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In the first article we present, *Implementation of a computer system for life: "Manage your refrigerator Bth-GTR"*, by HERNÁNDEZ CRUZ, Luz María, CARRERA LIRA, Dyan Itandehui, ORTIZ CUEVAS, Nancy Georgina and PANTÍ GONZÁLEZ, Daniel Alberto, with adscription in the Universidad Autónoma de Campeche, Instituto Tecnológico Superior de Hopelchén, in the next article we present, *Design proposal for a progressive die*, by TUDÓN-MARTÍNEZ, Alberto, ZÚÑIGA-MARTÍNEZ, Marco Antonio, GARCÍA-CASTILLO, Ilse Nallely and ROSALES-GALLEGOS, Israel Atzin, with adscription in the Universidad Tecnológica de San Luis Potosí, in the next article we present, *Antibacterial gel dispenser with automated thermometer*, by GONZALEZ-MONZON, Ana Lilia, TORRES-ARREOLA, León Guillermo, PIÑA-ALCANTARA, Henry Cristopher and GODINEZ-TREJO, Roberto Carlos, with adscription in the Tecnológico de Estudios Superiores de Jilotepec, in the next article we present, *Automated Sanitizing Tunnel*, by GONZALEZ-MONZON, Ana Lilia, RUEDA-MEDINA, Israel, PACHECO-ALVARADO, Luis Kevin and MARTINEZ-SANTIAGO, Alejandro, with adscription in the Tecnológico de Estudios Superiores de Jilotepec.

Content

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Implementation of a computer system for life: "Manage your refrigerator Bth-GTR"

Implementación de una solución informática para la vida: El proyecto “Gestiona tu refrigerador Bth-GTR”

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Abstract

This article carries out applied research for the use and integration of technology in everyday life. The main objective of the study is to apply Bluetooth technology in a project called "Manage your Bth-GTR refrigerator" with the use of a sensor, an Arduino card and the development of a mobile application that provides the user with the ability to handle information related to the temperature and humidity of the refrigerator, and at the same time, store and manage the supply of the products. The knowledge society faces the importance of information in any area of life, particularly its usefulness in devices for everyday use, which is critical and indispensable in our day to day. The assumed methodology is divided into two main phases: the analysis of the IT solution and the integration of the Technologies provided for this purpose. Finally, the functionalities of the implemented mobile application are specified. The proposal evidences the opportunity to carry out future studies on the use, application, integration and implementation of new technologies that provide the human being with efficient and useful tools for daily activities.

Daily life, Mobile technology, Bluetooth

Resumen

El presente artículo efectúa una investigación aplicada para el uso e integración de la tecnología en la vida cotidiana. El objetivo principal del estudio es aplicar la tecnología Bluetooth en un proyecto denominado “Gestiona tu refrigerador Bth-GTR” con el uso de un sensor, una tarjeta Arduino y el desarrollo de una aplicación móvil que proporcione la capacidad al usuario de manejar información relativa a la temperatura y humedad del refrigerador, y al mismo tiempo, almacene y gestione el abastecimiento de los productos. La sociedad del conocimiento encara la importancia de la información en cualquier ámbito de la vida, particularmente su utilidad en dispositivos de uso cotidiano, que tiene un carácter crítico e indispensable en nuestro día a día. La metodología asumida se divide en dos fases principales: el análisis de la solución informática y la integración de las Tecnologías previstas para tal fin. Por último, se concreta las funcionalidades de la aplicación móvil implementada. La propuesta evidencia la oportunidad de realizar estudios futuros en el uso, aplicación, integración e implementación de nuevas tecnologías que aprovisione al ser humano herramientas eficientes y útiles para actividades de su quehacer diario.

Vida cotidiana, Tecnología móvil, Bluetooth

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Introduction

In today's world, communication between electronic devices is a basic technological need, in particular, for those that are available to everyone and are in daily use. Currently there are different technologies that allow the interconnection of devices. The project "Manage Your Refrigerator" (Bth-GTR) is a proposal, in which the user will have the ability to view the temperature of his refrigerator (temperature control), make a record of the products that it contains inside (product inventory) and a notification system. The computer solution proposes the development of a mobile application that stores and controls the temperature of the refrigerator, manages the inventory of consumable products and the notification system for inappropriate values of temperature or minimum quantity for supply; And, the use of Bluetooth technology for communication between the refrigerator and the mobile app.

Within the common Mexican household, 87.6% (INEGI, 2021) of the population has a refrigerator more than five years old. With this, it can be ensured that these devices do not have cutting-edge technology that allows managing information regarding the supply and control of the same. And, on the other hand, in this same sense, it is important to mention that refrigerators with intelligent technology are extremely high prices considering the Mexican minimum wage it would be impossible to acquire a refrigerator with these characteristics.

The comfort, flexibility, and proximity that people have with the use of the refrigerator in their homes, support the use of Bluetooth technology facilitating its connection with any mobile device.

The sections that we find in this writing are:

- The research project: briefly explains the study proposal;
- Methodology, description of the steps followed in the development of the case study; and, finally,
- Results cover the analysis, design, and implementation of the proposed IT solution.

The research project: "Manage your Bth-GTR Refrigerator"

The project 'Manage your refrigerator' (Bth-GTR) is an applied research proposal, through which technologies are integrated to develop a mobile application that serves the user to consult and restock their food inventory (consumables) in a more comfortable, easy, fast, and accessible way. The connection is made with Bluetooth technology, mainly due to its availability on mobile devices and undoubtedly facilitates the transfer of data over a short distance. In addition, it has a lower monetary value than Wi-Fi technology and does not need any specialized installation for its use. For this reason, it is the most appropriate resource to use in this proposal.

Methodology

In the research carried out, the emphasis of the study lies in the practical resolution of the application and integration of technologies that allow people to offer a computer solution to manage and supervise comfortably, easily, quickly, and in an economical way an object of daily use, the refrigerator. The project 'Manage your refrigerator' has as its main objective, to be able to have a device that provides the basic information (temperature, humidity, and inventory) to your mobile device, through a connection via Bluetooth.

The methodology assumed is divided into two steps described below:

1. Integration of technologies: describes the characteristics and functionality of the different technologies used in the computer solution of the Bth-GTR project.

Among which the following are distinguished:

- Bluetooth module Hc-05, which will allow connection via Bluetooth with the mobile application.
- One Card R3 Atmega328 16u2 compatible Arduino with your USB cable, this will be the one that will receive the data and send it to the mobile application through the Bluetooth connection.

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- Humidity and temperature sensor dht11 Arduino / pic, through this, you can obtain the current temperature of the refrigerator and the humidity of it.
- Plate for the assembly of the circuit.
- Cables for connection between circuit components.

2. Bth-GTR IT Solution Analysis Stage: the requirements and design specification process for the Bth-GTR project are detailed.

Figure 1 represents the Methodology of the research study.

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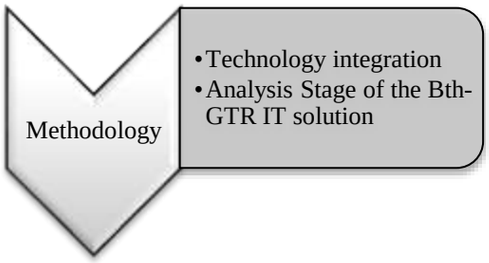

Figure 1 Methodology assumed in the Project "Manage your Bth-GTR refrigerator"

Integration of Technologies in the Bth-GTR IT solution

The technologies that are integrated into the Bth-GTR project's IT solution are listed below:

- *Sensor humedad y temperatura DHT11*. Humidity and temperature sensor DHT11. It is a digital sensor that measures temperature and humidity, it is a low-cost and easy-to-use sensor. It integrates a capacitive humidity sensor and a transmitter to measure the surrounding air and then display the data through a digital signal on the data pin, it should be noted that it has no analog output. It is commonly used with the accompaniment of an Arduino, with support for the 'Single bus' protocol. As for the hardware, it is only necessary to connect the VCC pin of power to 3-5V, the GND pin to ground (0V), and the data pin to a digital pin of the Arduino. The only drawback of this type of sensor is that new data can only be obtained in 2 seconds. (SAC, Sensor de temperatura y humedad relativa DHT11, s.f.)

- *Bluetooth module HC-05*. Bluetooth is a short-range, low-power wireless communications protocol in the 2.4 GHz ICM band that supports both data and audio traffic. Its link is so highly reliable that it makes the technology one of the most suitable for any type of application in digital communications, since it enables error detection mechanisms, offers a natural immunity to interference using a dispersed spectrum of frequency jump FHSS at 1600 jumps per second, and enables encryption processes to ensure reliable and secure communications.

- *The Bluetooth HC-05 module* allows you to create the connection of projects with Arduino to a cell phone, smartphone PC wirelessly, with the ease of operation of a serial port, so the transmission is carried out completely transparently to the programmer. It connects directly to the serial pins of our preferred microcontroller (respecting the voltage levels, since the module is powered with 3.3V)., this board also includes a 3.3V regulator, which allows to power the module with a voltage between 3.6V - 6V.

