characteristics to define the use of water in the infrastructure of the Higher Technological Institute of Huauchinango.

Storm water, Sustainable, Ecological

A systematic review on life cycle assessment of solar water heaters

Una revisión sistemática sobre la evaluación del ciclo de vida de los calentadores solares de agua

SALGADO-CONRADO, Lizbeth, ÁLVAREZ-MACÍAS, Carlos, ESMERALDA-GÓMEZ, Alma Graciela and PÉREZ-GARCÍA, Laura Andrea

Facultad de Ingeniería Mecánica y Eléctrica, Universidad Autónoma de Coahuila

ID 1st Author: *Lizbeth, Salgado-Conrado* / **ORC ID** - 0000-0002-2181-5861, **CVU CONACYT ID** 296620

ID 1st Coauthor: *Carlos, Álvarez-Macías* / **ORC ID** - 0000-0002-2263-0316, **CVU CONACYT ID** 165872

ID 2nd Coauthor: *Alma Graciela, Esmeralda-Gómez* / **ORC ID** 0000-0003-1998-0056, **CVU CONACYT ID** 322782

ID 3rd Coauthor: *Laura Andrea, Pérez-García* / **ORC ID** 0000-0002-5880-6192, **CVU CONACYT ID** 887623

Abstract

The aim of this study is to provide an up-to-date literature review of Life Cycle Assessment (LCA) of solar water heaters, published in 2000-2021. A systematic review was chosen as the research method to achieve a comprehensive overview of existing studies in solar thermal systems, identifying the variability of the reported results due to the methodological choices such as functional units (FU), location, system boundaries, life cycle inventory, and impact methods. We conducted a quantitative analysis of the environmental impact of solar water heaters. The results show that there is a significant variability in studies for lack of data inventory, presentation of results in absolute or percentage terms, lack of normalization, and sensitivity studies. The major challenges in solar water heater LCA were identified as the lack of LCA studies in the American, Asian and Australian continents, lack of comparative studies of LCA with similar goals and scopes, lack of studies of evacuated-tube solar collectors, integral collector storage systems, and new solar water heaters.

Assessment, Systematic, Environmental Issues, Solar Water Heater

Process standardization and its impact on the manufacture of amaranth products

Estandarización de procesos y su impacto en la fabricación de productos de amaranto

SOTO-LEYVA, Yasmin, BONES-MARTÍNEZ, Rosalía and SANTOS-OSORIO, Arturo

Tecnológico Nacional de México/Instituto Tecnológico Superior de Huauchinango

ID 1st Author: *Yasmin, Soto-Leyva* / **ORC ID:** 0000-0003-2652-7065, **CVU CONACYT ID:** 951464

ID 1st Coauthor: *Rosalía, Bones Martínez* / **ORC ID:** 0000-0001-8829-9737, **CVU CONACYT ID:** 368744

ID 2nd Coauthor: *Arturo, Santos-Osorio* / **ORC ID:** 0000-0003-3643-5770, **CVU CONACYT ID:** 951024

Abstract

Currently, the amaranth industrialization has become in an important activity to producer families of west-center region of Puebla State to increase their economic incomes. The objective of this study was propose a strategy based on the good practices and current applicable regulations of food industries, finding out the quality in the process and products of the microenterprises dedicated to create amaranth products. The analysis was applied to six microenterprises of Tochimilco and Atzitzihuacán, Puebla, to get the general characteristics of the families and agro-industrial activities that they realize. Results show that the economic and ignorance restricts the competitive grow in the agro-industrial market, due to deficiency of bases to guarantee the hygiene and safety during the elaboration processes. This project proposes to introduce the requirements of the food industry through improvement tools and methodologies and available resources from producers.

Industrialization, Amaranth products, Methodologies

Optimization of the rainbow trout rearing process (O *ncorynclius mykiss*). case-study

Optimización del proceso de crianza de trucha arcoíris (O*ncorynclius mykiss*). Estudio de caso

HERNÁNDEZ-MALDONADO, Evelia, GONZAGA-LICONA, Elisa and VILLA-BARRERA, Víctor

Superior Technological Institute of Huauchinango

ID 1st Author: *Evelia, Hernández-Maldonado* / **ORC ID:** 0000-0001-9648-289X, **CVU CONACYT ID:** 1220738

ID 1st Coauthor: *Elisa, Gonzaga- Licona* / **ORC ID:** 0000-0002-7970-7855, **CVU CONACYT ID:** 904035

