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**“MULTIMEDIA SYSTEM FOR THE ADMINISTRATION OF CONTENTS OF THE DIGITAL
BILLBOARD OF THE FACULTY OF ENGINEERING IN APPLIED SCIENCES”**

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MULTIMEDIA SYSTEM FOR THE ADMINISTRATION OF CONTENTS OF THE DIGITAL BILLBOARD OF THE FACULTY OF ENGINEERING IN APPLIED SCIENCES

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ABSTRACT: The lack of a system that allow the manipulation of the multimedia resources that are shown in the digital billboard of the Faculty of Engineering in Applied Sciences, entails the approach of the development of this system whose purpose is to take advantage of the multiple advantages that multimedia offers to present information in an attractive and dynamic way.

KEYWORDS: Multimedia, Multimedia System, Multimedia Resource, Digital Billboard, XP Methodology, Java ServerFaces, PrimeFaces.

RESUMEN: La falta de un sistema que permita la manipulación de los recursos multimedia que se muestran en la cartelera digital de la Facultad de Ingeniería en Ciencias Aplicadas, conlleva al planteamiento del desarrollo de éste sistema cuya finalidad es aprovechar las múltiples ventajas que brinda la multimedia para presentar información de forma atractiva y dinámica.

PALABRAS CLAVE: Multimedia, Sistema Multimedia, Recurso Multimedia, Cartelera Digital, Metodología XP, Java ServerFaces, PrimeFaces.

1. INTRODUCTION

The constant development of technology and computing has allowed the integration of multimedia in various fields because it is a resource that manages to get the attention immediately through its presentation at strategic points generating a great visual impact on users. According to Coleman multimedia technology has reached all the fields of society such as: work, culture, leisure and education [1].

Multimedia applications are involved in most of the fields of human daily life, which implies the use of this technology as a resource that offers combinations of means to optimize times, tasks, work or academic activities in a different way than conventional, making it more attractive and efficient. A multimedia system can be defined as a tool that offers combinations of text, animations, images, audio and video in a same document that are coordinated, produced, controlled and displayed by a computer [2].

The digital age allow to reach all kinds of people in a more practical and ecological way, transforming the data into graphics, videos and many more. The systems used to manipulate the digital billboards allow to display several types of multimedia resources at the same time making use of a split screen.

The main objective of this system is provide the university community, and mainly the students of the Faculty of Engineering in Applied Sciences, the specific information of all university activity as any other information that may be considered of interest, independently of the source of origin, through a digital billboard.

2. MATERIALS AND METHODS

2.1. Software

To implementation of the system the following tools was used.

The web application is developed with Java technology, using the framework JavaServer Faces (JSF) 2.2 "is a working environment (integrated in Netbeans) to develop Java Web applications on the server side, that present a graphical interface when executed [3]" and the PrimeFaces 6.0 implementation provides a set of visual components to facilitate the development of rich internet applications. The application server in which running the system is Wildfly 10, using the PostgreSQL 9.3 relational database manager for storing and reading the information the system manages.

The Model View Controller (MVC) model of JSF is used for the implementation of the system which allow separate the data (model) of the view.

2.2. Hardware

To display of the billboard is used a Smart TV that connects with HDMI cable to a computer, from which the system is accessed through a web browser.

2.2. XP Methodology

In order for software to be of quality is necessary the use of a methodology of software engineering; in this project Xtreme Programming (XP) is used, that is

a methodology of development of agile software based on the simplicity, the feedback and the reuse of code [4]; is designed for the development of small and medium software projects, it uses a technique called user stories that are used to specify software requirements [5]; consists of four phases: Project Planning, Design, Development and Testing.

Project Planning.- Phase in which the compilation of all project requirements is performed through an interaction with the user. User stories and iterations are generated.

Design.- Simple designs or non-functional system prototypes are created.

Development.- The user is an essential part in the development of the system; the coding must be done based on standards already created, so that the code is consistent. The main thing is the functionality of the code and the optimization should be done at the end.

Testing.- The use of tests to verify the functionality of code that is being implemented is a fundamental pillar of the methodology; the code will only be implemented when it has passed the corresponding tests.

The main objective of using an agile methodology is to be able to deliver to the user quickly and often a system that has value.

3. RESULTS

The results obtained with the implementation of the system are satisfactory, since with its use it was possible to improve the presentation of contents in the digital billboard, since system allows dividing the screen of visualization in several parts to show at the same time different types of multimedia contents [6].

Illustration 1 shows the diagram of the architecture used in the development of the system. Access is done through a web browser (for better performance use current versions of Mozilla Firefox), the storage of resources (images, animations or videos) is done in a folder located outside the context of the application and is made use of Servlets that from the resource address returns the image, animation or video; Servlets are small java programs that run on the server and serve to improve the response time, receive a request from a web browser or any HTTP client processes it and returns a response, the servlets have no graphical interface [7]. To display the billboard on the display screen is used an HDMI cable (VGA cable can be used), or can be use a projector.