- Bluetooth communication occurs between two types of devices: a master and a slave, however, the Bluetooth module HC-05 comes configured from the factory to work as a slave, that is, prepared to listen to connection requests, but we can configure it to work with Maestro using AT commands. Finally, it is important to mention that this module meets the specifications of the Bluetooth 2.0 standard that is perfectly compatible with Android phones or smartphones (SAC, Módulo Bluetooth HC05, s.f.)

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- Arduino Uno R3 card. The Arduino card is a free hardware board that incorporates a reprogrammable microprocessor and a series of female pins (which are internally attached to the I/O pins of the microcontroller) that allow different sensors and actuators to be connected in a very simple and comfortable way. The 'hardware board' refers specifically to a PCB ('Printed Circuit Board', which is a printed circuit board), these PBC's are surfaces made of a non-conductive material (usual resins of reinforced fiberglass, ceramic, or plastic) on which appear laminated tracks of conductive material (usually copper), are used to connect electrically, through the conductive paths, different electronic components welded to it, so it makes it a more compact and stable way to build an electronic circuit.

- The way to connect the Arduino board to the computer is through a USB cable since most of these boards incorporate a connector of this type.(ARTERO, 2013).

- The Arduino UNO R3 board is based on the ATmega328 microcontroller, with 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power connector, an ICSP header, and a reset button. To be able to program the Arduino it is necessary to download the program that it includes and write the necessary code so that the board knows what to do.

- Mobile application: The creation of the mobile application is developed in App inventor, which uses a type of programming quite colorful, fun, entertaining, and easy, in this case, this platform was chosen since it facilitates the interaction of Arduino and Bluetooth technology.

Having recognized the technologies, it is significant and transcendental to discern the core functionality they have in the Bth-GTR project's IT solution. Table 2 shows the technologies identified for the "Manage your Bth-GTR refrigerator" Project and their main function in it.

Component.	Description
Humidity and temperature sensor DHT11	The sensor measures the temperature and humidity in the device where it is installed.
Bluetooth module HC-05.	It allows connection with the use of Bluetooth technology to other devices.
Arduino Uno R3 card.	Free hardware board that incorporates a reprogrammable microprocessor and a series of pins-female that allow connecting in a very simple and comfortable way different sensors and actuators. For this case the Humidity and Temperature Sensor DHT11.
Mobile App	A type of application designed to run on a mobile device with the ability to use Bluetooth technology.

Table 2 Technological components and their main function in the Project 'Manage your Bth-GTR refrigerator'
Source: Own Source

Analysis Stage of the Bth-GTR IT solution

This section details the analysis that was carried out to manage and design the computer solution "Manage your Bth-GTR refrigerator". Framing the scope of the mobile application to be developed.

The initial question of the project is what? The requirements, according to the definitions in the IEEE glossary, the requirements are:

"A condition or need of a user to solve a problem or achieve a goal". (Std 610.12-1900, IEEE: 62).

"A condition or capability that must be present in a system or system components to satisfy a contract, standard, specification, or another formal document." (Std 610.12-1900, IEEE: 62).

A requirement is a description of a condition or capability that a system must meet, whether arising from an identified user need, or stipulated in a contract, standard, specification, or another document formally imposed at the beginning of the process.

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The requirements are divided into:

– *Functional requirements*. They define the functions that the system will be able to perform, describe the transformations that the system performs on the inputs to produce outputs, it is important that the What? and not the How? these transformations must be made.

– *Non-functional requirements.* They are the characteristics that in one way or another can limit the system, for example, performance (time and space), user interfaces, reliability (robustness of the system, availability of equipment), maintenance, security, and portability, among others. (CHAVES, 2005)

Table 3 shows the initial requirements of the Project "Manage your Bth-GTR refrigerator".

ID	Description of the Requirement
R01	Develop the circuit based on the diagram.
R02	Design and implementation of programming on the Arduino.
R03	Develop the interface design for the mobile application.
R04	Coding of the application and interface based on the design.

Table 3 Initial requirements of the Project "Manage your Bth-GTR refrigerator"
Source: Own Source

Use cases are a practice that is employed to capture a set of requirements and drive the incremental development of a system, this helps to understand how the system will be employed and then to evolve to an appropriate system that supports users. It makes clear what a system will do and, by intentional omission, what it will not do, just as, they enable effective vision, managing scope in the incremental development of software of any size.

Use cases can benefit both small agile development teams that produce heavy-lying applications and large projects that produce complex systems, such as corporate systems, product lines, and cloud systems.

Use cases have a much broader scope than just requirements capture, support the analysis, design, planning, estimation, monitoring, and testing of systems, provide a structure for the successful adoption of your curated management and development practices. In addition, the use cases are lightweight, scalable, versatile, and easy to use.(Ivar Jacobson, 2013).

Table 4 shows the Matrix of the relationship between the requirements and the use cases for the Project "Manage your refrigerator Bth-GTR"

Requirements/ Use Case		CU01 Enter	CU02 Create an inventory of the products you have	CU03 Tips	CU04 Bluetooth connection	CU05 Get temperature and humidity data
R01	Develop the circuit based on the diagram.				✓	✓
R02	Design and implementation of programming in Arduino.				✓	✓
R03	Develop the interface design for the mobile application.	✓	✓	✓	✓	✓
R04	Coding of the application and interface based on the design.	✓	✓	✓	✓	✓
R05	Establish a connection between the sensor and the application for sending data.				✓	✓

Table 4 Matrix of relationship Requirements/Use Cases of the Project 'Manage your Bth-GTR refrigerator'
Source: Own Source

The importance of use cases lies in:

– Identify functions and how roles interact with them (the main purpose of use case diagrams).
– For a high-level view of the system.
– Especially useful when presented to managers or stakeholders. The roles that interact with the system and the functionality provided by the system can be highlighted without delving into the inner workings of the system.
– Identify internal and external factors. (ORDOÑEZ, CALVACHE, & PINO, 2019)

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Given the importance of the use cases, the full description is made for each of them. Table 5 shows the description of the use case CU05 Obtain temperature and humidity data.

***CU05.* Get temperature and humidity data.**		
Version 0.3 (21/04/2021)		
Dependencies – R01 Develop the circuit based on the diagram. – R02 Design and implementation of programming in Arduino. – R03 Develop the interface design for the mobile application. – R04 Coding of the application and interface based on the design. – R05 Establish a connection between the sensor and the application for it sending data.		
Precondition The previous link between the application and the circuit had to be established.		
Description Humidity and temperature data will be obtained with the help of the sensor.		
Normal sequence		
Step	**Acction**	
1	The user enters the main page of the application.	
2	The user clicks the "continue" button	
3	The system directs you to the "Home" tab	
4	The user clicks on the menu and chooses the "Bluetooth" option.	
5	The system directs you to the "Bluetooth" tab	
6	The user clicks the "connect" button.	
7	The system displays the devices available for connection	
8	The user selects the Arduino device.	
9	The system pairs with the selected device.	
10	The user clicks on the menu and chooses the "Start" option.	
11	The system directs you to the "Home" tab	
12	The system displays the temperature and humidity data in the corresponding fields.	
Post-blessing Current refrigerator temperature and humidity data will be displayed in the app		
Exceptions		
Step	**Action**	
7	*The device for Bluetooth connection with the HC-05 device cannot be found.*	
	E.1	The connection to the device is not created.
	E.2	Temperature and humidity data cannot be obtained from the refrigerator.
Feedback		
For the temperature and humidity of the refrigerator to be displayed in the application, the connection via Bluetooth must be established.		

Table 5 Description of the USE case CU05 Obtain temperature and humidity data from the Project 'Manage your Bth-GTR refrigerator'
Source: Own Source

Use case diagrams are another indispensable and key tool at the analysis stage. They are composed of 4 basic elements:

1. Actor: The actor in a use case diagram is any entity that plays a role or role in a given system. It can be a person, an organization, or an external system and is usually drawn as the skeleton.

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2. Use case: A use case represents a function or an action within the system. It is drawn as an oval and named with the function.

3. System: The system is used to define the scope of the use case and is drawn as a rectangle. This is an optional but useful element when viewing large systems. For example, you can create all the use cases and then use the system object to define the scope that your project covers. Or you can even use it to show the different areas covered in the different releases.

4. Package: The package is another optional element that is extremely useful in complex diagrams. Similar to class diagrams, packages are used to group use cases. They are drawn as the image below. (ORDOÑEZ, CALVACHE, & PINO, 2019).

Figure 2 shows the general use case diagram for the Project "Manage Your Bth-GTR Refrigerator".

Figure 2 Principal Use Case Diagram for the project "Manage your refrigerator Bth-GTR"

Results

Once the analysis phase is concluded, a functional prototype is made using the Fritzing software. Figure 3 shows the prototype and functional diagram of the physical connections of the Arduino Board and the Sensor for the project "*Manage your refrigerator Bth-GTR*".