ID 2 nd Coauthor: *Víctor, Villa-Barrera* / **ORC ID:** 0000-0001-6118-9474, **CVU CONACYT ID:** 951194

Abstract

The rainbow trout (Oncorynclius mykiss), is a species belonging to the Salmonidae family, native to the Pacific coast of North America, due to its easy adaptation to captivity, its breeding has been widely spread almost throughout the world. In Mexico, the cultivation of trout began at the end of the 19th century, in the first natural nursery in Chimea Lerma, state of Mexico, in order to carry out repopulation in national water bodies. There are several species of this fish that can be farmed, but what has achieved the greatest success is the rainbow trout, due to its rapid growth, lower oxygen content in the water, and resistance to disease. Referring to trout farming in the problems that producers in the Huauchinango region have in terms of overpopulation of specimens in ponds, generating uncertainty in the inadequate distribution of trout affecting their size and weight, it is carried out an extra activity known as "unfolding", which consists of the transfer of trout through a net from a pond that passes through a trout selector who determines the size and destination of each of the specimens, with the aim of dividing them according to to the stages of growth; this operation generates additional costs that are not recoverable at the final point of sale of the specimen, knowing these factors arises the need to optimize the process of rearing and fattening trout by standardizing the ponds, establishing a model to develop a hatchery of trout. Thanks to the results obtained in the analysis of the La Barranca hatchery, the optimal conditions were defined for the design of the hatchery ponds that will be located in the "Piedras Pintadas" river within the region corresponding to the property of the Preeminent Technological Institute of Huauchinango, Puebla, located in Colonia 5 de Octubre of the same city.

Optimization, Process, Rainbow Trout, Research, Standardization

Removal of aluminum (Al) and lead (Pb) in contaminated water using carboxymethylcellulose (CMC) gel polymer

Eliminación de aluminio (Al) y plomo (Pb) en agua contaminada utilizando un polímero de gel de carboximetilcelulosa (CMC)

ANTONIO-CRUZ, Rocío, DEL ÁNGEL-MAYA, Flor Elena, PURATA-PÉREZ, Nora Alicia and CÁCERES-JAVIER, José Luis

Tecnológico Nacional de México Campus Villahermosa

ID 1st Author: *Rocío, Antonio-Cruz* / **ORC ID:** 0000-0003-3638-5152, **CVU CONACYT:** 25705

ID 1st Coauthor: *Flor Elena, Del Ángel-Maya* / **ORC ID:** 0000-0001-8209-9574, **CVU CONACYT:** 942200

ID 2nd Coauthor: *Nora Alicia, Purata-Pérez* / **ORC ID:** 0000-0002-6823-6912, **CVU CONACYT:** 328771

ID 3rd Coauthor: *José Luis, Cáceres-Javier* / **ORC ID:** 0000-0002-5455-5891, **CVU CONACYT:** 813537

Abstract

Water is a renewable resource, very important for living beings and essential for various activities. However, when it is contaminated, it becomes a non-renewable resource and it is necessary to investigate and know how to preserve it. Nowadays, water is a highly polluted resource, mainly due to human and industrial activities, due to this, a treatment is sought to solve one of the problems, such as the presence of heavy metals such as: lead, cadmium, arsenic and mercury, which are very toxic and accumulate by the organisms that absorb them, which in turn are a source of contamination of food chains that, when ingested by man, cause blindness, amnesia, rickets, myasthenia or even death (Covarrubias and Peña, 2017). On the other hand, aluminum has a wide application in the food, pharmaceutical, paper and construction industries and in the treatment of drinking water and wastewater. However, the possible damage to health caused by the consumption of this element has not been emphasized. One of the diseases that has been associated with the intake of this element is Alzheimer's and there is a risk of developing other conditions (Trejo et al., 2004). Currently, the use of clean technologies is being promoted, which are products, tools or processes that seek to reduce environmental pollution. An example are gels, these are cross-linked hydrophilic polymers capable of expanding their volumes due to their high expansion in water and are widely used in wastewater purification. There are different types of absorbent materials such as activated carbon, minerals, zeolites, ion exchange resins, biosorbents (biomasses) and cross-linked polymers. In this research work, a polymer (carboxymethylcellulose gel) was synthesized, using glutaraldehyde (GA) as a binding agent. crosslinking and hydrochloric acid (HCl) as reaction catalyst. The carboxymethylcellulose (CMC) gel was in contact with the contaminated water containing Al and Pb ions, these were retained by the absorption process within the cross-linked network of the CMC gel, and by atomic absorption (AA) analysis. the amount of Al and Pb ions removed from the contaminated water was determined.

