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# Web application for the management of the request and commission formats

# Aplicación web para la administración de formatos y solicitud de comisión

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**Abstract**

This paper describes the design and development of a web application for the management of the information obtained from the Request and Commission formats. The formats sited are "Commission Notice", "Permit request form" and "Car request form". The application was developed using HTML and PHP programming languages and MySQL as the database management system. The results obtained with the application implementation were satisfactory, being that the different forms are not just generated in a faster manner, but also the obtained information was managed in an efficient way. As an innovation, the system includes the option to back up the information forms in a digital format. The web application was developed for the Department of Information and Communication Technology in the Technological University of the South West of Guanajuato (UTSOE). Due to the obtained benfits with the application web, it is expected to implement it in all the UTSOE departments.

**Web application, Information System, Digital formats**

**Resumen**

El presente artículo describe el diseño y desarrollo de un sistema web para la administración de información generada en la elaboración y administración de formatos de solicitud y comisión. Los formatos corresponden a los eventos de "Aviso de Comisión", "Solicitud de Permiso" y "Solicitud de Automóvil". Para el desarrollo de la aplicación, se utilizaron los lenguajes de programación de HTML, PHP y MySQL. Los resultados obtenidos fueron satisfactorios ya que con la implementación del sistema no solo se elaboran de manera rápida los diferentes formatos de solicitud, sino que también se administra de manera eficiente la información generada por los mismos. Como una innovación, el sistema incluye la opción de respaldar la información de las solicitudes en formato digital. El sistema web se desarrolla para la carrera de Tecnologías de la Información y Comunicación (TIC) de la Universidad Tecnológica del Suroeste (UTSOE). Dadas las facilidades del sistema en la administración de información, se pretende extender su uso a las carreras restantes de la UTSOE.

**Aplicación web, Sistema de Información, Formatos digitales**

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## Introduction

Information and Communication Technologies (ICT) are a set of techniques, application developments and advanced devices that integrate storage, processing and data transmission functionalities (Pérez-Foguet, 2006). Within the area of application development, two options stand out: desktop and web. Desktop applications have the disadvantage that in order to be used/accessed, it is necessary to install them on the client's computers; while web applications can be accessed or updated at any time and place via intranet or internet with the use of multiple platforms/browsers/web servers (Dressler, 2007), and (Mao Shan-jun, 2009).

Currently, there is a wide range of possibilities when facing web development. All of them are intended to provide advanced features to web pages in order to meet the broad needs of users, based on the client-server scheme. In (Tiago H. Moreira de Oliveira, 2014), the implementation of an innovative system for the administration of agricultural properties that allows the administration of more agile and efficient crops is described, with the purpose of improving productivity and competitiveness. The system records and generates reports of resource consumption in addition to the resulting products for a given period of time. In addition, the Agrifootprint system includes graphic representations so that the user obtains an immediate view of the crop information. In (Bai J, 1998) a medical teleconsultation system is presented to demonstrate the usefulness of the World Wide Web (WWW) in the exchange of medical information and telemedicine. The system is developed in Java, which provides several basic java tools to meet the requirements of medical applications, including a file manager, data tools, news window and a digital audio tool. The file manager handles medical images stored on a data server, which comes from a hospital database. The ads window allows users to discuss special cases through text, send their diagnostic reports personally or in a group, and recognize different report formats for later use.

For the development of the web application, this article uses web programming tools such as: HTML5, PHP, MySQL, JLPDF and FPDF. The rest of the paper is structured as follows.

Section two describes the characteristics of the materials used and the method implemented for the development of the application. In section three the results obtained are presented. Finally, section four presents the conclusions generated by the elaboration of the project.

## Materials and methods

### 1. Materials

Web application development has greatly evolved in recent years (Dhande, 2014) and (Khalil, 2016). The result of this evolution is the large number of tools that can be found for the development of web applications, such as CGI, JSP, PHP, ASP, etc., which provide advanced features for web pages in order to cover the broad user needs, based on the client-server scheme (Maan, 2012).

In the development of this project, the programming languages HTML, PHP, MySQL were used. A programming language is nothing more than a structured system designed primarily for machines and computers to understand each other and us, humans.

**HTML:** The HTML programming language (HyperText Markup Language) is basically a set of tags that serve to define the text and other elements that can be seen on web pages (Scott, 2015).

