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LOST AND FOUND MANAGEMENT SYSTEM

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ABSTRACT
In computing, a web application or web app is a client–server software application which the client or user runs in a web browser. Web applications are getting popular these days as they can be accessed from anywhere using a web browser and the convenience of using a web browser as a client to update and maintain web applications without distributing and installing software. Common web applications include webmail, online retail sales, online auctions, wikis, instant messaging services and many other functions. In this project, a webbased distributed lost-and-found service for California State Polytechnic University, Pomona is designed and implemented. The major goal of this project is to help the students around the campus with a web service to find their lost stuff more quickly. The application is an online lost and found web portal with an interactive user interface. It is a user-friendly web application which is created using web programming languages connected to the database. The project is designed using a client-server model. The main features of the web application include an authentication, registration and login system, a lost and found listings page where the user can enter the information about the lost and found items. Keeping in mind some security issues, the users cannot delete any items. The reason was some users may delete the items just to mess around. This privilege is given to the admin only. The application also allows the users to update the listed items if needed. The users can update the contact information and change the password.

Keywords
Information Service, Lost People, Web Application, Connecting People

INTRODUCTION
A web-based database system resides on an Internet server. The database can be accessed through a web browser. A distributed system is a system consisting of a collection of autonomous machines connected by communication networks and equipped with software systems designed to produce an integrated and consistent computing environment [2]. Distributed systems are helpful in letting the users to co-operate all the activities in a more effective and efficient manner. The key purpose of the distributed systems is represented by resource sharing, openness, concurrency, scalability, fault tolerance and transparency [5].

Web-services provide a standard means of interoperating between different software applications running on a variety of platforms and/or frameworks. Web applications use web documents written in a standard format such as HTML and JavaScript, which are supported by a variety of web browsers. Advantages of web-based distributed databases are easy maintenance and updating, reusability and modularity, distribution of data update and security.

The architecture used for the web-based distributed database is the Client/Server model. In this model, client sends request to the web server. The request is then transferred to the database server [8]. The results are sent back to the web browser in the client side after the database server processes the requests by the clients.

In this project, we designed and build a lost and found web application with basic functions like the lost and found portals available online: user registration, login/logout, changing user password, posting lost stuff, posting found stuff, admin login.

LITERATURE SURVEY
2.1 Distributed Databases
A distributed database system allows applications to access data from local and remote databases. Distributed databases use a client/server architecture to process information requests.

Advantages of using distributed databases:

- Management of distributed data with different levels of transparency like network transparency, fragmentation transparency, replication transparency, etc.
- Increase reliability and availability/
- Easier expansion
- Protection of valuable data and information.
- Improved performance.
- Less cost.
- Systems can be modified, added and removed from the distributed database without affecting other modules.
- Reliable transactions.
- Distributed query processing can improve performance.

2.2 HTML

Hyper Text Markup Language, commonly abbreviated as HTML, is the standard markup language used to create web pages. Along with CSS, and JavaScript, HTML is a cornerstone technology used to create web pages as well as to create user interfaces for mobile and web applications. Web browsers can read HTML files and render them into visible or audible web pages. HTML describes the structure of a website semantically. It helps in the presentation or appearance of the document (web page), making it a markup language, rather than a programming language.

HTML elements form the building blocks of HTML pages. HTML allows images and other objects to be embedded and it can be used to create interactive forms. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. HTML can embed scripts written in languages such as JavaScript which affect the behavior of HTML web pages. HTML markup can also refer the browser to Cascading Style Sheets (CSS) to define the look and layout of text and other material.

Advantages:

- Its plain text so is easy to edit.
- It is fast to download.
- Is very easy to learn.
- It is now a standard.
- It is supported by most browsers across most if not all platforms.
- Simple to edit only requires a text editor.
- Can be used to present just about any kind of data.

2.3 Cascading Style Sheets

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language. Along with HTML and JavaScript, CSS is a cornerstone technology used by most websites to create visually engaging webpages, user interfaces for web applications, and user interfaces for many mobile applications

CSS is designed primarily to enable the separation of document content from document presentation, including aspects such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple HTML pages to share formatting by specifying the relevant CSS in a separate .css file, and reduce complexity and repetition in the structural content.

It can also be used to display the web page differently depending on the screen size or device on which it is being viewed. Readers can also specify a different style sheet, such as a CSS file stored on their own computer, to override the one the author has specified.

Features:

- Separation of content from presentation.
- Site-wide consistency.
- Bandwidth.

- Page reformatting.
- Accessibility.