The entity-relationship diagram of the database that the system is using is shown in Illustration 2.

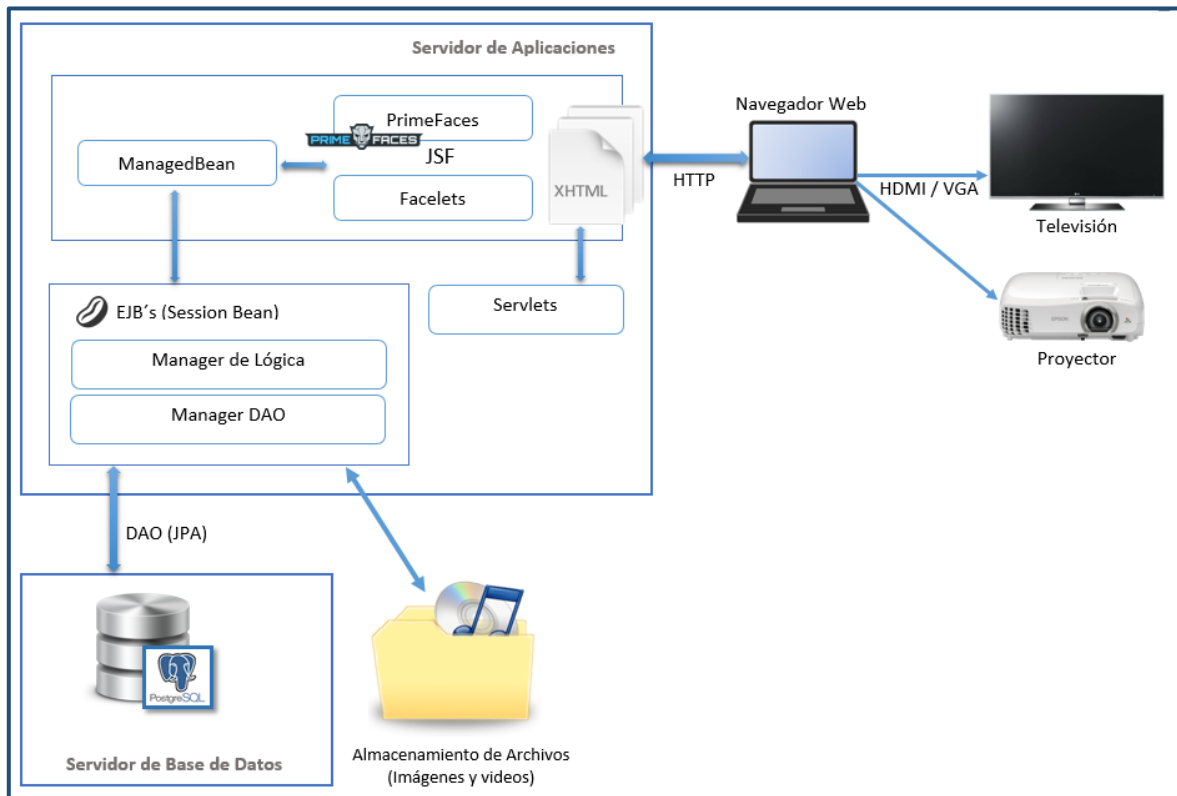


Illustration 1: System Architecture Diagram.