**PHP:** PHP (Personal Home Page Tools) is a free and platform-independent, server-side programming language, with a large library of functions. It provides a work environment in which users can develop simple dynamic web applications, in addition to interacting with databases. Like HTML, PHP allows embedding code in HTML pages (Scott, 2015).

**MySQL:** A Database Management System (DBMS) is a very specific type of software dedicated to serve as an interface between the database, the user and the applications that use it; it is a software which serves to define, build and manipulate a database, thus allowing access to data in a fast and structured way. Some of the most used DBMS are: Oracle, Postfix, PostgreSQL, Access, SQL, MySQL, etc. MySQL is a very fast, multi-threaded, multi-user and robust relational database management system.

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It is designed for critical production environments with a high workload (Scott, 2015). The main features of MySQL are:

- It is a relational database management system.
- It is Open Source.
- The database server is very fast, reliable and easy to use.
- Work in client/server or embedded environments.
- There is a large amount of software that uses this system.

## 2. Methods

For the development of web applications, with certain quality guarantees, it is convenient to follow some of the existing software development models, where programming is only one of the stages of the software development process (Pavaloaia, 2013).

**Cascade:** The cascade development methodology rigorously orders the stages of the software development process, so that the beginning of each stage must wait for the end of the previous stage; also, at the end of each stage, the model is designed to carry out a final review, which is responsible for determining if the process is ready to move on to the next phase (Jain, 2012).

Some of the advantages of the cascade methodology are:

- Allows departmentalization and management control.
- It is an easy linear model to implement, understand and facilitates project management.
- The process leads to delivering the project on time.
- It allows having the project under control.
- Limits the amount of interaction between equipment that occurs during development.
- The amount of resources needed to implement this model is minimal.
- Documentation is produced at each stage of the development.
- After each important stage, the tests are performed to check the correct operation.

Figure 1 shows the stages that will be carried out for the development of the project.

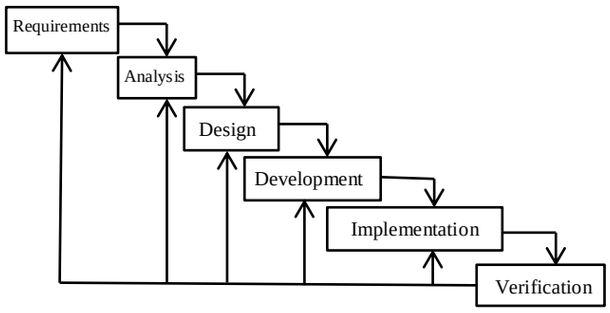


**Figure 1** Methodology implemented in the development of the project

- **Requirements**: This stage consisted of investigating whether there was hardward and software for the development of the application.

- **Analysis**: Basically, at this stage the relevant information that will handle the application is analyzed. This information was obtained from the "Commission Notice", "Permit Request" and "Automobile Request" formats.

- **Design**: At this stage, the interfaces that would integrate the application were proposed; these were those of teacher and director.

- **Development**: At this stage, programming (coding) of both the interfaces and the database was carried out.

- **Implementation**: At this stage, the database connection was made with the characteristics of the user interfaces.

- **Verification**: At this stage, tests were carried out to verify the correct functioning of the data that each of the interfaces records in the database.

## Results

This section presents the results obtained in the design and development of a web application for the management of information generated in the elaboration and administration of "Commission Notice", "Permit Application" and "Automobile Application".

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## 1. Database

For the management of the information and the generation of digital documents, a database called "applications" was created, which included the following tables: cars, commission notice, categories, cities, day, department address, chiefs, immediate chiefs, month, number, teachers, application_auto, application_permission, transport and users. Figure 2 shows the list of tables generated in the database.


**Figure 2** List of tables in the database

The ***Automobiles*** table stores the various means of transportation that the institution has for the exclusive use of its workers. In the case of the ***Comission_Report*** table, it contains the fields that are specified in the commission format, in this table each generated request will be accommodated. In the case of the ***Categories*** table, it shows the administrative positions (director, ptc, among others.). The ***Cities*** table contains the name of the cities, to which they are commissioned. The ***Day*** table stores the day on which the request is solicited. The ***Department_Address*** table specifies the areas of the users involved in the various request formats. The ***Chief_Finance*** table shows the name of the Head of the finance department that signs the authorization in the application. The ***Immediate_Header*** table contains the name of immediate bosses that authorize the workers to leave. The ***Month*** table stores the users request month. The ***Number*** table stores the years of the requests. The ***Teachers*** table contains the list of potential applicants. The ***Auto_Request*** table stores the auto request format data.

