

“Mewar Lost and Found Information System”

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Abstract

The conventional lost and found systems within institutions of learning are plagued with huge inefficiencies such as poor communication, poor centralization, and slowness in the retrieval process. The common traditional techniques of paper records and bulletin boards can create problems like lack of updates, overlapping and unnecessary administration to the users, which prevents the timely recovery of lost items. The paper was a review to create and test a complete web-based Lost and Found Information System to overcome these problems. Among the major goals were the need to improve the tracking of items, increase the ease of use of the tools, facilitate the process of reporting, retrieval and the development of effective management of lost items. The system combines the latest web technologies and includes the functions of a Radio Frequency Identification (RFID) of items in real time and web services that are important to facilitate the exchange of data. It makes use of centralized database management system with PHP and MySQL to store and retrieve data in an organized manner with user-oriented design concepts of easy navigation. Its methodology encompasses real-time notifications, automation capabilities in item purges, as well as platform integration capabilities. The achievements of implementation show that there was a great increase in the efficiency, the accessibility, and the user engagement. The system offers a centralized reporting and searching and claiming items platform that has minimized manual input and reduced the occurrence of human error. Searchable databases and real-time notifications will increase the rate of recovery and user satisfaction. This paper concludes that web technologies need to be integrated in lost and found management so that modern solutions, which are scalable, are advocated which encourages community forms of solutions and increase administrative efficiencies in institutions.

Keywords: Lost and Found, Web Technologies, Centralized System, Real-time Notifications, Educational Institutions.

Introduction

Lost and found management integration of web technologies provides a solution of asset tracking in the modern effective way. With the help of web services and RFID (Radio Frequency Identification), the institutions will be able to track the positions of items in real-time, which will help save time spent on searching for lost items. Rfid tags on valuables can be identified in a short time, and web services enable the successful integration of the system and provide the user with the necessary information [1].

Alongside these features, users are given real-time alerts and updates about the status of their reports or matched items hence improving the likelihood of recovery on time and minimizing the level of frustration that is usually encountered with the traditional methods of search which are manual[14].

This increased interactivity does not only increase the level of retrieval speed, but also boosts user satisfaction that has been enhanced through an interactive system. In contrast to the traditional

approaches, when items that were lost are reported with the help of paper registration or randomly dispersed channels of communication, mobile applications provide the user-friendly interface integrating all the required services into one, handy platform [15]. The fact that updates can be tracked, findings can be reported, and it is possible to search through a centralized database in essence saves a lot of time and brings much confidence in the system.

Besides, the combination of new and modern technologies like Radio Frequency Identification (RFID) and mobile and web platforms is quite strong. RFID tags make it possible to track items in real time with help of wireless identification, whereas the web services supporting RFID tags make unrestricted data exchange and monitoring of items. This is a much stronger and reliable system as compared to the traditional systems that in most instances are inconsistent and not scalable. These technologies also automate the process of item recognition and status updates and therefore do not need human input hence minimization of human error and maximized efficiency in operations [2].

Literature Review

The application of web technologies within the lost and found management systems is a controversial and an opportune research field especially in terms of educational institutions that have huge, dynamic populations that on constant movements. The possible improvement of the accessibility of users and the spreading of relevant information is one of the fundamental benefits of the given integration. Recent academic sources repeatedly point at the shortcomings of the conventional forms of communication, e.g. bulletin boards or email messages as the latter can frequently be not efficient enough to provide the latest and credible updates [3]. As is pointed out by [4], this is important because the analysis of the UMP Lost and Found Mobile Application reveals the severe flaws of such traditional approaches. In particular, the officials as well as unofficial announcements can be undermined by their temporality- newer announcements will promptly overtake older ones so that all the important information is buried or even erased within several days. The five days period of visibility is a major discouragement to the efficiency of students in their ability to locate lost items because the announcements are not always reviewed.

Moreover, there are the layers of complexity associated with the use of unofficial social platforms like WhatsApp and Facebook to exchange lost and found information. These platforms are based on the fragmented definition of a group, in which the membership is not consistent and access to information is disproportionate. A large number of the students might not be included in the corresponding groups or even updated because of the vast amount of irrelevant information. This leads to low chances of successfully searching or retrieving the elements lost, and the tendency of frustration among the users increases. Lack of an institution-wide digital system that operates centrally contributes to the issue. This is because without a centralized platform of reporting, tracking, and retrieval of lost items, institutions must make use of repetitions, word-of-mouth, and this entails redundancy, administration inefficiencies, and lack of accountability [5].