2.4 JavaScript

JavaScript is a high level, dynamic and interpreted programming language. Alongside HTML and CSS, it is one of the three core technologies of Web content production; the majority of websites employ it and it is supported by all modern Web browsers without plug-ins. JavaScript is prototype-based with first-class functions, making it a multi-paradigm language, supporting object-oriented, imperative, and functional programming styles. It has an API for working with text, arrays, dates and regular expressions, but does not include any I/O, such as networking, storage, or graphics facilities, relying for these upon the host environment in which it is embedded The syntax of JavaScript is actually derived from C, while the semantics and design are influenced by the self and Scheme programming languages. It is also used in game development, the creation of desktop and mobile applications, and server-side network programming with runtime environments such as Node.js.

2.1 PHP

PHP is a server-side scripting language designed for web development but also used as a general-purpose programming language. It stands for Hypertext Preprocessor.

PHP code may be embedded into HTML code, or it can be used in combination with various web template systems, web content management system and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP code may also be executed with a command- line interface (CLI) and can be used to implement standalone graphical applications.

PHP is a general-purpose scripting language that is especially suited to server-side web development, in which case PHP generally runs on a web server. Any PHP code in a requested file is executed by the PHP runtime, usually to create dynamic web page content or dynamic images used on websites or elsewhere. PHP can be deployed on most web servers, many operating systems and platforms, and can be used with many relational database management systems (RDBMS). Most web hosting providers support PHP for use by their clients. It is available free of charge, and the PHP Group provides the complete source code for users to build, customize and extend for their own use.

2.1 MySQL

MySQL is an open-source relational database management system (RDBMS). In July 2013, it was the world's second most widely used RDBMS, and the most widely used open- source client–server model RDBMS. “SQL" stands as the abbreviation for Structured Query Language.

MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP open-source web application software stack. LAMP is an acronym for "Linux, Apache, MySQL, Perl/PHP/Python". Free-software open-source projects that require a full-featured database management system often use MySQL. MySQL is also used in many high-profile, large-scale websites, including Google, Facebook, Twitter, Flickr, and YouTube.

Advantages of using MySQL

- It is easy to use**.**
- Support is readily available whenever necessary.
- It’s Open-Source.
- It’s Incredibly Inexpensive.

METHODOGY

The Lost and Found Web Application uses the following hardware and software systems:

1. Windows 8.1 OS 8GB RAM Intel i5 Core Processor 2.60 GHz 64-bit Operating System.

2. Notepad ++ for PHP development.
3. Notepad ++ and Google Chrome for HTML and CSS web development.
4. Notepad ++ and Google Chrome to write webpages and test them in the Internet Explorer.
5. MySQL Server as database to maintain and store data and information.
6. HTML, CSS, JavaScript are used for client side interface.
7. PHP is used to connect the front-end web pages to the MySQL database server.
8. Package used: WAMPSERVER 2.0 WAMP stands for Windows, Apache 2.2.11, MySQL 5.1.33 PHP 5.2.9.

3.1. Use Case

Our system will work using the following steps:

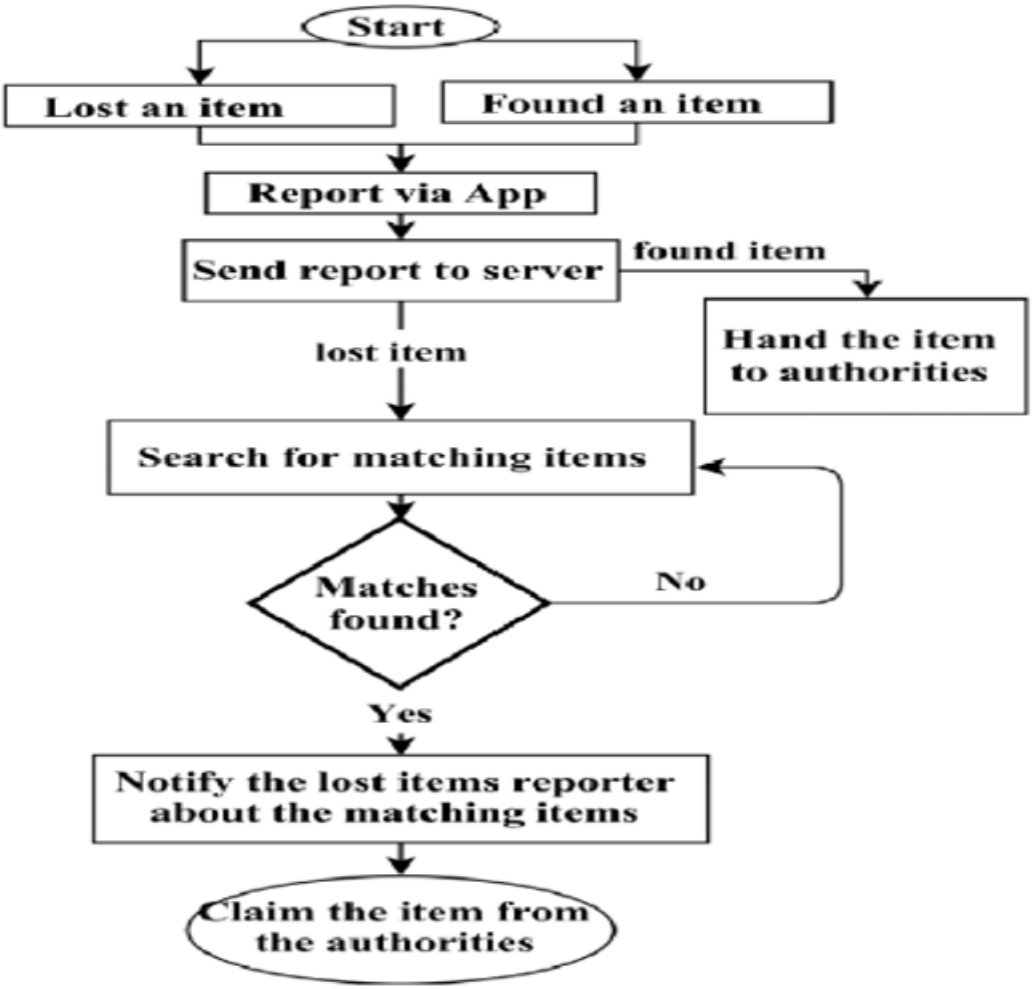
1) The end user can open his own account providing his address so that people can contact him when required. The individual will be created automatically by the system.

2) The user can have two rules: a) The user has found someone.
b) The user has lost someone.

3) If the user found someone who cannot provide his product information properly, then the user will create a found issue from his profile, providing the least information about the found person i.e., appearance, where found, photos etc.

4) If the user loses someone, s/he will also provide the detailed information and photos about the missing product.

5) Finally, our system's algorithm will try to text match between the lost and found issues; two best matching results will show up, thus allowing the people who lost and the product who found, can contact each other. The following Fig.



Industrial Engineering Journal
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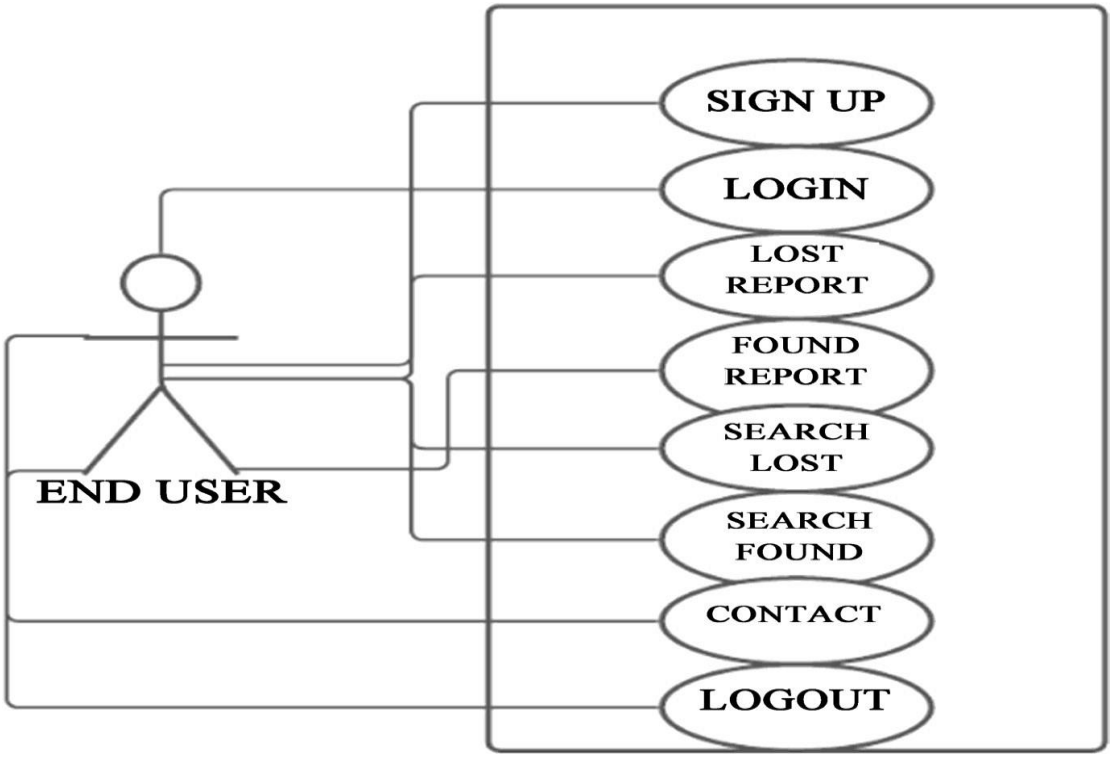
Use Case for Lost In this system