Aluminum, Lead, Gels, Carboxymethylcellulose

Market research to identify the viability of using solar stoves in the municipalities of Peñamiller and Jalpan de Serra, in the state of Querétaro

Estudio de mercado para identificar la factibilidad de uso de las estufas solares en los municipios de Peñamiller y Jalpan de Serra, del Estado de Querétaro

ÁLVAREZ-ORTEGA, Annel Angelia, MORADO-HUERTA, Ma. Guadalupe, CASTILLO-MARTÍNEZ, Luz Carmen and MARROQUÍN-DE JESÚS, Angel

Universidad Tecnológica de San Juan del Río

ID 1st Author: *Annel Angelia, Álvarez-Ortega* / **ORC ID:** 0000-0001-6177-6345, **CVU CONACYT ID:** 676492

ID 1st Coauthor: *Ma. Guadalupe, Morado-Huerta* / **ORC ID:** 0000-0003-0029-4208, **CVU CONACYT ID**: 251130

ID 2nd Coauthor: *Luz Carmen, Castillo-Martínez* / **ORC ID:** 0000-0001-6544-5279, **CVU CONACYT ID:** 412614

ID 3rd Coauthor: *Ángel, Marroquín-de Jesús* / **ORC ID:** 0000-0001-7425-0625, **CVU CONACYT ID**: 81204

Abstract

Based on a study carried out, through the application of 115 surveys to heads of families in the rural area of the municipalities of Peñamiller and Jalpan de Serra, in the state of Querétaro, the main market parameters for the use of of solar cookers for the area of influence. The people who answered the surveys were chosen according to a series of homogeneous characteristics such as rural geographic area, social and economic vulnerability, uses and customs. The selected localities were: Valle Verde, San Antonio Tancoyol and Las Ánimas of the municipality of Jalpan de Serra, while, for the municipality of Peñamiller, the surveys were applied to the inhabitants of the following localities of Peña Blanca, Alto Bonito and Mentiras. It should be noted that the instrument underwent a pilot test which made it possible to validate that the wording of the questions was adequate, that there was a clear understanding in the wording, the use of simple language and that, of course, the application time will be found in the recommended parameters. For the pilot test, a small sample was chosen that represented 2% of the representative sample under study. In addition, other results of the survey have made it possible to obtain information regarding the main energy sources used for cooking food, the number of inhabitants per household, knowledge about the existence of solar cookers, the availability of trying this type of cooker, as well as such as the type of food that would be cooked in the appliance and the prices willing to pay. However, it must be considered that the cost the user is willing to pay is less than one thousand pesos in order to be attractive, the product must also be weather resistant. In this research stage, no product presentation variables such as weight, volume or appearance were considered. The scope of this study is exploratory and market tests on physical prototypes are required, which are planned in the near future.

Renewable Energy, Market Research, Solar Stoves, Solar Cooking

Staphylococcus carnosus study as an alternative biocollector for metal minerals

Estudio del *staphylococcus carnosus* como un biocolector alternativos para minerales metálicos

RAMOS-ESCOBEDO, Gema Trinidad, ESCALANTE-IBARRA, Griselda Berenice, ROSALES-SOSA, Ma. Gloria and REYES-GUZMAN, Claudia Verónica

Facultad de Metalurgia-Universidad Autónoma de Coahuila

ID 1st Author: *Gema Trinidad, Ramos-Escobedo* / **ORC ID**: 0000-0003-2902-6928 - **CVU CONACYT ID:** 94696

ID 1st Coauthor: *Griselda Berenice, Escalante-Ibarra* / **ORC ID:** 0000-0002-6329-5294, **CVU CONACYT ID:** 321452

ID 2nd Coauthor: *María Gloria, Rosales-Sos* / **ORC ID**: 0000-0002-6654-3433, **CVU CONACYT ID:** 63212

ID 3rd Coauthor: *Claudia Verónica, Reyes-Guzman* / **ORC ID**: 0000-0001-5470-0510, **CVU CONACYT ID:** 176351