By creating a specific, online lost and found management framework, the problems might be provided with a strong solution. This system would be used as a scorecard where all the lost item reports are deposited, classified and made searchable real-time. It would also have an intuitive interface that is student-related and allows quick navigation, submitting items and searching. Besides, it might implement other functionalities like automatic notifications, time-based items filters and multilingual functions so that every student, irrespective of their background, would be in position to access and utilize the system comfortably [6].

Such technology would streamline the communication process, in addition to quelling the use of unreliable medium and outdated processes. It would make sure that all the vital data is stored,

systematized and very accessible, which would enhance the chances of successful recovery of items. This, in its turn, would aid the institutions in saving on administrative resources, decrease redundancy, and increase satisfaction among students. Finally, the implementation of centralized web-based systems is a prospective solution, which conforms to the digitalization patterns of teaching and learning that are taking over contemporary learning setting. Such systems are also helpful in making the campus a more connected, efficient and responsive community by making sure that none of the lost items remain unreported or unnoticed.

Web Technologies in Lost and Found Management [7]

One option that can be used with regard to enhancing the recovery of items in learning institutions involves the integration of web technologies on lost and found systems. The old fashioned ways such as bulletin boards or informal channel is not reliable because of the limited life of the announcement and in most cases students fail to get the necessary updates. Such disintegrated systems are not centralized and cause confusion.

Web-based applications are a solution to such problems since they act as the central point through which items can be searched, reported, and claimed by the users in an efficient manner. Such systems deliver real-time notifications, databases that can be searched, and data that is uniformly kept in the system unlike social media or messaging apps that only have limited reach and duplicate data. Also, they stimulate the community involvement by using the services to engage users in reporting and tracking, which will lead to collaboration and higher possibilities of retrieving the items.

When in the end such technologies are introduced, the accessibility and operational efficiency are improved and student engagement, the area of lost and found items is also improved.

User Experience and Interface Design [8]

Interfaces and system design are critical towards the usability of web-based lost and found systems. An expert interface enhances ease, interaction and productivity. The presence of the drag-and-drop functionality and customizable filters that reflect the digital archive practices allow the users to treat the system intuitively and provide the maximum amount of satisfaction when performing a search.

The development of web user interfaces (WUI) has improved the user friendliness of the online medium, and therefore UX design is fundamental in web-based migrations. Algorithms can be reused when writing an interface, this can save on errors and be more productive, but cannot be easily faced with the peculiarities of web UIs. To contain this, developers ought to concentrate on development of more flexible reusable modules that can help achieve consistency and flexibility throughout the system.

A balance between functionality and user-friendliness assures that the interface will remain efficient and be user-friendly to use, which will result in less difficult user interaction and satisfaction with lost and found operations.

Design Principles

Web-based lost and found system design [16] is focused on the user-centered functionality, simple navigation and effective data management. The model of interactions is simplified, and the process depends on an Add Lost Item button to provide the lost items, as the submissions have to wait to be approved by the administrator, so the data is accurate and reliable.

In addition to basic search and sorting, the system also has advanced sorting and search functions, which allow users to filter items by a particular attribute and find entries in the shortest time possible.

To keep the database relevant, the items that are not viewed or claimed in 30 days will be automatically removed, and backed up every day, which means that data can be restored in case of need [17].

In addition, the system is REST API-friendly allowing the external platforms to integrate smoothly with the system through standard HTTP methodologies which enables users to retrieve and update their data [18]. This improves the flexibility of the systems and widens usability on services.

Through these principles, the system has been able to guarantee a comfortable system to operate in and good interaction between users and development of trust in the users by the precise, systematic and available lost and found systems.

Accessibility Considerations

Designing web-based lost and found systems should consider the issue of accessibility to ensure that all people including the disabled can use it with ease. It is important to be able to integrate accessibility at early stages of the development process since otherwise, other users who depend on the assistance of technologies such as screen readers will experience hindrance to access.