users will be able to create profiles using their email address and phone number and will need to update their profiles with all the necessary information such as address, contact number, etc. Then they can post on the lost section about the lost product with as many details as possible, with two images of the missing product. Anyone can login using a username and password and search for a missing product in the lost section by providing information such as name, color, missing location, etc. All the posts that match the provided information will be shown. Figure 3 shows the use case diagram for searching lost product.

Use Case for Found

In the same way as for lost cases, if anyone finds a missing
person, they need to register on the site using their email id and then, after login, they need to update their profile with all the necessary information. In found issues, the person can post a found case with all the available information such as name, parents' name, found location, two images, etc. Anyone registered on the site can search in the
"found" section for found persons providing information such as names, skin color, missing location, etc. The best matching results will be shown. The fol- lowing **Figure 4** shows the use case diagram for found case scenario.



RESEARCH GOAL AND PHASES

The final product is a web interface that helps students at Cal Poly, Pomona with the lost items around the campus. The students can use the web interface to post details of the lost items and found items. The main features of the web interface include separate UI for the lost and found items. A database is connected to the client side server. The major goal is to help students with locating the lost items on the campus.

The product of this project is a Lost and Found Web Application for California State Polytechnic University, Pomona. California State Polytechnic University is the second largest campus in the CSU with the enrollment of about 22,156 students in the fall quarter 2015. It is in fact the second largest polytechnic university in the US. A lot of students are accepted each quarter for different majors in many different colleges. The campus itself is huge with many buildings for all different majors such as Agriculture, Business Administration, Education, Engineering, Science and many more. There are

several other buildings CLA building, Kellogg Library, Market Place, Bronco Student Center, Bookstore and many other countable buildings. Students usually stop by in Library or in the food court to study and eat and can often forget their valuable items around these areas and all around the campus. I found an adaptable charger that a student left in the charging station in the library. Losing the valuable stuff leads to a lot of stress. Although there is a lost and found office located in the BSC at Cal Poly Pomona but some of the students don't bother to take the lost stuff to the office. A web application can help the students in a better way to get their lost stuff back.

4.1 Phase 1

In the first phase, the goal was to build a client-side interface for the web application with all the interactive features for a better user interface. It is done using HTML/CSS for the difference pages and using JavaScript for the home page to make it more interactive for the users. **4.2 Phase 2**

In the second phase, the goal was to design and create database tables with different attributes for storing and maintaining the information entered by the users. The language used for managing the databases is MySQL server for storing the user information.

4.3 Phase 3

In this phase, a connection is established between the client side UI and the server side database server. A scripting language should be used to connect the client side and the server side database. I am using PHP for this purpose.

4.4 Phase 4

JavaScript cannot directly connect to MySQL. To connect JavaScript to MySQL, JavaScript should be mixed with PHP. JavaScript is a client-side language and MySQL is a server-side technology that runs on the server machine.

Basically, the language distribution per the physical machine is:

Server Side – PHP and MySQL.

Client Side – HTML/CSS and JavaScript.

DESIGN AND IMPLEMENTATION

5.1 Client-Server Model

The client–server model is a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called servers, and service requesters, called clients[11]. The client and server may be residing on the same system or can communicate with each other over a computer network if residing on a different hardware system. A server runs server programs and shares resources with the clients. The client requests the server for the content or a specific function.

Client and server exchange messages in a request response message cycle. The client communicates with the server by sending a request and the server responds back with a response to the client. The exchange of the messages is called inter-process communication.

5.2 Database Design

The schema mentioned below is used for the database design for different functionalities.