Abstract

Biotechnology has been explored as a potential low cost, environmentally benign alternative to many of the current mineral processing techniques. Recent investigations have shown that selected bacteria may also assist in the beneficiation of these minerals through bioflotation bioflocculation. Bioflotation represents an innovative in the minerals benefit process, where the bacteria are generally used as a collector avoiding the use of conventional reagents. The aim of this study was to evaluate the use of *Staphylococcus Carnosus* as bio-reagent in the flotation process of sulfides such as galena (PbS), pyrite (FeS_2) and chalcopyrite ($CuFeS_2$). To evaluate the bacterial influence on minerals floatability Hallimond flotation test was carried out. The absorption zeta potential and adhesion measurements were useed to determine the adhesion of the bacteria from each mineral. The assays were carried out with and without bacteria. The results showed that *S. Carnosus* has a hydrophobic behavior and different affinity grade to sulfides mineral substrates. This interaction allowed the bacteria to act as a collector. The biomodified sulfides show the following floatability in decreasing order: galena>chalcopyrite>pyrite. These differences point out the possibility of future application of *S. carnosus* in selective separation of sulfide minerals to depress the gangue type ores (pyrite among others).

Biotechnology, Bioflotation, Hydrophobic, Alternative, Processing

Evaluation of activated carbon from cactus residues in the color removal process in synthetic water

Evaluación de carbón activado de residuos de nopal en el proceso de remoción de color en agua sintética

URBANO-HERNÁNDEZ, Marta, OJEDA-CASTILLO, Valeria and PRADO-SALAZAR, María del Rosario

Universidad Tecnológica de Jalisco, División de Química Aplicada

ID 1st Author: *Marta, Urbano-Hernández* / **ORC ID:** 0000-0002-2897-6158

ID 1st Coauthor: *Valeria, Ojeda-Castillo* / **ORC ID:** 0000-0002-1397-0589, **CVU CONACYT ID:** 417629

ID 2nd Coauthor: *María Del Rosario, Prado-Salazar* / **ORC ID:** 0000-0002-6366-1944, **CVU CONACYT ID:** 100541

Abstract

The removal efficiency of activated carbons prepared from *Opuntia spp*. cladodes in the adsorption of Crystal Violet from the synthetic wastewater was investigated in a 3^2 factorial design (two factors and three levels). *Opuntia spp*. powder was processed into activated carbon by carbonizing at 650 ºC and activated with acetic acid (60% v/v) for 1 h. Then, synthetic solutions of crystal violet were prepared and the adsorption process was carried out by varying initial crystal violet concentration and carbon activated dose, at room temperature. The results showed that 77.8% of adsorption of crystal violet from the syntethic water and an adsorption of 622.3 mg/g at room temperature and 10 min of contact.

Dyes, Remotion, Wastewater, Cristal-Violet

Used edible oils a latent threat in the contamination of water bodies

Aceites comestibles usados una amenaza latente en la contaminación de los cuerpos de agua

TORRES-RIVERO, Ligia, LOEZA-CRUZ, María Samantha, MORALES-ORTIZ, Verónica and MEDINA-DIAZ, Emery

Tecnologico Nacional Demexico/Instituto Tecnologico De Cancun

ID 1st Author: *Ligia, Torres-Rivero* / **ORC ID:** 0000-0002-3303-3437, **CVU CONACYT ID:** 316421

D 1st Coauthor: *María Samantha, Loeza-Cruz*

ID 2nd Coauthor: *Verónica, Morales-Ortiz* / **ORC ID:** 0000-0002-9640-4848, **CVU CONACYT ID:** IT18E824

ID 3rd Coauthor: *Emery, Medina-Diaz* / **ORC ID:** 0000-0002-8921-8924, **CVU CONACYT ID:** IT19C037

Abstract

This article refers to the poor disposal of used vegetable oil management, in cheap kitchens and in homes in regions 226, 249, 238, 235, 233, New Jerusalem New Millennium, a body of water is located, an irregular settlement. It is essential to create awareness for the management and disposal of used vegetable oils, national and international legislation that departs from the importance of the impact caused by the dumping of used edible oils, but it is necessary at the local level for proper management. of used vegetable oil, a total of 100 surveys were applied on the management and disposal of used edible oils, in the regions and irregular settlement of the Municipality of Benito Juárez Quintana ROO with a snowball statistical treatment, non-probabilistic sampling. The application of the surveys shows us that 70% of the population pours residual oils into the drain, 45% have a body of water nearby, to the drain or put it in a plastic bag in the garbage, 6% take it to the center collection, used cooking oils, after receiving adequate treatment, become raw material to produce biodiesel.

Disposal, Used Edible Oils, Spills, Water Bodies

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2143 - 50 Itzopan Calle. La Florida, Ecatepec Municipio México Estado, 55120 Código postal, MX. Tel: +52 1 55 2024 3918, +52 1 55 6159 2296, +52 1 55 4640 1298; Correo electrónico: contact@ecorfan.org
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