By following Web Content Accessibility Guidelines (WCAG) by W3C, the system will facilitate accessibility of the system through; keyboard navigation, image alt text and correct colour contrast that can positively influence access by users with visual or motor impairments. Also, proper use of assistive programs such as JAWS requires training of the users and so, the user and the staff should be educated.

The staff (e.g. the library staff) should guide the user in using the system in the open areas like the library etc. By focusing on accessibility, it is not only ethically and legally the correct thing to do but also enhances engagement and satisfaction of the lost and found services by the user.

Database Management for Lost items.

The database management of the lost items should be performed efficiently, particularly when the identification is done by many individuals. Having a properly designed database will allow to store and retrieve the information about items in an orderly manner, which can enhance traceability, as well as solve the problem posed by paper-based databases. This is simplified through web applications which enable users to enter new records, update or delete them so that the inventory is always up-to-date and available.

Databases containing information about item details like serial and tag numbers will provide a safe way of tracking possessions as pointed out in [9]. Such systems may also be used as records to be referred to in future or be statistically analyzed. Moreover, the use of the web-based system as was displayed in [10] makes transparency and accountability possible because it allows users to post and keep track of the lost or found items. This two-in-one capability improves communication and elevates recovery rates of success.

Such applications are developed in PHP and MySQL and therefore they can be accessed in different devices thus increasing the accessibility. All in all, the database-based systems achieve efficiency, user confidence, and engagement in the lost and found operations [19].

Data Storage Solutions

To manage lost and found, a data storage where data is easy to retrieve and be safe is essential. A local Storage provided by HTML5 presents a more effective solution to the client, a larger amount of data may be stored in a persistent form to enhance the user experience by avoiding the necessity of entering data several times. In contrast to cookies, local storage does not drop data immediately the browser has

been shut-down, unlike cookies, a property that makes it so appropriate in record-keeping in this type of systems [11].

Local storage however lacks user control thus challenges in updating or deleting data. As a solution, web applications are able to encrypt sensitive data prior to storage which safeguards user privacy which is very crucial in cases of lost and found. Such strategies as breaking encrypted messages down into portions on client computers strengthen their protection and effectiveness.

Through the incorporation of local Storage with robust encryption and retrieval procedures, the systems may realize efficiency, data integrity, which will enhance the level of trust of the users and lead to better interaction in the lost and found platform.

Data Retrieval Techniques

The web-based lost and found systems need effective data retrievals [24]. The lost items are posted by users through the Add Lost Item button and they do not get posted into the searchable database without the approval of the administrator. The interface allows one to edit, sort and search according to certain properties, which makes it more user-friendly and accurate when it is required to find something [12].

The system has timers that remove automatically those items that have not been viewed within 30 days which enhances the clearness and minimizes clutter when maintaining a pertinent database. The deleted entries are stored under archives which are stored daily in case there is need to restore the information, thus the data is intact.

Additionally, it has an external system communicability by integration of external systems based on the REST architecture. The system reads and writes data using standard HTTP techniques (GET, PUT, and so on) to enhance its functionality and increase its usability as a centralized system to help manage the lost items.

LIMITATIONS

Although web technologies have many benefits in the lost and found systems, there are a number of limitations that should be taken into consideration. One important weakness is that the system requires the involvement of a user. In the case of a lack of active participation, like claim or reporting this effectively demeans the efficiency of the platform as a result of incomplete or stale data [12].

Influences on performance with regard to technical constraints are also in existence. Despite the use of trusted tools such as Java EE and MySQL, there may be a problem such as poor response time due to limited server or poor database management, particularly when accessed by a lot of users. Besides, the synchronization problem and the possibility of errors in systems can appear with the integration with third-party platforms.

The issue of privacy and security also makes matters more difficult. That is, protection of data of users and correct matching of items should be provided by adherence to the regulations concerning data protection and by the great security level. A trade off between the ease of use versus the security of handling data requires more resources and skills.

These constraints provide a strong argument on why ineffective lost and found management systems require strategic planning, technical strength, and the focus on users.