Table structure for table found listing

```
CREATE TABLE IF NOT EXISTS `found_listing` (
`id` int(11) NOT NULL AUTO_INCREMENT,
`date_found` date DEFAULT NULL,
`item_name` varchar(45) NOT NULL,
`found_location` varchar(45) NOT NULL,
`returned_to` varchar(45) NOT NULL,
`users_id` int(10) unsigned NOT NULL,
`date_added` date DEFAULT NULL,
PRIMARY KEY (`id`,`users_id`),
KEY `fk_found_listing_users1_idx` (`users_id`)
```

Dumping data for table found_listing

INSERT INTO `found_listing` (`id`, `date_found`, `item_name`, `found_location`, `returned_to`, `users_id`, `date_added`)

Table structure for table lost_listing

```
CREATE TABLE IF NOT EXISTS `lost_listing` (
`id` int(10) unsigned NOT NULL AUTO_INCREMENT,
`date_added` date DEFAULT NULL,
`date_lost` date DEFAULT NULL,
`item_name` varchar(45) NOT NULL,
`user_name` varchar(45) NOT NULL,
`user_email` varchar(80) NOT NULL,
`user_phone` varchar(15) NOT NULL,
`lost_location` varchar(45) NOT NULL,
`description` varchar(10000) DEFAULT NULL,
`users_id` int(10) unsigned NOT NULL,
PRIMARY KEY (`id`,`users_id`),
KEY `fk_lost_listing_users_idx` (`users_id`)
)
```

Dumping data for table lost_listing

INSERT INTO `lost_listing` (`id`, `date_added`, `date_lost`, `item_name`, `user_name`, `user_email`, `user_phone`, `lost_location`, `description`, `users_id`)

Table structure for table users

```
CREATE TABLE IF NOT EXISTS `users` (
`id` int(10) unsigned NOT NULL AUTO_INCREMENT,
`username` varchar(15) DEFAULT NULL,
`password` varchar(20) NOT NULL,
`email` varchar(100) NOT NULL,
`name` varchar(50) NOT NULL,
`admin` tinyint(4) DEFAULT '0',
`phone` varchar(15) DEFAULT NULL,
PRIMARY KEY (`id`),
UNIQUE KEY `unique_email` (`email`),
UNIQUE KEY `username_UNIQUE` (`username`)
)
```

Dumping data for table users

INSERT INTO `users` (`id`, `username`, `password`, `email`, `name`, `admin`, `phone`)

5.3 Screenshot of homepage

Index.php is the home page, any new user is directed to this page. The page displays the sign me up/in tab and the lost and found listings tab. It also displays simple instructions of how to create a login account for the users. Below is the home page screenshot.

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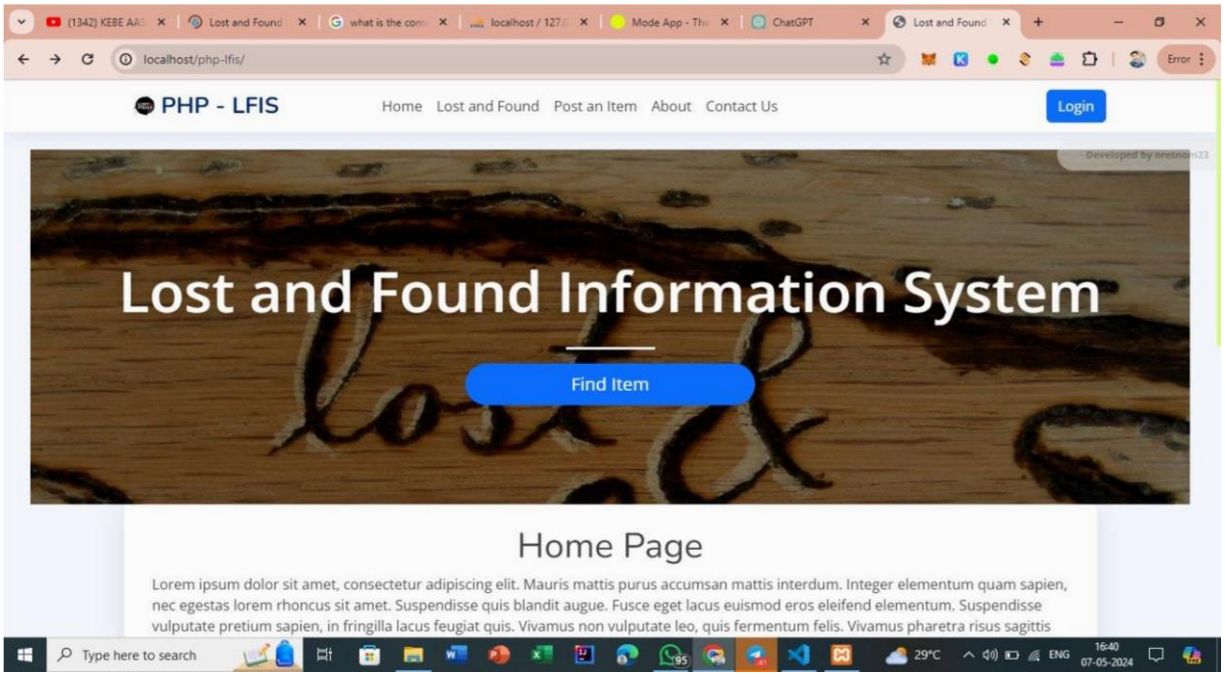

Figure 1. Homepage

Lost and Found Listings page

Listings page.php displays the lost and found items added by the users of the web application. This webpage can also sort the added items per the date added and lost date. Below is the lost and found listings page screenshot.

