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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, Departamento de Sistemas y Computación. Avenida Ing. Víctor Bravo Ahuja No. 125 Esquina Calzada Tecnológico, Oaxaca, Oax., México.

ID 1st Author: *Eva, Rafael-Pérez* / **ORC ID:** 0000-0003-2793-1254, **CVU CONACYT ID:** 905268

ID 1st Co-author: *Francisco Emmanuel, Martínez-Castellanos* / **ORC ID:** 0000-0003-0759-6495, **CVU CONACYT ID**: 1244671

ID 2nd Co-author: *Maricela, Morales-Hernández* / **ORC ID:** 0000-0002-3521-2041, **CVU CONACYT ID:** 731036

ID 3rd Co-author: *Luz María, Mingüer-Allec* / **ORC ID**: 0000-0003-2954-1815, **CVU CONACYT ID:** 786966

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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

Resumen

En la actualidad, las aplicaciones móviles se han vuelto más relevantes que nunca, han cambiado la forma de vida de las personas en todos los sectores de la sociedad. La aplicación móvil: Red social para la búsqueda de personas desaparecidas, es una aplicación bajo Android desarrollada con el objetivo de ayudar a encontrar personas desaparecidas mediante el formato de una red social. México atraviesa una crisis de seguridad que no solo ha sido definido por la violencia, homicidios, secuestros, extorsiones o robos, sino también por los índices elevados de personas desaparecidas o no identificadas que han impactado en nuestra vida cotidiana. La aplicación móvil tiene como objetivo, dar un espacio a las publicaciones de personas desaparecidas, prevención de delitos cibernéticos, agilizar el proceso de publicación de alertas no oficiales y crear una comunidad bajo el formato de una red social para compartir información con los usuarios que ayude a encontrar a las personas desaparecidas. La metodología de desarrollo para esta aplicación fue el modelo incremental mediante el lenguaje de programación en Dart

Aplicación móvil, Personas desaparecidas, Red social

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* Correspondence to the Author (E-mail: evarafaelperez@gmail.com)
† Researcher contributing as first author.

Introduction

In these modern times, with the advancement of technologies, society is increasingly facing a more open environment, with greater communication benefits. Mobile applications have become indispensable technological tools to carry out our daily activities, to entertain us, to communicate and to keep us informed of what is happening or happening in our society. Mobile applications aim to make information available at all times and provide quick access to different functions, tools and online services from the palm of the hand.

UNESCO (2014) stresses that technological tools favour accessibility, autonomy, participation, communication, information, mobility and adaptation to the environment, which through their implementation allows the user to obtain information and stay connected and updated from anywhere with an Internet connection.

The development of the mobile application: Social network for the search of missing persons under the Android operating system allows the following benefits: Shortening the waiting time to be able to spread the word that a person has disappeared, that users of the community can upload alerts in the form of publication by filling in fields such as general data, last location, photograph; avoiding cybercrime, by creating the community under the format of a social network allows to disseminate and give relevance to the issue of missing persons to be helped and to help other people. It has the following modules: creation and authentication of users, creation of missing persons alerts, comments and reactions module, search and tracking between user accounts, user profile, notifications, prevention against cybercrime, filter against hurtful phrases in comments and disable screenshots.

The present work is oriented in the area of computer science in the part of software development, which describes the problem statement, software methodology, project development, results, conclusions, acknowledgements and references.

Problem statement

Nowadays, the practice of the disappearance of people continues not only in Mexico but also worldwide. In Mexico, in recent years, the phenomenon of the disappearance of persons has become part of the severe problems of insecurity and violence that the country is experiencing.

The Law of the National Registry of Missing or Disappeared Persons, published in the Official Journal of the Federation (2012), in its article 3, section IV, establishes the concept of a missing person as:

> Any person who, based on reliable information from relatives, close or related persons, has been reported missing in accordance with domestic law, which may be related to an international or non-international armed conflict, a situation of internal violence or unrest, a natural disaster or any situation that may require the intervention of a competent public authority.

For Hernández (2020), the disappearance of persons has various causes, which can be accidental, self-willed, by the will of a private individual or by the force and will of the State. In Mexico, the states of Jalisco, Tamaulipas, State of Mexico, Veracruz and Nuevo Leon, are the ones that concentrate 70.7% of disappeared and missing persons, (ADN Político, 2021), real figures that represent the missing persons in our country.

One of the problems that arise are the scarce results obtained by the institutions of justice in relation to the search and location of missing persons, since the waiting time given by the authorities to raise an official missing person alert is 48 to 72 hours, which is vital for the life of a person.