RESULT AND DISCUSSIONS

By including the web technologies in lost and found systems, it is possible to increase the efficiency of schools and other learning facilities to a significant degree. A research conducted by Muhammad

Razman Robert and Muhammad Syafiq [13] points at the weakness of an existing strategy of UMP, which depends on temporal announcements through such media as WhatsApp and Facebook. Such practices lead to diminished visibility, wrong information and inaccessibility among students.

This fact of non-centralized system further complicates the process of recovery efforts since students are required to rummage through old and redundant announcements. It might help overcome these issues by creating a specific mobile application that would update the user in real-time and show items as the centralized list and send specific notifications to the user, enhancing the successes of communication and retrieval.

Such a system would remove inefficiencies, cut down on redundancy, as well as improving student satisfaction. In addition to resolving logistic problems, it fosters a culture of team working and support. The adoption of such technologies will allow institutions to transform the process of lost and found so that it will be very transparent to recover the items promptly.

Successful Implementations Case Studies.

The relatively new adoptions of lost and found systems on the web have been reportedly successful. One of such case studies [12] was a Java EE application with MySQL and WildFly, the interface of which was user-friendly (adding and searching lost items). Both the functional and non-functional requirements were included in the system and it provided efficiency in managing the data and handling the smooth performance of the system.

Community-based platforms are also a good example of efficient application of web technologies, most of which include social media to improve exposure and interaction. Such systems enable users to make profiles and follow item tracking as well as being updated on a personal basis. The support of the administration tools is the support of the user managing, tracking of the items, and importing of the information.

These illustrations show how the design centered on the user and integration of the technology can improve the efficiency of the system and end user satisfaction. The system will be constantly enhanced as per user feedback so as to ensure the system is improved to adapt to the changing needs in the lost and found facilities.

Lost and Found Systems at Universities.

Lost keys and IDs are common factors which are encountered in university campuses. To solve this, the University Malaysia Pahang (UMP) came up with the UMP Lost and Found Mobile Application, which provides a centralized system through which lost items can be reported and located [13]. In the past, students had been using unofficial means such as WhatsApp and the university portal, which is where the communication was weak and reduced to pieces.

The application allows its users to put item descriptions, contact and last known location information. Searchable database also enhances visibility and higher chances of recovery, which builds more community and collaboration among students.

The application is an example other universities should emulate in terms of how mobile and web technologies can be used to simplify operations, eliminate recovery time, and increase student satisfaction. Since campuses are moving towards a more digital-first approach, solutions of this nature are necessary to develop an efficient and responsive lost and found system [20].

Lost and Found Solutions Programs, Corporate.

Incorporating lost and found systems based on the web are also being increasingly implemented in corporate setting [21] to enhance the effectiveness of recovery and create an atmosphere of responsibility. One such project is the UMP Lost and Found Mobile Application that was created to substitute non-formalized systems such as WhatsApp and social media with a formalized and centralized one [13].

The application enables users to post data on items such as photographs, contact and the last whereabouts in a searchable database. It has a user-friendly interface and notification feature that encourage active interaction which raises the probability of retrieving the item and improving user interaction.

Application of such systems in businesses would minimize the loss of items, improve internal business processes, and enhance the satisfaction of the employees. With the development of digital solutions, organizations are supposed to adjust those to requirements of big volumes and enterprise-specific needs and turn the field of lost and found management into more organized and scalable and effective regimes.

Trends of Lost and Found technology in the future.

The progress in web technologies is making it a way of more efficient lost and found systems. The conventional methodology being used at the University of Malaysia Pahang case as [13] usually results in chaos and redundancy of information. The demand is increasing to centralized and real-time platforms making items reporting and retrieval easier.

The trends of the next several years are the integration of Artificial Intelligence (AI) and Machine Learning (ML) to increase the accuracy of [22] search and offer a personalized set of suggestions, which depends on the user behaviour. Such technologies as QR codes and NFC can be used in the instant identification and tracking of the item and decrease the reliance on disjointed social media channels [23].

Also, the institutions, businesses, and organizations can collaborate with networks to have joint databases of lost and found. These systems would be characterized by the notifications in real time and automated reporting that will greatly enhance the recovery time and user satisfaction. The adaptation to these trends in technology would help in keeping the lost and found solutions efficient and in line with the changing expectations of the user.