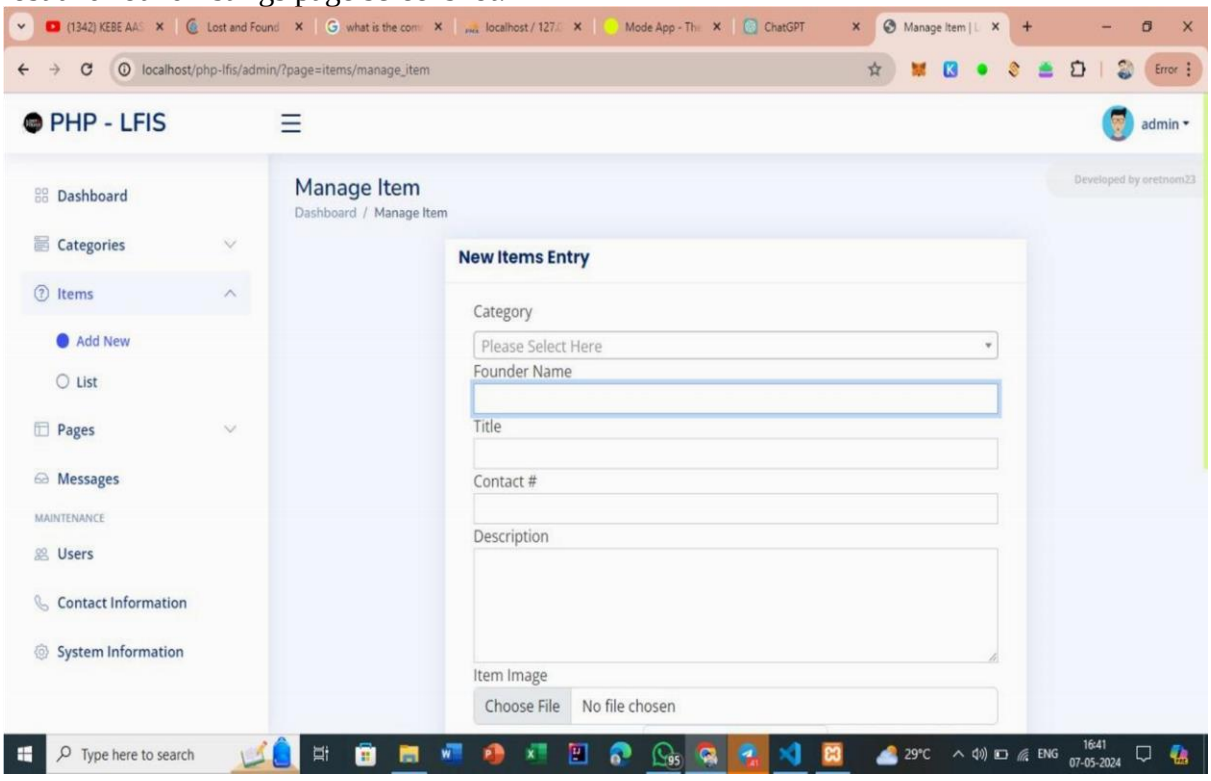

Figure 2. Lost and found listings Page

Login Page

The login page lets the user log in to the website with their username and password. It also lets the users register their account with the website. After successful login, it navigates to the account of the user and displays the homepage. In addition, a new tab “Your Listings” is displayed on

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the top of the page which lists the items posted by the user who is logged in. Below is the login page screenshot and the user login page.