Another problem is that when a person goes missing, they use social networks such as Facebook to make a publication, and add the personal phone number to receive reports about the missing person, this generates situations of extortion by other ill-intentioned users, since exposing the personal number usually ends in telephone extortion, scams or hacking of WhatsApp or Telegram accounts.

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Another disadvantage is that when users or family members upload disappearing posts on social networks, their personal information such as photos and other contacts on their profile are exposed, which can also lead to identity theft. Current social networks are not designed for altruistic purposes, and at the time of creating or uploading a publication of this nature, users ignore it to see another publication focused on entertainment and fun or simply disinterest in helping.

Faced with this scenario, the mobile application is created: Social network for the search of missing persons to help people get back to their families.

Software methodology

The incremental development model was used for this project. In the words of Pressman (2010), the model, "combines elements of the waterfall model with the interactive philosophy of prototyping. This model applies linear sequences in a staggered fashion as time progresses on the schedule. Each linear sequence produces a software increment". Its stages are: Communication, Planning, Modelling, Building and Deployment, as shown in Figure 1.

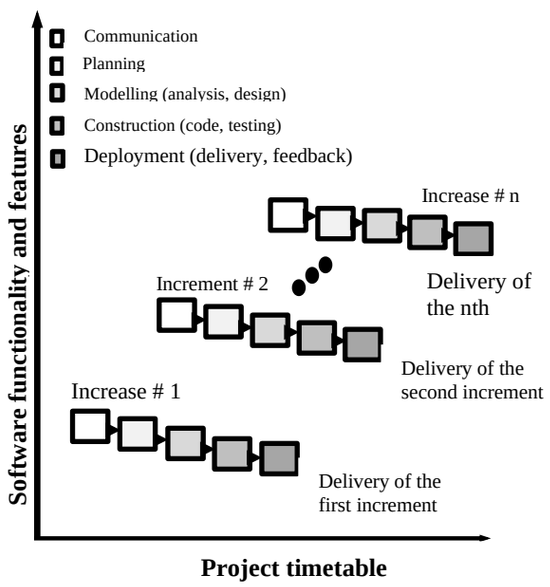

Figure 1 Stages of the Incremental Model
Source: Pressman, R. (2010). Software Engineering a Practical Approach. Seventh edition

Project development

For the development of the mobile application: Social network for the search of missing persons, aspects of versatility, ease of use and user-friendly interfaces were taken into account, which allowed to work in a more practical way and move more quickly with the project, its development was based on six increments.

In this project, six functional increments were carried out and each one of them was reviewed. The interfaces of the mobile application modules are explained in the results section. For the purposes of this article, the activities of each phase of the incremental model are described.

- Communication phase, in this activity, communication and meetings with the client were essential to identify the requirements. For the definition of functional and non-functional requirements, the user story technique, the Class-Responsibility-Collaboration-Cards (CRC) and the survey data collection technique were used.

For Cohn (2004), a user story is, "a brief description of a software functionality as perceived by the user", it is important to mention that different stories were made based on the user's needs. For Ambler (1995) the use of cards (CRC) "is a set of standard index cards that represent classes and is divided into three areas: class name, responsibilities and contributors". Hernández, Fernández and Baptista (2006, p.310) define the survey as "the instrument most commonly used to collect data, consisting of a set of questions regarding one or more variables to be measured". The survey was conducted remotely using the Google form, due to the pandemic situation and to be able to reach more people. The survey was applied to 50 people between 18 and 58 years of age, in order to identify the needs and requirements as each increment evolves for the development of the mobile application modules.

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- Planning phase, in this phase the schedule of activities was created, where the activities such as the number of increments, the tasks of each of the phases of each increment, the periods of completion and delivery dates were established. The various technologies to be used in the modelling phase were also chosen. In the case of the database, it was decided to use a non-relational database. A non-relational database is one that does not use the tabular schema of rows and columns, instead it uses a storage model that is optimised for the specific requirements of the type of data being stored (Zoiner, 2018).

- Modelling phase, in this phase the different tools that were chosen in the planning stage were applied, for the design of the flowcharts and cases the tool diagrams.net was used, which is a free and open source web application that allows creating diagrams from any web browser. For the operation of the non-relational database, the Firebase Storage manager was used for the storage of images and as a database where documents, information and data are stored.

- Construction phase. In this phase the graphical user interfaces were designed in a responsive way, and the coding of the respective modules was also carried out in each of the increments, taking as a reference the delivery dates specified in the schedule of activities. For the coding of each of the modules, the open source Flutter framework developed by Google was used to create native applications in an easy, quick and simple way, using the object-oriented Dart programming language. The coding order was according to the modules developed for each increment:

  - Creation of interfaces/Navigation of interfaces.
  - Connection to the Firebase database.
  - User creation and authentication.
  - User search.
  - Creation of alerts.
  - Follow/Unfollow users.
  - React/Don't react alerts.
  - Feedback.
  - Notifications.