Figures and Tables:

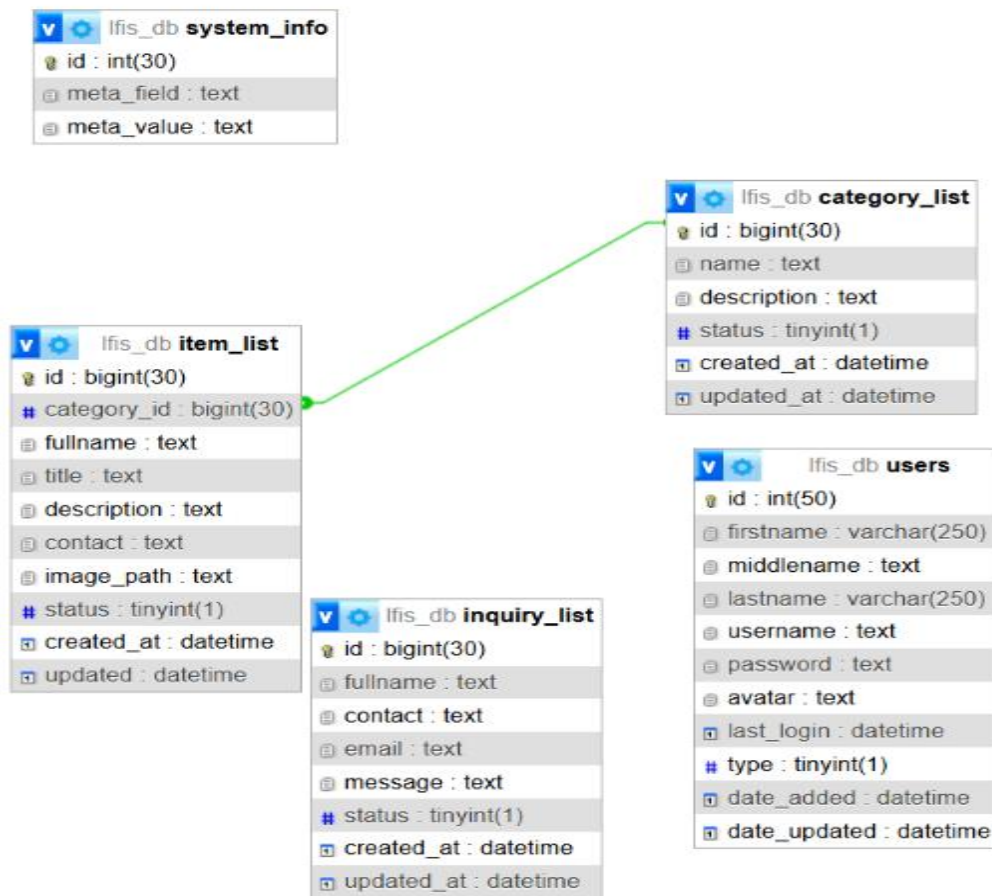


Fig. 1 Database Design

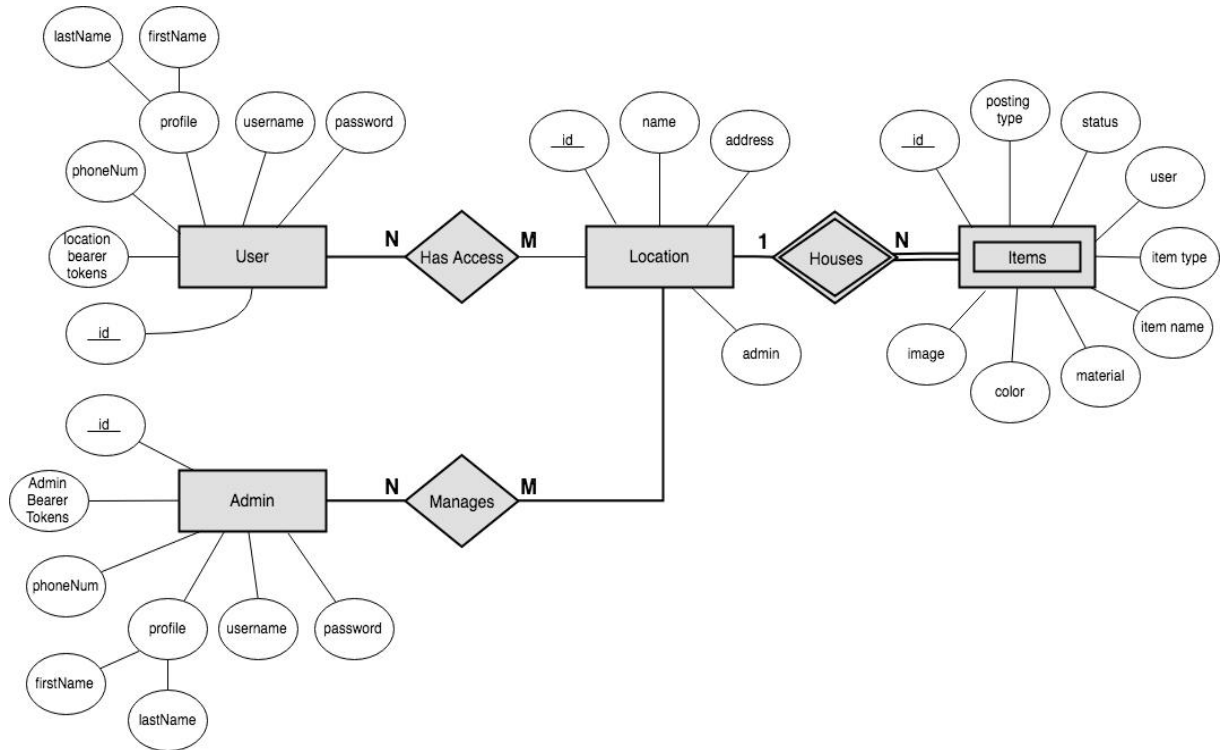


Fig. 2 ERD (Entity Relation Diagram)