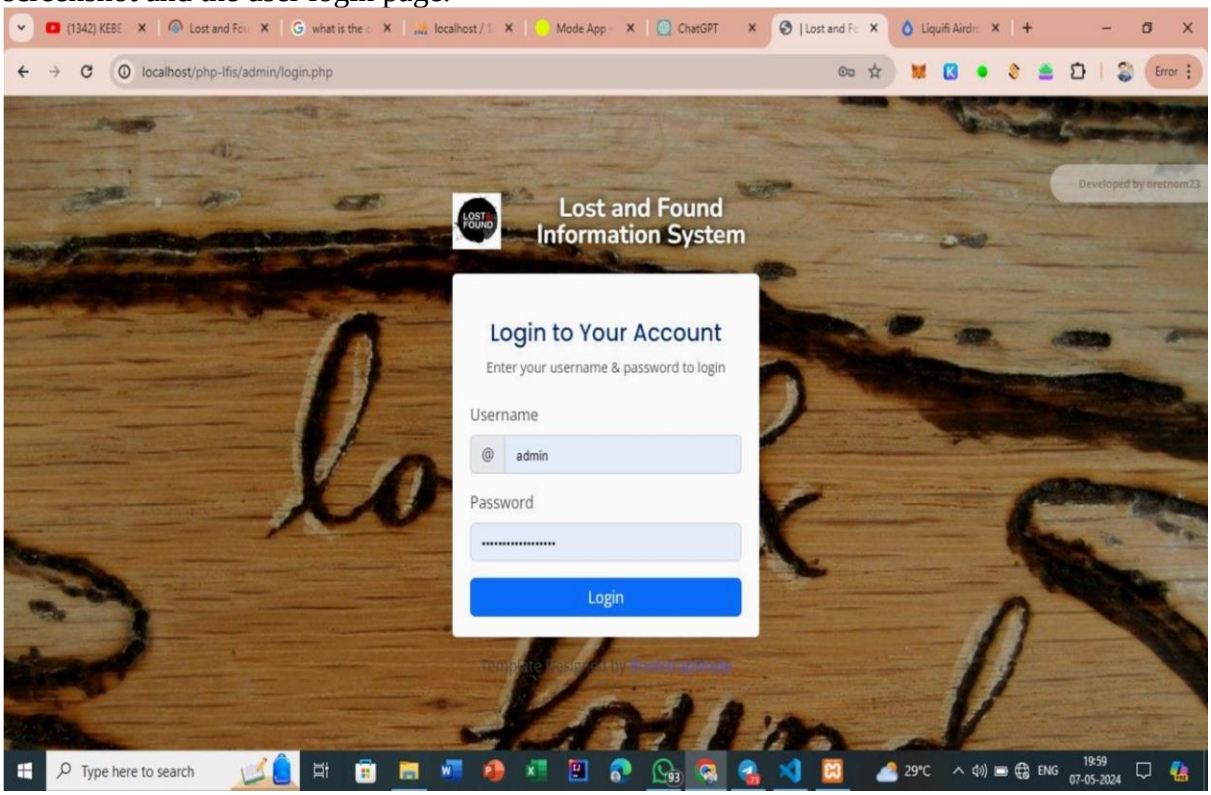
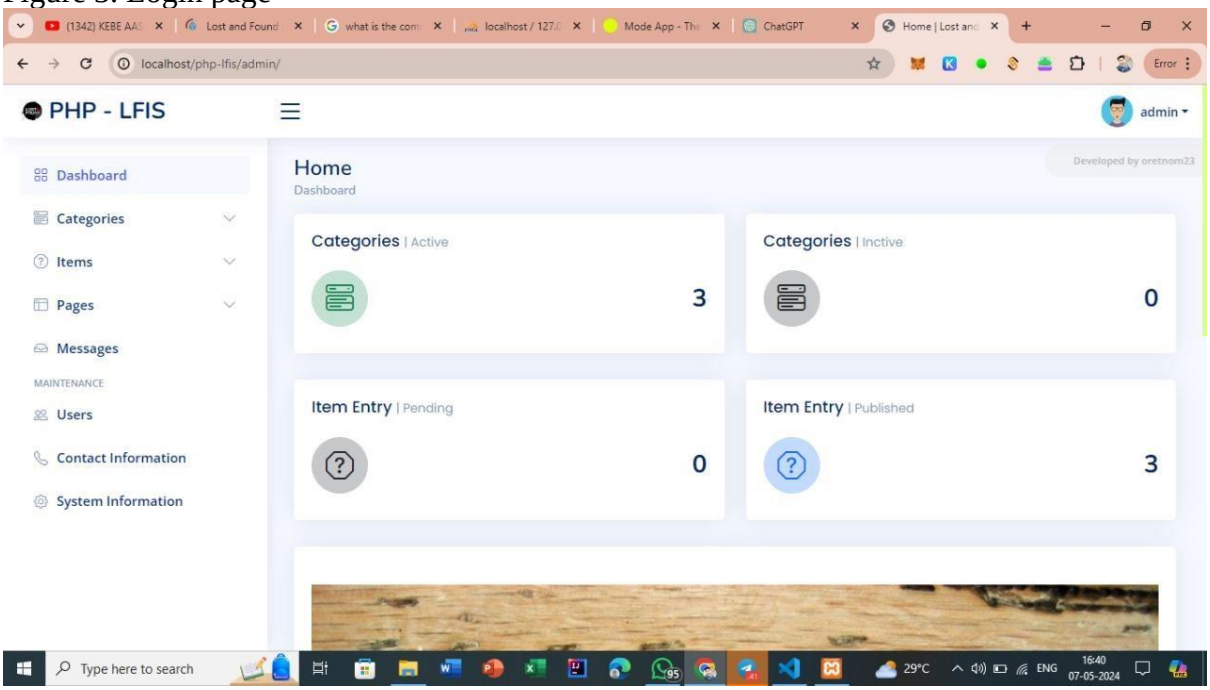