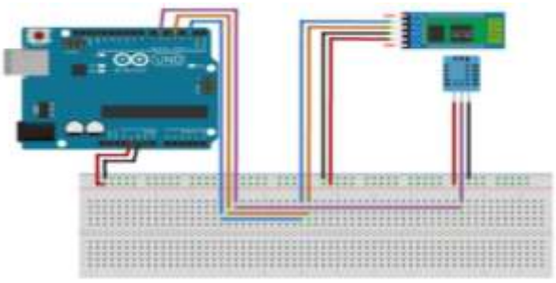

Figure 3 Arduino connection for the "Manage your Bth-GTR refrigerator" Project. Prototype and functional scheme

Next, Figure 4 shows the prototype of the connection in the project "Manage Your Bth-GTR Refrigerator".

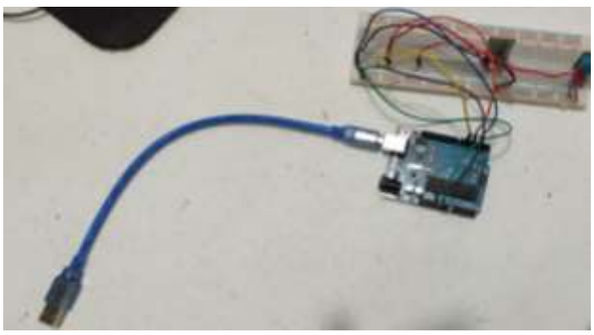

Figure 4 Project "Manage your refrigerator Bth-GTR"

Finally, Figure 5 shows the main interface of the *App Bth-GTR* and the TIPS section for users.

Figura 5 *Home of the* App Bth-GTR

The *App Bth-GTR* needs to activate the Bluetooth connection, otherwise the reading data from the refrigerator will not be loaded. It is important to mention that it is essential to be near the refrigerator. Figure 6 shows the Bluetooth connection interface prior to reading temperature and humidity.

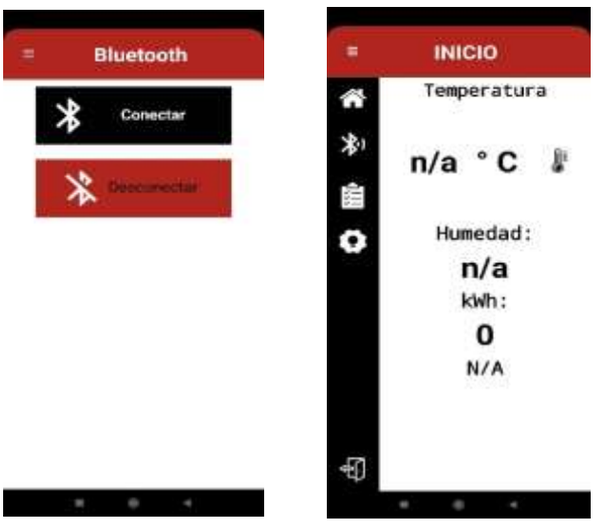

Figure 6 Interface for Bluetooth connection in the App Bth-GTR

Figure 7 shows an example of temperature and humidity reading within the *App Bth-GTR*.

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Figure 7 Interface for Bluetooth connection in the *App Bth-GTR.*

Figure 8 shows the graphical user interface (GUI) for the supply, control and monitoring of consumable products in the refrigerator.

Figure 8 GUI of the App Bth-GTR

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Conclusions

After doing the research, it is concluded that the mobile application "*Manage your refrigerator Bth-GTR*" has a stable connection via Bluetooth and allows the reading of temperature and humidity of the refrigerator. Also, the correct storage, control and monitoring of product inventory is carried out, including a notification system.

Customer expectations were successfully addressed. However, areas of opportunity are identified for the improvement of the IT solution. The possible advances that can be implemented include the use of other technologies such as Wi-Fi connection, so that it could have different connectivity conditions, in addition to the implementation of long-distance monitoring so that in this way there is more flexibility and user interaction with your refrigerator.

Last but not least, the implementation of the consumption module (kWh) is expected to allow the refrigerator to be monitored every day. In addition, the user, in addition to having a better management of his refrigerator, would also have it in the consumption of electrical energy (economy).

Referencies

ARTERO, Ó. T. (2013). ARDUINO. Curso práctico de formación. RC Libros.

Borja Cameron, Ó. Á. (2018). Inovacion en electrodomesticos: Hacia un hogar eficiente, inteligente y conectado. Protiendas (70), 34 - 49.

CHAVES, M. A. (2005). La ingeniería de requerimientos y su importancia en el desarrollo de proyectos de software. (Vol. 6). InterSedes: Revista de las Sedes Regionales.

Herazo, L. (24 de 03 de 2021). ¿Qué es una aplicación móvil? Recuperado el 24 de 05 de 2021, de Anincubator Website: https://anincubator.com/que-es-una-aplicacion-movil/

Ivar Jacobson, I. S. (2013). Casos de uso 2.0. La guía para ser exitoso con los casos de uso.

ORDOÑEZ, W. A., CALVACHE, C. J., & PINO, F. J. (2019). Mapeo sistemático sobre la evaluación de la agilidad en organizaciones de desarrollo de software (Vol. 16). ITECKNE: Innovación e Investigación en Ingeniería,.

RUIZ, R. L., VÁSQUEZ, J. A., & LONDOÑO, G. A. (2004). Implementación del protocolo Bluetooth para la conexión inalámbrica de dispositivos electrónicos programables. (Vol. 10). Scientia et technica.

RUIZ, R. L., VÁSQUEZ, J. A., & LONDOÑO, G. A. (2004). Implementación del protocolo Bluetooth para la conexión inalámbrica de dispositivos electrónicos programables. (Vol. 10). Scientia et technica.

SAC, N. M. (s.f.). Módulo Bluetooth HC05. Recuperado el 24 de 05 de 2021, de Naylamp Mechatronics - Perú: https://naylampmechatronics.com/inalambrico/43-modulo-bluetooth-hc05.html

SAC, N. M. (s.f.). Sensor de temperatura y humedad relativa DHT11. Recuperado el 24 de 05 de 2021, de Naylamp Mechatronics - Perú: https://naylampmechatronics.com/sensores-temperatura-y-humedad/57-sensor-de-temperatura-y-humedad-relativa-dht11.html

SERNA, A., ROS, F., & RICO, J. C. (2010). Guía práctica de sensores. Creaciones Copyright SL.

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Design proposal for a progressive die

Propuesta de diseño de un troquel progresivo

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Abstract

The objective of this project is to elaborate a design proposal for a progressive die to help reduce the manufacturing cycle time of a metal part in a die-cutting machine and contribute to increasing the number of parts produced. The methodology used to prepare the progressive die design proposal is concurrent engineering, also known as simultaneous engineering or total engineering; it consists of a methodology where the design of the product is integrated into all the necessary processes to manufacture it. (F, 2003); It is the guide of each one of the phases that have been set in the design, such as conceptual and functional design and retail design; all this in order to take into account the requirements, parts, functions, manufacturing and construction to materialize the ideas that are proposed in this.

Proposal, Design, Machine

Resumen

El objetivo del presente proyecto es la elaboración de una propuesta de diseño de un troquel progresivo para contribuir a reducir el tiempo de ciclo de fabricación de una pieza metálica en una máquina de troquelado y contribuir al incremento del número de piezas producidas La metodología que se utiliza para la elaboración de la propuesta de diseño del troquel progresivo es la ingeniería concurrente, también conocida como ingeniería simultánea o ingeniería total; consiste en una metodología dónde el diseño del producto está integrado en todos los procesos necesarios para fabricarlo. (F, 2003); es la guía en cada una de las fases que se han fijado en el diseño, como lo son el diseño conceptual y funcional y diseño de detalle; todo esto con el fin de que se tengan en cuenta los requerimientos, piezas, funciones, fabricación y la construcción para materializar las ideas que en este se proponen.

Propuesta, Diseño, Máquina

Citation: TUDÓN-MARTÍNEZ, Alberto, ZÚÑIGA-MARTÍNEZ, Marco Antonio, GARCÍA-CASTILLO, Ilse Nallely and ROSALES-GALLEGOS, Israel Atzin. Design proposal for a progressive die. Journal Innovative Design. 2021, 5-13: 10-15

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Introduction

There is a constant need for companies to continuously improve production processes and develop products that meet customer needs in terms of service, cost and delivery.

A company dedicated to the manufacturing sector has the need to make improvements in the production process, because in recent years the demand for its products by its customers has increased. The manufacturing process that it uses consists of several operations that are carried out independently in several die-cutting machines to bend and cut, consuming long times in the elaboration of metal parts, for this reason it is considered necessary to make improvements in the production process.

The hypothesis of the project is that by carrying out the necessary operations for the elaboration of the metal part with a single die, the cycle time will be reduced, since it will not be necessary to carry out die changes to carry out each operation that is required in the process of manufacture of the piece, in this way it will contribute to time reduction for elaboration of the piece and contribute to the increasement of production keeping the company in a competitive market.

Development of Sections and Sections of the Article with subsequent numbering.

In the die design methodology, the reference of the engineering design process is considered (Victorino, 2003), which contemplates the stages shown in Figure 1.