The ***Permission_Request*** table stores the permission request format information. The ***Transport*** table contains the means of transportation that users may require/request for commissions. Finally, the ***Users*** table stores the list of personnel that can access the web system. The information in the tables is necessary both for the design of the website interfaces and for the generation of digital documents.

## 2. Interface Programming

For the storage and management of the information stored in the database, it was required to implement an access interface for both types of users. Figure 3 shows the home page of the web application; the home page, in addition to welcoming the user, requests the username and password.


**Figure 3** Welcome page and start to the web administration system

If any of the data (username or password) is incorrect, a window will be displayed indicating the error. Otherwise, the system will give access to the user or administrative or management personnel. Figure 4 shows the interfaces for administrators and managers.

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a)


b)

**Figure 4** Interfaces for a) administrative and b) managers

## 2.1. Interface for administrators

The manager interface allows each user to fill in the "Commission Notice", "Permit Request" and "Automobile Request" formats. Figure 5 shows the allowed formats and the users registered in the system.

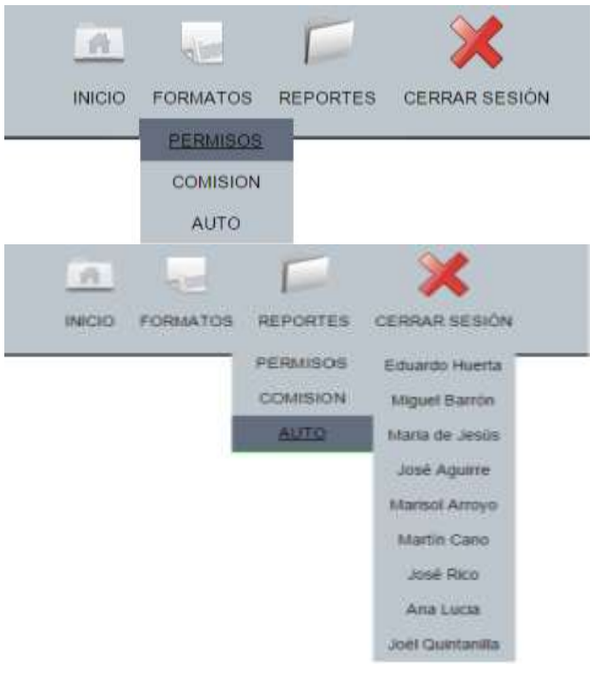


**Figure 5** Drop-down menus for formats and reports

Depending on the type of format that the user requires, the system will display its filling interface. When the format is filled in correctly, the system displays a pop-up window indicating that the data has been recorded correctly. As an innovation, the system displays a pop-up window to give the user the option to save and print the document. With this option, information is stored not only in the database, but also in the different formats of digital documents. Figure 6 shows the format that is generated for *commission notice*.

## 2.2. Interface for managers

Unlike the administrative interface, the manager interface allows you to visualize the information generated by all administrators in the different complemented formats.


**Figura 6** Format for "Commission notice"

Table 1 shows the information to be displayed in the case of the *car request* format.

| ID | Day | Month | Year | Applicant | City | Days | Reason | Transportation |
|---|---|---|---|---|---|---|---|---|
| 9 | 1 | January | 2015 | Dr. José Miguel Barrón Adame | Abasolo | 0 | | CAMIONETA |
| 11 | 1 | January | 2015 | Dr. José Miguel Barrón Adame | Abasolo | 0 | | CAMIONETA |

**Table 1** Information of the generated requests

The information of the different formats which are complemented by the administrative ones in the case of *car application* is: *Day, Month, Year, Applicant, City, Days, Reason and Transportation.*

## Conclusions

The management of corporate information by a company is an arduous and complex task which is normally facilitated through desktop applications.

This article described the design and development of a web application for the management of information generated in the preparation and administration of application formats: "Commission Notice", "Permit Application" and "Automobile Application". The web application was developed for the Information and Communication Technologies (ICT) of the Technological University of the Southwest (UTSOE) of Guanajuato.

The results obtained were satisfactory since, with the development of the web application, not only the different types of application formats are quickly developed, but also the information generated by them is efficiently managed.

Therefore, the use of HTML, PHP and MySQL programming tools were a good choice for the development of the application. As an innovation, the application has the option of supporting information in digital documents. Given the advantages and facilities offered by the application, it is intended to extend its use to the remaining majors at UTSOE.

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