Figure 3. Login page



EVALUATION OF RESULTS

Procedures and criteria play a very important role in the outcome of any project or application. Many different phases are involved in the overall design of the any application. Three major requirements involve functional testing, usability testing and compatibility testing [6].

6.1 Functionality Testing

The web application supports all different web browsers. The HTML/CSS code should be compatible to run in all different web browsers. Similarly, all the database queries should be executed correctly. Data retrieval and updating testing is performed to make sure all the data is correct and accurate. The web application was tested on different web browsers such as Chrome, Safari, Firefox and IE. It works efficiently and is compatible with all the browsers. Login and authentication system was tested two times by registering two users and logging in. The update contact information function works well as required. Password change function was tested multiple times to find any errors, works efficiently. There were some errors showing up on the listings page, which were fixed. All the features of the application were tested multiple times and they work completely fine. Below are the screenshots from google chrome and internet explorer browsers.

6.1 Usability Testing

The web application is easy to use for all different users. Navigation to different controls are properly tested. All the links are working in a desired way. The application has features that can be easily understood to users. It offers a pretty interactive homepage. When a user logs in, the user can see the interactive user homepage with all the navigating tabs placed on the top of the page, the listings page is in middle of the homepage and again all the tabs are displayed on the bottom of the homepage as well. The bottom of the homepage below the listings page displays simple steps for the user about how to register and login to the website. The features were tested by my multiple users, they found the design and functions of the application interactive and easy to use. All the tabs and links are working as required. Below is the screenshot of the user homepage which appears interactive to the end users

6.1 Compatibility Testing

Testing is done to ensure that the web service is compatible with all different kinds of browsers, operating systems and mobile browsers. The compatibility testing is performed using windows 8.1 operating system on a HP laptop, a MacBook machine, an IPhone 5s browser, an android mobile browser. The web application was efficiently working on all of them. Testing was done by sending a lot of traffic to the server and the server responded in a timely manner without any delays. We also tested the web application on different browsers such as IE, google chrome and safari. As PHP is an open source software, the application responded good on all the browsers. Below are the screenshots from an IPhone 5s and an android mobile browser.

Discussion:

- **Effectiveness:** Did the Lost and Found system achieve the project's objectives? How did it improve efficiency, streamline operations, or enhance the user experience?
- **Challenges:** Discuss any difficulties encountered during development or implementation. How were these challenges addressed?
- **Limitations:** Identify any limitations of the current system. Are there features that could be improved or functionalities to be added in the future?
- **Comparison:** If there was a previous system in place, compare its performance to the new TMS.
- **Return on Investment (ROI):** If applicable, discuss the financial benefits of the TMS for travel businesses.
- **Future Scope:** Outline potential future developments for the TMS based on user feedback and industry trends.

By analyzing the results and discussing their implications, you can demonstrate the value of your TMS project and identify areas for further improvement.

CONCLUSION AND FUTURE WORK

It can be concluded that the web application provides basic features and functions such as user registration, login and authentication, a lost and found listings page, an update contact information page, an admin login account with full privileges. The implementation of different phases is functioning as expected. Test cases were performed on different operating systems, browsers and platforms to ensure that the application was functioning correctly on all the above. Thus, it can be concluded that the application is a web interface that can help students at Cal Poly Pomona post the lost and found stuff and displays the lost and found stuff to the users accessing the web application.

A few more features that can be introduced to the web application include text alerts and email forwarding to the students when their lost stuff is found and returned to the ASI lost and found office, a slightly better user interface for the listings page specifically a separate lost and found page and a good encryption algorithm for the authentication purpose. The web application should be able to automatically shoot an email or a text message to the cell phone on just one click on the application by the admins. For future work, I would like to introduce this feature to the web interface and make changes to the existing application so that it is more user friendly.

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