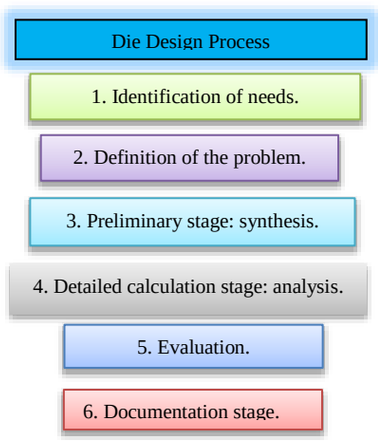

Figure 1 Design methodology
Source (project contribution, unpublished)

1. Identification of needs

A list of specifications is drawn up in a concise and not so extensive way, which is presented in table 1, where a sketch of only two of the machine concepts is shown in one format (Riba, 2006)], in where the specifications are: for design C: Customer; I: Engineer; A: Required; D: Desired

Universidad Tecnológica de San Luis Potosí	**Date:**		**Product: Design of a die for the manufacture of part 317B8422P002**
Business:	**Revision:**		
Initial specifications			
Concept	C/I	R/D	Description
Function	I	R	Reliable for implementation and reduction of production times.
	I	R	Consume fewer resources
	I	D	Produce the part in a shorter time than the current process.
Necessary operations	I	R	Carry out the cut of the piece with the same die.
	I	D	Reduce cycle time by 50%
	I	R	Use only one press
	I	R	Produce one part for each die stroke
Precision	I	R	The first precision inspection is done with materials, dimensions and cycle times.

Table 1 Machine concepts
Source (project contribution, unpublished)

2. Definition of the problem

It is important to consider the main characteristics of the part to be manufactured, which are determined at this stage, such as material, tolerances, in addition to the required production.

1. Material: galvanized steel B8A26G5 0.060” +/- 0.002” [1.524 +/- 0.051].

2. All holes in the part should have a tolerance of + 0.001” - 0.003” [+0.025 - 0.076]

3. Annual production 90,000 pieces.

3. Preliminary stage: synthesis

The part to be manufactured is analyzed to determine the necessary operations for the manufacture of the part, which are considered to define the types of elements that the progressive die must contain and be able to satisfy the client's needs.

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In this analysis, three types of operations will be determined, which are: Planes (P), Punching (PZ) and bends (D), which are shown in Figure 2.

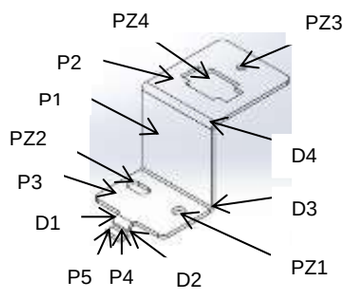

Figure 2 Necessary operations.
Source (project contribution, unpublished)

Table 2 shows the components nomenclature of the part, which are defined according to each element of the part.

Elements		Nomenclature
Planes	P1	Intermediate plane
	P2	Upper horizontal plane
	P3	Lower horizontal plane
	P4	Lower vertical plane located at P3
	P5	Lower horizontal plane located at P3
Punching	PZ1	Punching located at P3
	PZ2	Punching located at P3
	PZ3	Punching located in the P2
	PZ4	Punching located in the P2
Folds	D1	Fold linking P4 and P5
	D2	Fold linking P4 and P3
	D3	Fold linking P1 and P3
	D4	Fold linking P1 and P4

Table 2 Nomenclature of the components of the part
Source (project contribution, unpublished)

Elaboration of a relational diagram of the support, which is shown in figure 3, with the main elements of the piece used to visualize the number of necessary operations in the die design.

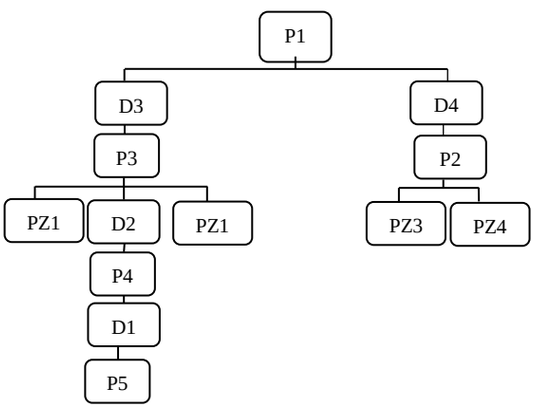

Figure 3 Relational diagram of the support.
Source (project contribution, unpublished)

Figure 4 shows the steps in a schematic form of the strip of material required to obtain the product, the steps indicated are related to the operations diagram. (Enrique, 2013)

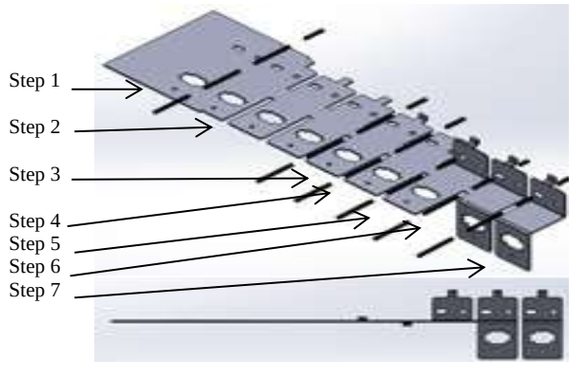

Figure 4 Steps in schematic form
Source (project contribution, unpublished)

4. Detailed calculation stage: analysis

In this stage, the element's shear and extraction force calculations are made, using the following equations:

For the calculation of shear force, equation 1 was used.

$$F = (S)(t)(K) \quad (1)$$

And for the calculation of the extraction force of the element, equation 2 is used (Eugene A. Avallone, 2008)

$$F_a = (F)(0.8) \quad (2)$$

Table 3 shows the results of the calculations of the forces of the planes elements operations.

Force calculations in planes		
Elements	Results	
	Cutting force (Kg.)	Extraction force (Kg.)
PI	3441.28	275.302
P2, P3, P4, P5	21932.7984	1754.623872

Table 3 Results of the calculation of the force of the planes
Source (project contribution, unpublished)

Table 4 shows the results of the calculations of the forces of the punching elements operations.

Punching force calculations		
Elements	Resultados	
	Cutting force (Kg.)	Extraction force (Kg.)
PZ1	1219.2	97.536
PZ2	1993.4	159.472
PZ3	851.154	68.09232
PZ4	5600.7	448.056

Table 4 Results of calculations of punching forces.
Source (project contribution, unpublished)

Equation 3 is used to calculate the force necessary to make the "L" bends.

$$P = \frac{(t)(K)(length)}{3} \quad (3)$$

And for the calculation of the extraction force of the element, equation 2 is used.

Table 5 shows the results of the calculations of the bending forces operations.

"L" Bend Force Calculations		
Elements	Results	
	Bending force (Kg.)	Extraction force (Kg.)
D1	193.548	15.48384
D2	193.548	15.48384
D3	903.224	72.25792
D4	903.224	72.25792

Table 5 Results of calculations of bending forces
Source (project contribution, unpublished)

The calculation of the total force is carried out using equation 4, which is the sum of all the punching, bending and planes.

$$F_{Total} = \sum_1^4 PZ + \sum_1^4 D + \sum_1^5 P \quad (4)$$

F_{Total}= 37232.0764Kg.

An additional factor of 10% is increased; this percentage is an experimental value to overcome the resistance of the springs and the clamp.

Once the add factor is added, a safety factor of 1 to 5 recommended by some designers is also added.

Then:

F_{final} = 37232.0764 kg (0.1) + 37232.0764 kg = 40955.28404 kg (1.2) = 49146.3408 kg.
F_{final} = 49 tons.

According to the total value of the forces, a press greater than 49 tons should be used

The calculation of the number of springs required for the extraction force is carried out.

In calculating the number of springs, equation 5 is used.

$$N_r = \frac{F_a}{F_r} \quad (5)$$

For the Fa Total calculation, equation 6 is used, where the sum of all extraction forces, both for punching, as well as for bends and planes, are considered.

$$F_{a\,Total} = \sum_1^4 PZ + + \sum_1^4 D + \sum_1^1 P \quad (6)$$

$F_{a\,Total}$= 2.9 ton ≈ 3 ton = 3000 Kg

Springs

The characteristics of the spring to be used are established, which are:

Spring outer diameter = 1.240”
Rod diameter = 0.625”
Free height = 3”.
Maximum load = 1027 lb = 465.75 Kg

Substituting the values of the total extraction force and the maximum spring load in equation 5, the number of springs to be used is obtained.

Nr = 6 springs.

Elaboration of drawings

Shop drawings and die part simulations are made using Solid Works software. (Gómez, 2014), which are shown in figures 5, 6, and 7.