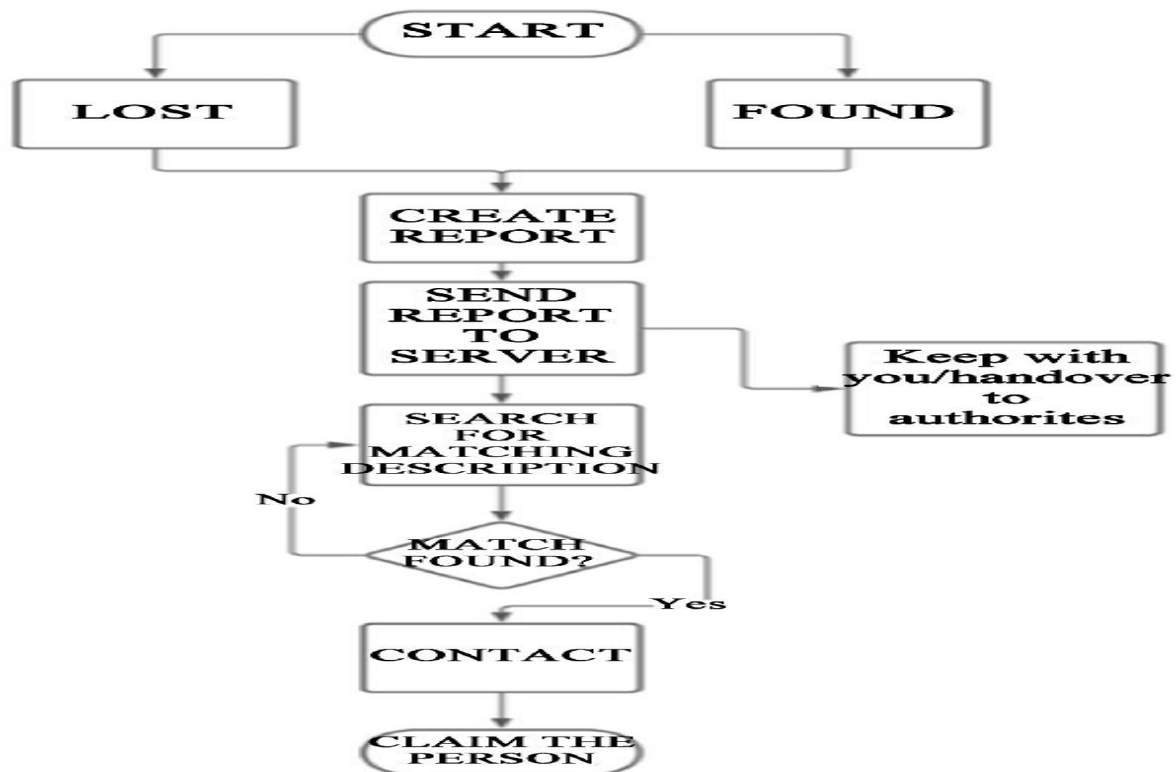


Fig. 3 Activity Diagram

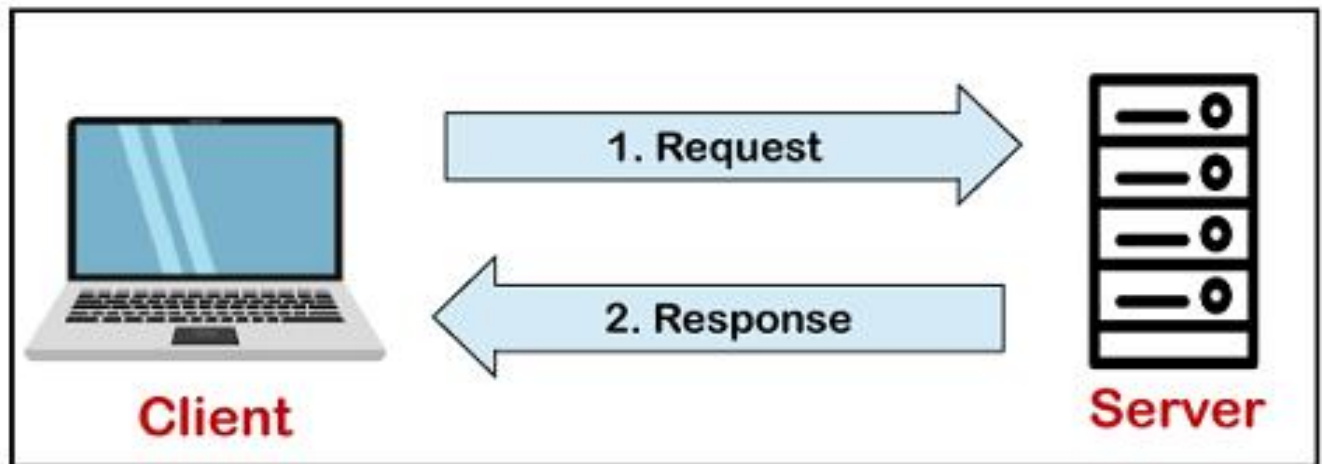


Fig. 3 MySQL work

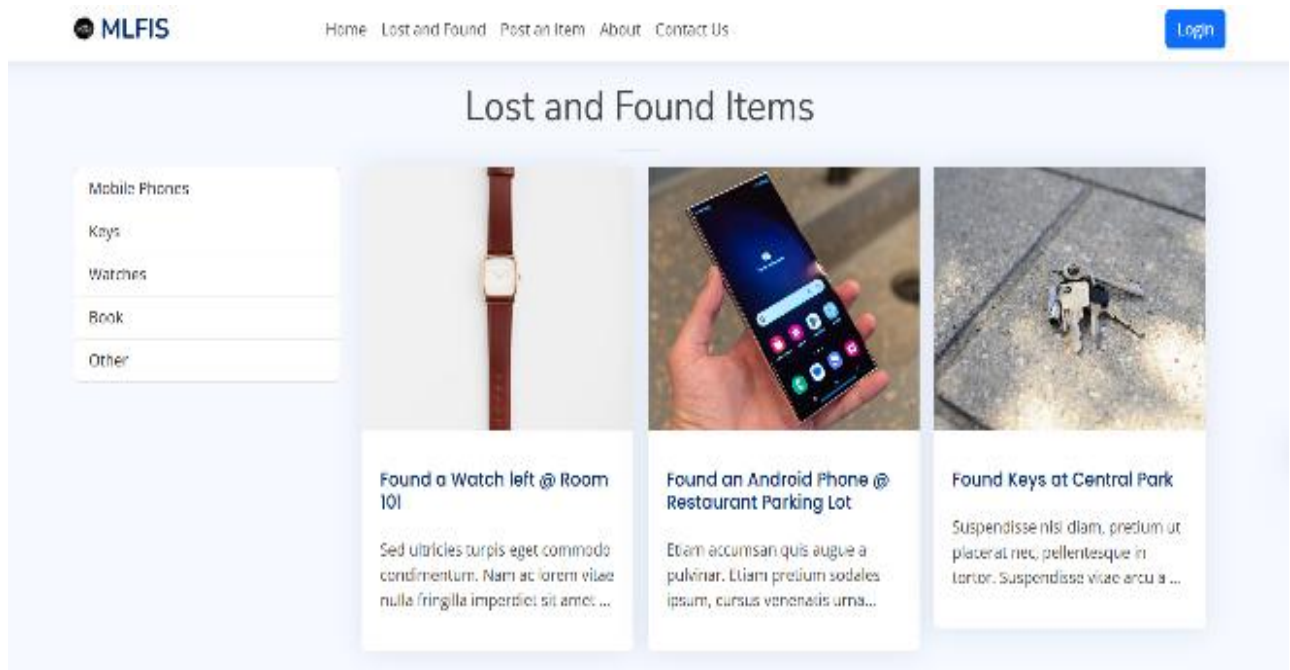


Fig. 4 Lost and Found Items

Name of test	User Registration
Item/Feature being tested	Whether system is able to create the user Account
Sample input	Allow user to register on providing specified Information.
Expected output	User account should be created.
Actual output	User account created successfully or Error Box if user is not providing correct info.
Remarks	Module is working properly.
Pass/Fail?	Pass/Fail

Table 1 Test cases

Conclusion

This paper thoroughly investigates the process and application of the web-based Lost and Found Information systems, especially in the academic institutions, and it showed that that information has great potential to promote the efficiency, accessibility, and also user interaction. The study also outlines a changing trend between traditional, which is usually inefficient solutions into modern, technology-oriented solutions of managing lost property.

Generalization of Major conclusions and Objectives of the research.