In this stage the tests of each module were also carried out, in this case the acceptance tests were applied. An acceptance test is defined as the testing of software by the user or client to determine whether it is accepted or not, its objective is to validate the software against the user's functional and non-functional requirements. Also at this stage, compatibility tests were carried out, verifying that the mobile application works on different mobile devices with different features under the Android 5.0 operating system or higher.

- Deployment phase: In this last phase, each of the developed modules was delivered and evaluated by the end user, in this part the necessary observations, suggestions or feedback were made depending on the module. In case of feedback, they are considered as part of the user's needs or requirements and are taken into account in the planning phase in the next increment.

Results

As a result of the mobile application is the development of each of the modules that were designed, coded and tested for proper functioning. The main modules of the mobile application are described below:

1. When running the mobile application it displays a welcome screen See Figure 2.

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Figure 2 Application welcome screen

2. When clicking on the Join the community button, a menu is displayed where the user's Gmail email accounts that are synchronised with the mobile device are loaded. If the user does not have a Gmail account, click on the option Add another account. The user can create or add an existing account that is not on the mobile device, see figure 3.

Figure 3 Login, create or add email accounts screen

3. Own profile: This is the personal profile where you can see the alerts you have published, as well as a profile photo, user name, description, a configuration button that allows you to edit or change the profile description and a logout button, as shown in figure 4.

Figure 4 User profile screen

4. Alert display: this screen shows a published alert, with the following data: the name of the user who published the alert, the place where the alert was issued, the image of the missing person, the buttons with options to react, comment and share, and the data of the missing person. See figure 5.

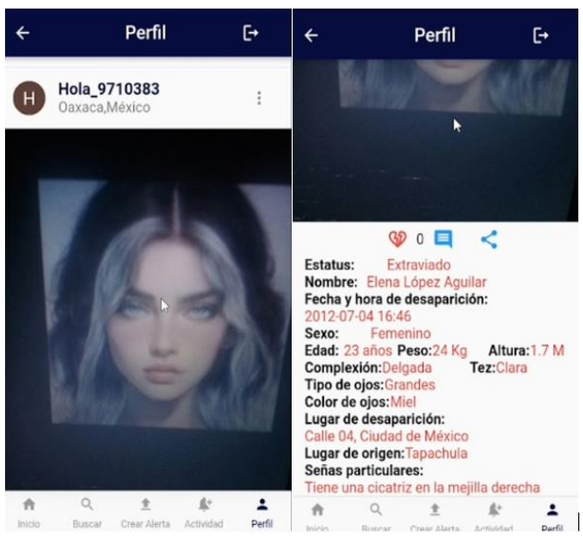

Figure 5 Alert display

5. Comments: This is the interface where an alert can be commented. On the right-hand side you can see what a censored comment looks like.

Figure 6 Comments screen

6. Search user: This interface shows how to enter the name of a user to be searched, once the name appears, click on it and it sends us directly to the profile. See figure 7.

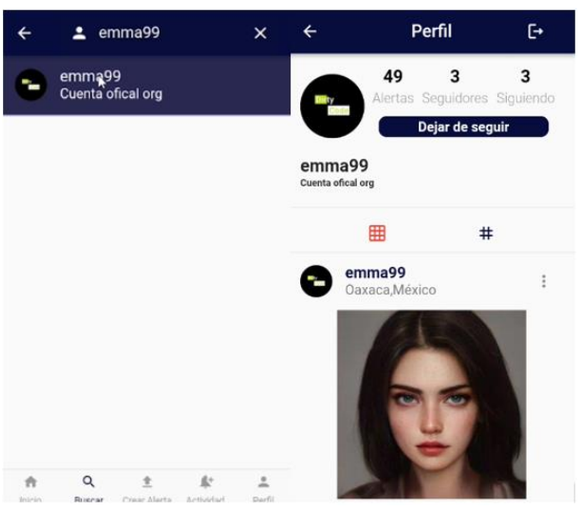

Figure 7 User search screen.

7. Create alert: In this interface when pressing the button Create Alert, it displays a menu to select the image, either by taking a picture with the camera or by the gallery, see figure 8.

Figure 8 Screen for selecting a photo

8. Form to create an alert: in this screen the previously selected photo is shown, it also shows a form to fill in the respective data, the alert is published once the Upload button is pressed, as shown in the following figure.