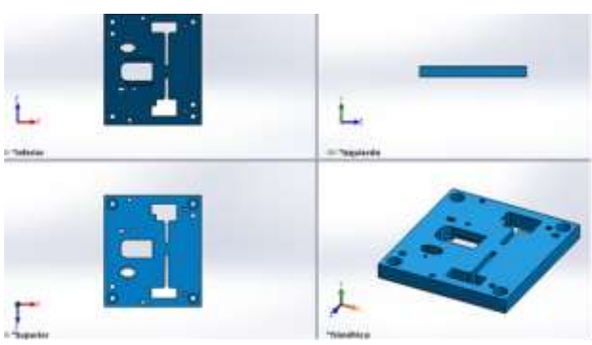

Figure 5 Cutting matrix.
Source (project contribution, unpublished)

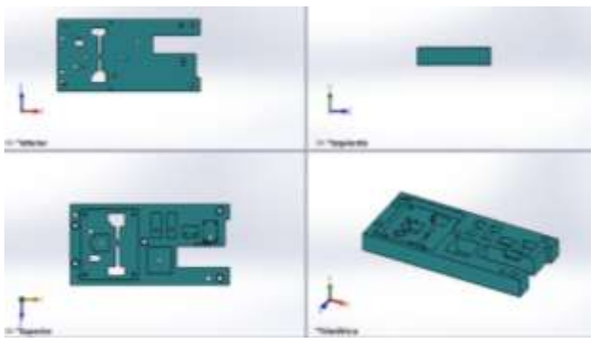

Figure 6 Lower Suffering.
Source (project contribution, unpublished)

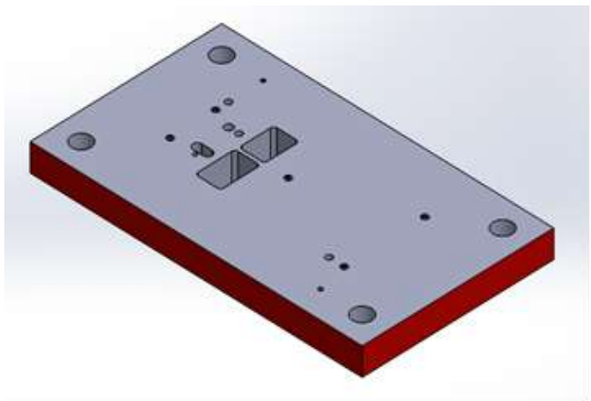

Figure 7 Lower die platen
Source (project contribution, unpublished)

5. Evaluation Stage

This stage is based on the dimensional part, for which a verification of its operation of the die was carried out in order to review possible interferences, part positioning errors or incorrect clearances.

This evaluation is carried out by preparing the assembly drawing in the Solid works simulator, which is shown in figure 8, performing the opening and closing of the die, executing the interference analysis between the elements that make up the die.

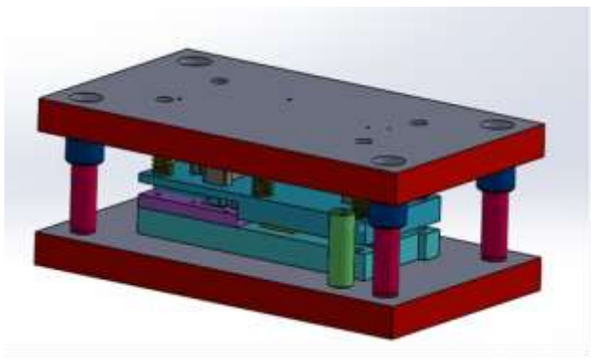

Figure 8 Complete assembly of the progressive die
Source (project contribution, unpublished)

6. Documentation stage

Documentation is developed that identifies the main operating characteristics of the progressive die and the workpiece.

1. Tooling ID: L1221
2. Part No.: 317B8422P001
3. Die free height: 9.125”
4. Width and length of the tooling: 26” x 15”
5. Minimum working load: 49 tons.
6. Material: Galvanized Steel.
7. Material thickness: 0.060”
8. Material width: 4.565”
9. Plumb: 0.050”

Results

With this project, the objective of developing a proposal for the design of a progressive die was achieved, for the elaboration of a metallic piece (with the part number 317B8422P002), with this proposal it is intended to eliminate a cost of 99.1% of the cutting process in laser and avoid the use of more than one press for the elaboration of the bends, at the same time reducing to 90.6% of the time to obtain the first piece within the specifications of the client.

Conclusions

It is concluded that it was necessary to prepare this project, which will be possible to satisfy the needs established by the company such as:

1. Design a die with the necessary elements for the part process.
2. The general dimensions of the die will allow it to be installed in a 250-ton press existing in the company.
3. When the die is manufactured, more than 90% of the resources currently used to manufacture the part will be eliminated.
4. The design of the die includes limiting stop systems for fine tuning.
5. With the elaboration of the data sheet a good functioning and optimal operation of the die is guaranteed.

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References

Enrique, C. H. (Marzo de 2013). Desarrollo de aspectos medotodológicos en el diseño de matrices progresivas. Catabria, Santander, España.

Eugene A. Avallone, T. B. (2008). Manual del ingeniero mecánico. México, México: Mc Graw Hill.

F, A. (2003). *Metodología del diseño industrial: un enfoque desde la ingeniería concurrente*. México: Alfaomega.

Gómez, S. (2014). El Gran libro de solidworks. México, México: Alfaomega.

Riba, M. (Octubre de 2006). Ingenieria concurrida. Catalunya, España: Retdic.

Victorino, G. G. (2003). Análisis del proceso de diseño en ingeniería. Madrid, Madrid, España: Universidad Politécnica de Madrid.

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Antibacterial gel dispenser with automated thermometer

Dispensador de gel antibacterial con termómetro automatizado

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Abstrac

The SARS-CoV-2 virus. Declared a health emergency at the international level since its origin in Wuhan (China) in December 2019, the spread occurs by an infected person who exhales droplets of saliva and contagion occurs when we touch contaminated surfaces or people and touch our eyes, nostrils or mouth. Therefore, some prevention measures are used to avoid contagion, such as social distancing, the use of face masks or a mask and the use of antibacterial gel which is of great importance because it is used in all public places to prevent the risk. contagion. Therefore, the objective is to make an automatic antibacterial gel dispenser for the Tecnológico de Estudios Superiores de Jilotepec to minimize the risk of contagion. The device itself works by means of a sensor that when putting the hand detects and dispenses the gel, at the same time it takes the temperature that the reading shows on the screen, considering that it is one of the main symptoms of the disease, this contributes to have a preventive in the disinfection of the hands with gel and temperature measurement.

Automated, Dispenser, Prevention

Resumen

El virus SARS-CoV-2. Declarado como emergencia sanitaria a nivel internacional desde su origen en Wuhan (China) en diciembre de 2019, la propagación se da por una persona infectada que exhala gotitas de saliva y el contagio se produce cuando tocamos superficies o personas contaminadas y nos tocamos los ojos, fosas nasales o boca. Por lo tanto, se utilizan algunas medidas de prevención para evitar el contagio, como el distanciamiento social, el uso de cubrebocas o mascarilla y la utilización de gel antibacterial el cual es de gran importancia porque se utiliza en todos los lugares públicos para prevenir el riesgo de contagio. Por lo tanto, el objetivo es realizar un dispensador de gel antibacterial automático para el Tecnológico de Estudios Superiores de Jilotepec para minimizar el riesgo de contagios. A si mismo el dispositivo funciona por medio de un sensor que al poner la mano detecta y dispensa el gel, al mismo tiempo toma la temperatura que se muestra la lectura la pantalla, considerando que es uno de los síntomas principales de la enfermedad, esto contribuye a tener una preventiva en la desinfección de las manos con gel y toma de temperatura.

Automatizado, Dispensador, Prevención

Citation: GONZALEZ-MONZON, Ana Lilia, TORRES-ARREOLA, León Guillermo, PIÑA-ALCANTARA, Henry Cristopher and GODINEZ-TREJO, Roberto Carlos. Antibacterial gel dispenser with automated thermometer. Journal Innovative Design. 2021, 5-13: 16-21

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Introduction

The prototype of an automatic gel dispenser, by means of an arduino microcontroller As a result of SARS-CoV- 2 has taken preventive measures to avoid contagion, it is necessary to take measures to take temperature since it is one of the symptoms of a person with Covid, as well as mouth covers and use of antibacterial gel on the hands, which is provided upon entering the institution by the surveillance personnel who, through a manual dispenser, distributes it and then takes the temperature one by one.

This causes a slow process and also puts at risk the people who do it, so if there is an automatic dispenser then the processes will be faster and safer, Also being automated avoids that people have contact with the gel dispenser and the thermometer provides the temperature reading on the screen that can be viewed personally.

In the first section of development we find the information of the components that make up the prototype such as the arduino, the pump, the control sensors, and the display. In section number two of design we find the design of the housing and the electronic plan. Section three is the methodology used for the development process of the prototype, which is the CDIO.

Section four shows the results of the gel dispenser prototype, and finally the conclusions.

Development

Micro controller

It is a programmable integrated circuit, capable of executing the orders recorded in its memory. A Microcontroller includes inside it the three main functional units of a computer: central processing unit, memory and input / output peripherals, the Arduino Nano board its ATM328P processing unit which is the same of an Arduino UNO, but without occupying the same space, being small and having input / output pins enough for the census and activation functions. See figure 1.