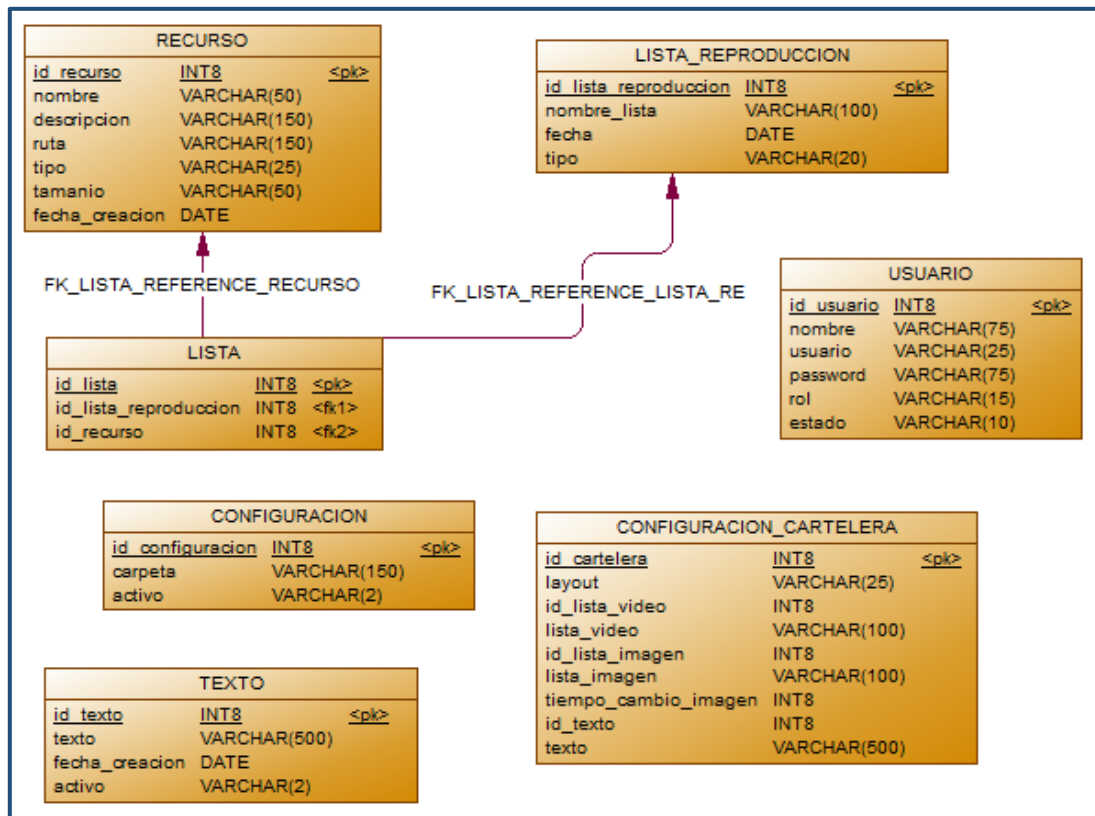


Illustration 2: Entity-relationship diagram of the web system database.

The user can perform the following actions within the system:

- ✓ Manage (create, delete, update) users, media resources, playlists.
- ✓ Set up billboard design and content.
- ✓ Display the billboard on the screen according to the settings set by the user; In Illustration 3 you can see an example of how the digital billboard is shown.



Illustration 3: Example of the digital billboard presented on a Smart TV. **Source:** Own.

The implementation of the system has allowed to reduce the expenses in the printing of materials like:

leaflets, leaflets; thanks to the different facilities provided by the system to presentation of information in an attractive and dynamic way, but without losing its importance; thus capturing the attention of the users of the faculty [8].

4. CONCLUSIONS

The framework JavaServer Faces provides a set of components in the form of tags that are defined in XHTML (Extensible Hypertext Markup Language) pages that are associated with the data using bean controllers, and allows the incorporation of libraries such as PrimeFaces, Bootstrap, BootFaces, RichFaces that facilitate the development of enriched Internet applications, achieving better visual and functional results.

The development and implementation of the multimedia system has greatly improved the process of presenting information through the use of multimedia resources to better capture the attention of students, teachers and administrative staff that are part of the Faculty of Engineering in Applied Science.

The software development methodology XP is an agile methodology that helps in the process of developing systems that need to be implemented in a short time, allowing the work team to be organized

correctly and to fulfill the tasks that each one has entrusted.

The use of digital billboards as media within any institution can contribute greatly to improving the information process about events or scheduled activities, thus providing information in a much more attractive and dynamic without losing its importance.

The handling of multimedia within any computer system can often be a little complicated depending on the result you want to obtain; however, it is important to know that there are different libraries that offer the possibility of using the multimedia resources through the use of labels, besides the servlets can be considered a good alternative for the presentation of multimedia resources.

5. RECOMENDATIONS

At the time of choosing the development platform, it is necessary to take into account the requirements provided by the user in addition to performing an analysis, to verify that the platform allows to fulfill in full the needs that the user seeks to satisfy, through the implementation of a system.

For future software development projects within the faculty it is recommended to correctly define the architecture to use before starting the development process, in order to obtain a much clearer and cleaner code structure, which will allow the system to perform well and be easier to maintain in the future.

The interface of any system should be designed with the aim of providing the user with a simple tool so that he can understand and manipulate easily and in turn satisfy his needs; since they are usually people who do not have technical knowledge and what they want is to improve a certain process with the development of software.

A good alternative not only for educational institutions but also for any company, is the implementation of digital billboards that can be distributed at different strategic points to provide information, offer products and services, etc.; achieving the optimization of material and technological resources, reduction of expenses and time in advertising.

The use of servlets for the presentation of multimedia is recommended, when the libraries that are being used do not allow obtaining the visual results required; since the incorporation of servlets in an application offers the possibility to present multimedia in any format and to invoke them from the labels of the library in use.

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