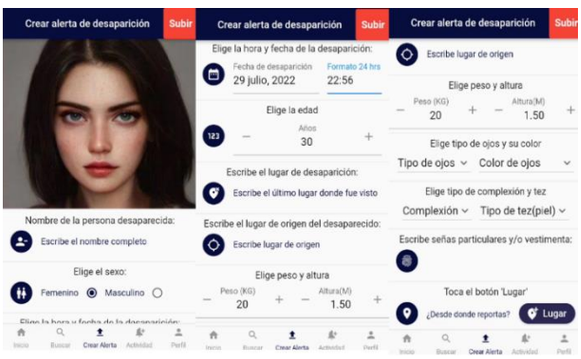

Figure 9 Form to create an alert

9. Notifications panel: This interface displays the notifications regarding our profile and our publications made. Notifications can be received when a user follows our account, if he/she reacts to the alert or comments on it. It also allows navigation, see the following figure.

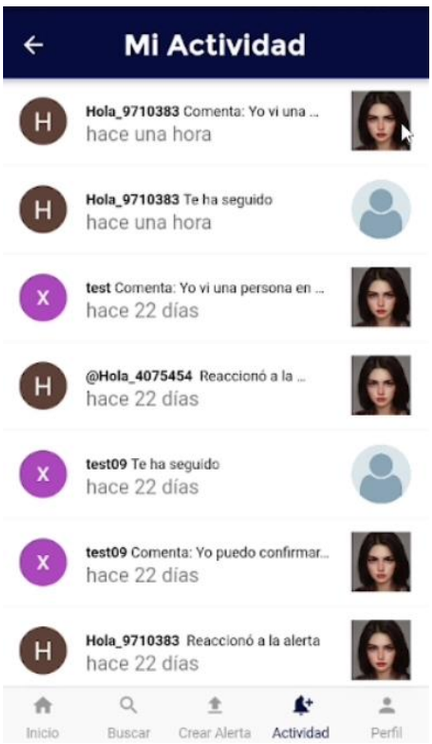

Figure 10 Notifications panel screen

10. Sharing option: In this interface, when you click on the share button on an alert, the mobile application takes you to the messaging application that you have on your mobile device, and you can share the alert data such as: photograph, name, age and place of disappearance, as shown in figure 11.

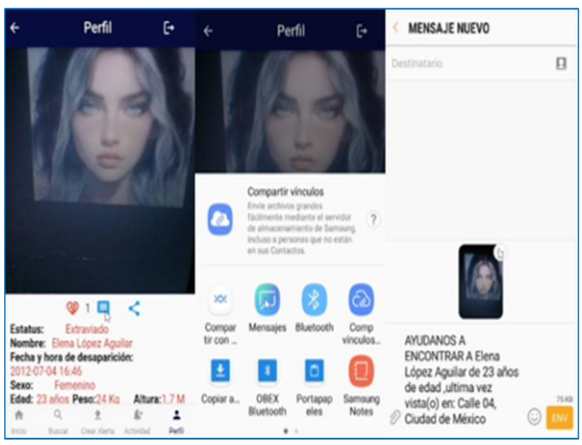

Figure 11 Sharing option

11. Prohibit screenshot. This interface shows when a user wants to take a screenshot of the photograph of the missing person, the application displays a message, as it is configured to block this process, see figure 12.

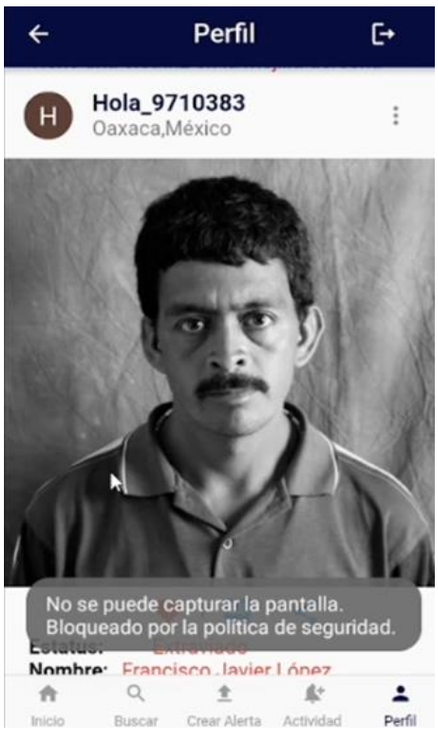

Figure 12 Prohibit screenshots

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Conclusions

Mobile applications today enable access to a growing diversity of tools and services that facilitate productive activities. Mobile applications are here to stay, their continuous growth will continue to impact our lifestyle and the way we carry out our activities. The Mobile Application: Social network for the search of missing persons, is a native application with altruistic purposes to help find missing persons and to prevent the most common cybercrimes, creating a community through the format of a social network for the issuance of publications and alerts to the serious social problem of insecurity that we are living day by day in which today faces society in our country.

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