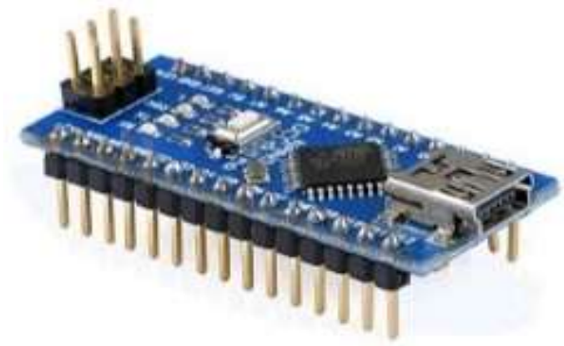

Figure 1 Arduino NANO (Arduino 2015)

16x2 lcd screen

LCD stands for Liquid Crystal Dysplay, a device used for displaying different types of content or information graphically, by using different characters, symbols or drawings. The second part of this term, 16x2, refers to the fact that the display has two rows, each with the capacity to display up to sixteen characters, symbols or figures, according to its programming. This display will show messages of prevention measures, as well as the user's body temperature. See figure 2.

Figure 2 LCD display (prometec 2021)

I2C Module

The I2C module for LCD allows communication between an Arduino or microcontroller and a LCD16x2 via I2C, which facilitates connections when carrying out any type of application.

This adapter allows to manage in a much more optimal way the port distribution since the data presentation can be carried out through only two data cables and two power cables compared to using the LCD directly to the controller. See figure 3.

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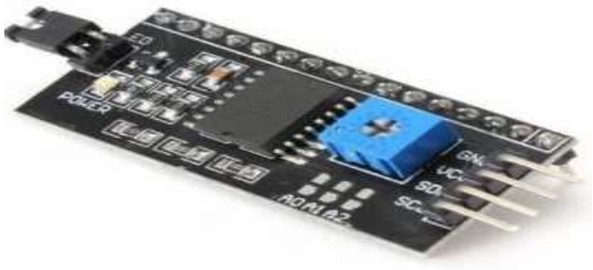

Figure 3 I2C module (Arduino 2015)

Air pump

Air pumps were used as they are strong enough to move the antibacterial gel by means of the vacuum pressure they generate, compared to a 5v submersible pump that the viscosity of the antibacterial gel could burn the motor. See Figure 4

Figure 4 Air pump (2020 flames)

Temperature sensor

The MLX90614 Infrared Temperature Sensor is a silicon chip with a thin micro machined membrane, designed to be sensitive to infrared radiation emitted by an object at a distance having a wide working range for objects from -70°C to 380°C, with an accuracy of 0.5°C. as well as the LCD display The sensor output is an I2C type digital communication interface. See figure 5

Figure 5 Temperature sensor (solerpalau 2021)

Triac BT 137

Triac is a three-terminal semiconductor device (T1,T2,G) which is used to control the current flow, The triac can be triggered independently of gate bias(G), i.e. by positive or negative gate current. Which will be controlled by Arduino to make the activation of the air pump and supply the gel. See figure 6

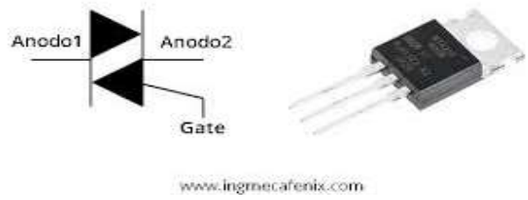

Figure 6 Triac bt137

DESIGN

The circuit for the operation of the gel dispenser that was made with software to test and connect the data output pins A5 and A4 the Arduino to detect the user by sending a digital output to the pins of the led' showing green as of the pump to initial pumping antibacterial gel showing on the a sign where it indicated access to the The I2c module is connected to an I2c module to avoid the excess of wires so in the module are connected ground voltage and data input that are connected directly to pins 6 and 7 of the Arduino, then when the pumping is finished a signal is sent to the red led pin to indicate that the antibacterial gel should be applied. See image 6.

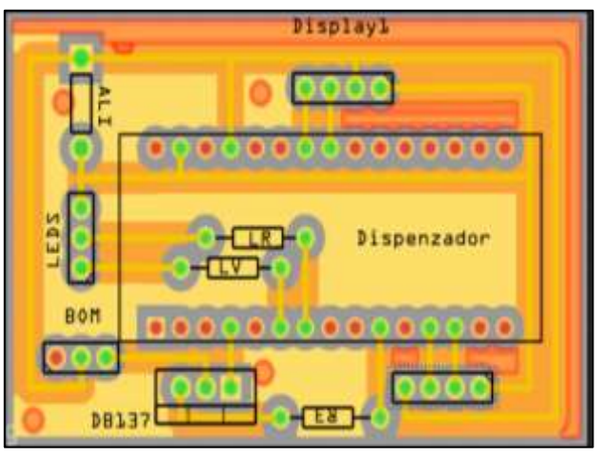

Figure 7 Electrical circuit
Source: Own Elaboration

The design of the automatic gel dispenser was carried out with the help of the software of Salid Works with which it is intended that the dispenser is manufactured in five pieces from poly-lactic acid (PLA). The first structure will contain the electronic components, as well as the hose outlet where the antibacterial gel is supplied.

This structure will measure 10 cm x 7 cm at the base, with a height of 5 cm. For the assembly of the LCD screen with a measure of 7 cm wide x 2 cm high, on the left side it has two perforations where the LEDs will be assembled, one green to indicate when the user should apply gel or if it has already been applied with a measure of .5 cm in diameter.

On the left side there is a hole where an on/off button will be located, as well as a rectangular hole where the power cable will pass, on the back side there is a rib with which it can be assembled to the gel container and can be fastened with screws. (See figure 8).

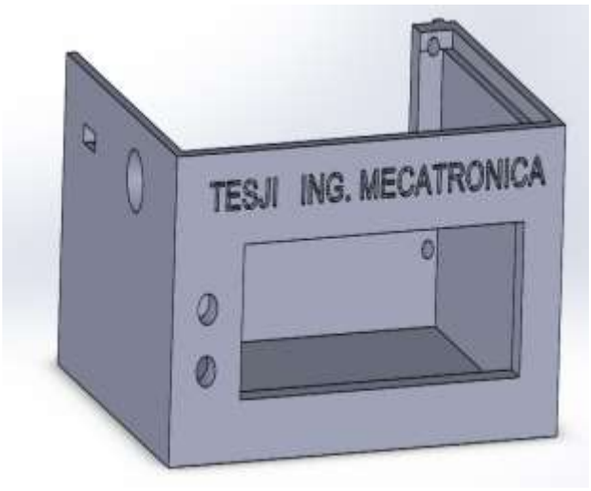

Figure 8 Front part
Source: Own Elaboration

The antibacterial gel tank is rectangular in shape with a space to locate the air pump so that it is not in contact with the liquid and produce an accident with the electrical components, the tank is designed for 500ml of antibacterial gel, For the assembly small holes were considered to hold the part where the electronic components will be placed, these pieces will be coupled by means of a rib on the back side of the first piece, in the upper part there is a space for the supply cover that will be placed by means of screws to 3 bars located in the corners to provide a better support. (See figure 9).

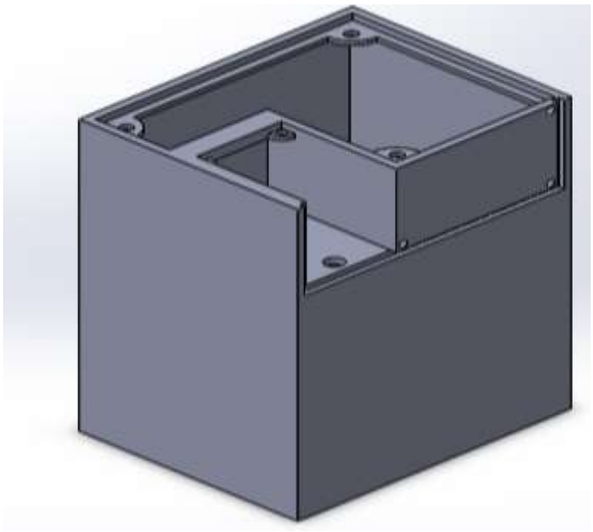

Figure 9 Gel container
Source: Own Elaboration

The lids were designed for each one of the structures according to the measures and function of each piece. The first one is for the antibacterial gel container with an orifice designed for the recharge of the antibacterial gel or alcohol. (See figure 10).

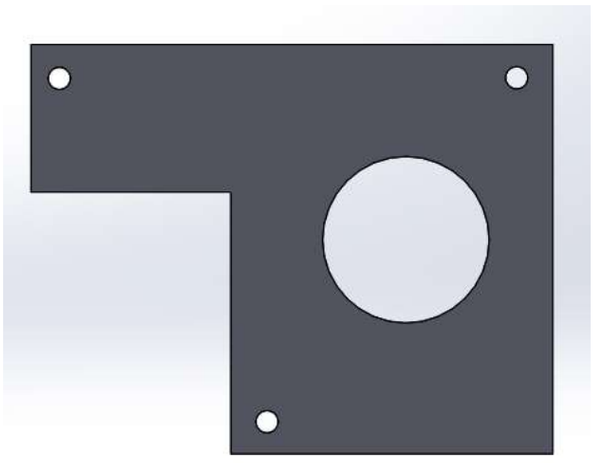

Figure 4 Container lid
Source: Own Elaboration

The second cover for the electronic components will join the pieces by means of four holes, two in each of the previous pieces. (See figure 11).

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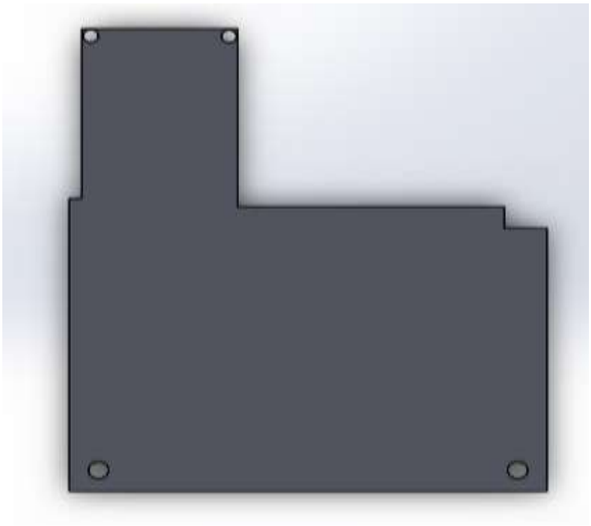

Figure 11 Front cover
Source: Own Elaboration

Having the 3D components already assembled with the structure, the device looks as follows. (See figure 12).

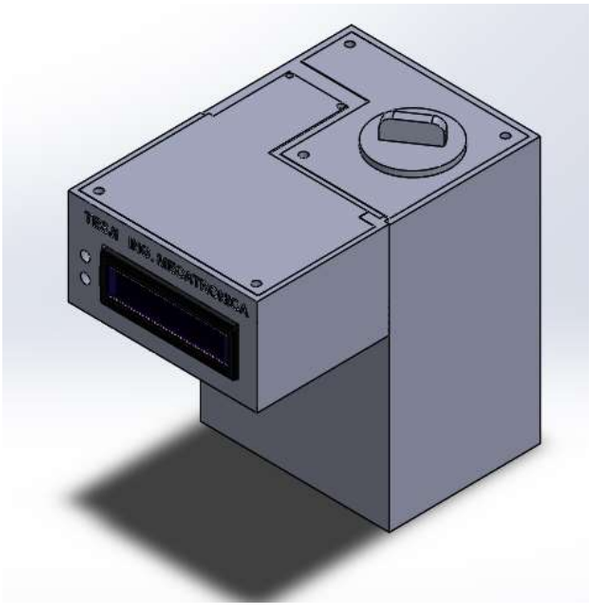

Figure 12 Antibacterial dispenser
Source: Own Elaboration

Methodology to be developed

The methodology implemented in the antibacterial gel dispenser is the Conceive - Design - Implement - Operate (CDIO). It is an intervention methodology used mainly with engineering students that allows to face in an innovative and flexible way the problems worked on, emphasizing the engineering fundamentals established in the context.

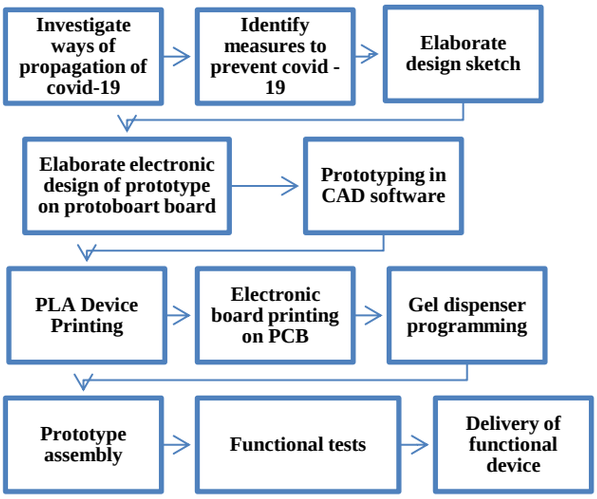

Figure 13 Methodology
Source: Own Elaboration

Results

The prototype that was made fulfills a functionality of sanitization of the user's hands without direct contact with the device allowing to have control with the access to the institution each time the antibacterial gel is provided, since it allows to dispense continuously and at the same time to take the temperature continuously avoiding that any person has contact with the gel container to provide it individually.

With the thermometer as it will automatically show the temperature on the screen at a low cost compared to similar products that exist in the market. This will reduce the waiting time for students and staff when taking the gel and their temperature by having quicker access. On the cost side, it is considered an economical prototype since its total cost is $2000 considering all the mentioned components and its elaboration. See Figure 14.

Figure 7 Dispenser
Source: Own Elaboration

Conclusions

Having a device with this type of functions at the entrances of each institution could be of great help in preventing contagion and avoiding contact with surfaces that may be contaminated with the virus or bacterial diseases, without the need to occupy personnel who are in charge of the application of the gel, putting at risk of contagion and spread of the virus. Keeping in mind the prevention measures for covid19 that will help to end the spread of this pandemic.

The development of this project required knowledge about computer aided drawing (CAD), as well as c++ programming language to control the Arduino microcontroller, knowledge about electronics to develop the PCB board.

Acknowledgment

We would like to thank the Tecnológico de Estudios Superiores de Jilotepec for the support provided for the publication of this article.

References

Bragado, D. (25 de MAYO de 2009). *blogspot.mx*. Obtenido de blogspot.mx: http://electroimn.blogspot.mx/

Didácticos, R. (15 de Diciembre de 2018). *Robótica, Automatización, control industrial, microcontroladores, electrónica digital*. Obtenido de Comparación Arduino Uno – Arduino Nano: http://robots-argentina.com.ar/didactica/comparacion-arduino-uno-arduino-nano/#:~:text=El%20convertidor%20de%20USB%20a,controlador%20FTDI232%20USB%20a%20serie.

Gonzalez, R. Z. (15 de Octubre de 2014). *Universidad Autonoma de Mexico*. Obtenido de "Dispensador automatico de croquetas": http://www.ptolomeo.unam.mx:8080/xmlui/bitstream/handle/132.248.52.100/5764/Tesis.pdf?sequence=1

kevin, N. (21 de Noviembre de 2011). *blogspot.mx*. Obtenido de blogspot.mx: http://electrokadpdcetis.blogspot.mx/2011/11/que-es-un-electroiman-e-historia.html

Llamas, L. (16 de junio de 2016). *Detector de obstaculos son sensor infrarrojo y arduino*. Obtenido de Ingenieria Informatica y diseño: https://www.luisllamas.es/detectar-obstaculos-con-sensor-infrarrojo-y-arduino/

OMS, O. (11 de Marzo de 2020). *Brote de enfermedad por coronavirus* (COVID-19). Obtenido de Nuevo Coronavirus 2019: https://www.who.int/es/emergencies/diseases/novel-coronavirus-2019/advice-for-public/q-a-coronaviruses

Pérez, J. L. (25 de Marzo de 2018). *Proyecto sensor de movimiento*. Obtenido de instituto Tecnologico del Parral: https://www.academia.edu/22115982/Proyecto_sensor_de_movimiento

Salas, M. A. (2019). *Electronica Digital*. Mexico, Guadalajara, Mexico: Trillas.

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Automated Sanitizing Tunnel

Túnel Sanitizante automatizado

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Abstract

Currently COVID 19 is a contagious virus that affects in different ways depending on each person, most of the people who are infected have symptoms of mild or moderate or very high intensity because in such a short time thousands of people are infected by contact being in a single area, the objective is to make an automated sanitizing tunnel in the Tecnológico de Estudios Superiores de Jilotepec so that students, teachers and staff entering the tunnel are sprayed with a disinfectant substance that will cover the entire body including hands as well as shoes and thus minimize the possibility of contagion; This is considered in the interest of the application of useful measures for the prevention of the contagion of the virus when entering the institution since this will avoid if bringing the virus in clothing, hair, face, hands, shoes. be neutralized by contact with the disinfecting substance.

Automated, Sanitizing, Covid

Resumen

En la actualidad el COVID 19 es un virus contagioso que afecta de distintas maneras en función de cada persona la mayoría de las personas que se contagian presentan síntomas de intensidad leve o moderada o muy alta debido a que en tan poco tiempo se contagian miles de personas por contacto estando en una sola área, el objetivo es realizar un túnel sanitizante automatizado en el Tecnológico de Estudios Superiores de Jilotepec para que los alumnos, docentes y personal que ingresen al túnel y sean roseados de una sustancia desinfectante que cubrirá todo el cuerpo incluyendo manos a si como los zapatos y así minimizar la posibilidad de contagio; esto es considerado en el interés de la aplicación de medidas de utilidad para la prevención del contagio del virus al ingresar a la institución ya que esto evitara si al traer el virus en la ropa, cabello, cara, manos, zapatos .ser neutralizado al tener contacto con la sustancia de desinfección.

Automatizado, Sanitizante, Covid

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† Researcher contributing as first author.

Introduction

The covid 19 has been a big problem, in this stage of virus, we know that it can be carried in clothes, hair, shoes or items that we can bring for personal use so a Sanitizing Tunnel at the entrance of the Tecnológico de Estudios superiores de Jilotepec is very important because when entering the institution, all students and teaching and administrative staff may pass to sanitize and thus minimize the contagion in case someone could carry the virus in the objects already mentioned, considering that it is automatically.

In section number one we find the introduction where it shows the content of all the writing, in section number two the materials used for the conformation of the prototype, in number three we find the electronic design that is the main base of the main prototype, in number four the methodology develops the steps with which it was carried out, in number four the development of the methodology where it shows how the tunnel was assembled and the sixth shows the results obtained from the project.

Development

Acrylic: Acrylic is a transparent or pigmented thermoplastic polymer with a wide range of colors. It is obtained from the polymerization of methacrylate monomer and is melted to offer it in sheets of standard sizes. Acrylic is one of the most consumed plastic materials as it is mainly used in: architecture, optics, construction, advertising, decoration, exhibition, printing, engineering applications, graphic arts and plastic arts.

A sprinkler is a device that transforms the flow of a pressurized liquid into a spray, which is the main reason why it is frequently used for irrigation purposes. The sprinkler is the device used in parks, gardens or in places where there are lawns for watering. It is a small but powerful device that allows spraying with the right amount of moisture. (See figure 1)

Figure 1 Sprinkler (hidroenv 2021)

Float: The float is a hermetically sealed plastic product, also known as a floating level sensor or switch, its design is very practical, as well as its installation, since it does not require major complications for its placement. In a society where drinking water is becoming increasingly scarce, the electric float is an excellent product to achieve a lower waste of water and electric energy. PanamaCOM. (2021). See Figure 2.

Figure 2 Floater (Panama 2021)

Motion sensor

A presence sensor or motion sensor is an electronic device that turns a system on or off when it detects motion in the area or environment in which it is installed. They are often used to optimize the energy consumption and efficiency of various systems such as ventilation, lighting or air conditioning in the home or office, although they also have applications in the field of security. (See figure 3)

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Figura 3 Sensor (Honewell 2018)

Hydraulic pump is a generating machine that transforms the energy with which it is driven into energy, which moves and increases the pressure of a fluid by adding energy to the hydraulic system, to move the fluid from a zone of lower pressure to a zone of higher pressure. See Figure 3. Pump)

Figure 3 Pump (Hiunday 2021)

In a control system there are elements called sensors, whose function is to collect data or interpret user commands within this are the button panels that are protected operator type of basic metal material, red, lamp module voltage 24VAC / DC, Total voltage. (See Figure 4).

Figure 4 Pushbutton panel (Grainger 2020)

A terminal block is a type of electronic connector where a wire is clamped against a metal part by the use of a screw, without using connectors or compatibility problems in joining wires of different cross-sections with a firm contact. (See Figure 5.)

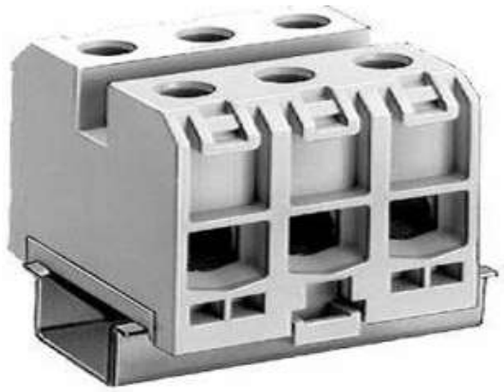

Figure 5 Clema (Grainger 2020)

Design

Electrical diagram that includes the connection of the elements of the button box, where it shows the single-phase electrical connection where it shows, the manual mode in the first line the start button that actuate it passes the current and it goes to the motor guard drives the green start lamp following the next one the stop button stops by the contactor and the second red lamp lights, then appears the automatic mode that when it detects the sensor does its function passing through the motor guard and the contactor lighting the lamps. (See Figure 6).

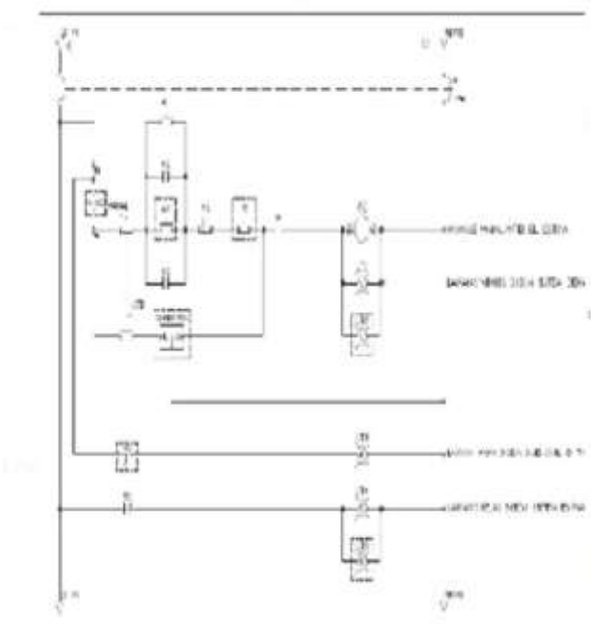

Figure 6 Electrical diagram
Source: Own Elaboration

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Methodology to be developed

Conception: To make the sanitizing tunnel it is necessary to investigate other research works about the tunnels and to gather the necessary information to make then we have a protocol of what has to be done according to the information gathered and the necessary materials.

Design: For the operation of the tunnel an electrical diagram will be made showing how it will work in manual and auto mode as well as a schedule of activities to take into account what will be done in each month and thus keep track.

Implementation: Having the electrical design, the materials, we will begin to structure the sanitizing tunnel in the best way that people can enter without any problem.

Operational: After having the structure with all its components incorporated, we will test the operation of the tunnel and if we obtain the results we expect, it will be placed in the area established for its use.

Give the meaning of the variables in linear wording and it is important to compare the criteria used.

Results

Figure 7 Structure
Source: Own Elaboration

In this part the structure of the tunnel that is made by ptr as a structure for the placement of the sprinklers that are activated by the sensor, has a float that is permissive and helps to deactivate the system automatically if the drum is emptied. (See Figure 8).

Figure 8 Automated Sanitizing Tunnel
Source: Own Elaboration

In this part is the tunnel finished with the elements in such a way that it is combined for the control of the system, both manual and automatic by means of a switch that allows the two functions and in the same way it protects from a short circuit, by means of a permissive transmitter of starting, by means of a sensor that allows to detect the movement and to be activated. The cost of the prototype is considered competitive in contrast to what is on the market, ranging between $12,000.00 for material and labor, being a project of constant utility to reduce the spread of Covid-19.

Conclusions

The disinfectant tunnel in these times of pandemic is a project that allows to carry out prevention in the part of disinfection of all persons entering the Tecnologico De Estudios Superiores de Jilotepec and can reduce the possibility of contagion by being sprayed with sanitizer from the head, clothes, backpack, shoes considering that the virus can be transported by these routes and thus avoid possible contagion of covid-19.

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References

Pallas R. (2020). Sensores y Acondicionadores de Señal. Barcelona, España: Marcombo.

Rodríguez P. C (2019). Componentes electrónicos. México: Biblioteca electrónica.

Prat V. LI. (2017) Circuitos y dispositivos electrónicos, México: Alfaomega.

Ballester E. Pique. R (2019) Electrónica de potencia México, Alfaomega

Reyes Ayala, J. E., & Flores Pérez, J. L. (2016). Proyecto sensor de movimiento.

OMS, O. (11 de Marzo de 2020). *Brote de enfermedad por coronavirus (COVID-19).* Obtenido de Nuevo Coronavirus 2019: https://www.who.int/es/emergencies/diseases/novel-coronavirus-2019/advice-for-public/q-a-coronaviruses

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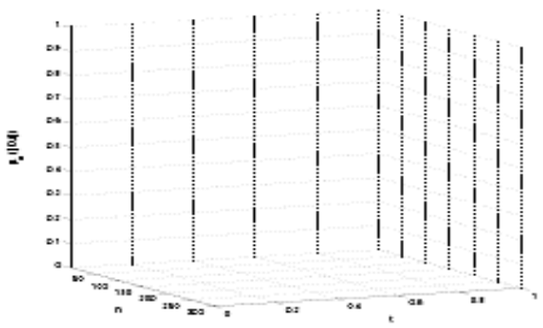

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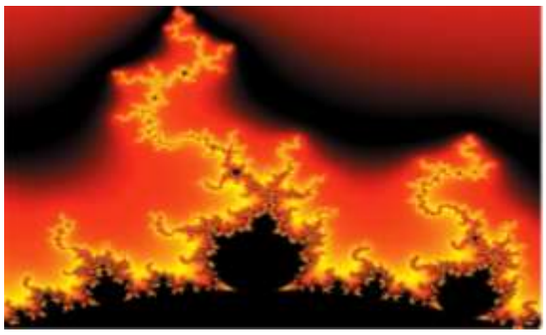

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The description of the peer review processes is made known by the Editorial Board in order that the Authors know what the evaluation criteria are and will always be willing to justify any controversy in the evaluation process. In case of Plagiarism Detection to the Article the Committee notifies the Authors for Violation to the Right of Scientific, Technological and Innovation Authorization.

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The Arbitrators undertake to notify about any unethical conduct by the Authors and to indicate all the information that may be reason to reject the publication of the Articles. In addition, they must undertake to keep confidential information related to the Articles they evaluate.

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