- Increased efficiency and accessibility: Web and RFID technologies make the asset tracking more efficient and modern to allow tracking it in real-time, and the previously unnecessary effort to find lost objects is minimized [1]. Such systems improve the communication, improve the chances of recovery and can be used with various machines [2].
- Real time Notifications and user satisfaction: The system provides real time notifications and updates of reports or matched items which proximate at large the probability of timely recovered objects and will minimize the frustration that will be attendant with the manual search mechanism [3]. This increased interactivity can help to improve the rate of retrieval and increase user satisfaction by having a responsive and streamlined system [4].
- Centralized and Intuitive Platform: Unlike the traditional systems, which use paper logs or fragmented communication, web based systems represent an intuitive platform that brings all the required functions on one convenient platform. This central database saves on time wastage and boosts confidence in the system [4].
- Strong and Reliable Technology: RFID used in conjunction with mobile and web-based solutions generates a strong, robust, and reliable tool of tracking and monitoring the items in real-time overcoming the shortcomings in consistency and scalability of the traditional methods [5]. Automatic addition and updates of the status of the items reduces human errors and increases operational efficiency [5].

Implications and Advantages Accomplished.

- Conquering Traditional Shortcomings: Web-based systems manage the most disadvantageous flaws of standardized solutions such as bulletin board, email notification and unofficial social media platforms that tend to have brevity in their updates, fragmented, and lack accountability [6] [7].
- Better User Interface and Data Management: usability and efficiency in performing a task requires a well-designed user interface design and user experience (UX) [8]. The system is also user-friendly and efficient due to features such as the drag-and-drop functionalities, optional filters, advanced sorting and search functionalities, etc. [9]. The storage, retrieval and traceability of item data is efficiently managed, in most cases with technologies such as PHP and MySQL, to ensure that organization is present in the paper-based system despite its limitations [2] [10].
- Rescue and reconstruction Digital platforms encourage collaboration, involving users to make reports and useful rescuing, make it a community-driven ecosystem [10]. This encourages a high level of engagement and the likelihood of recovering the items [7].
- Aligned with the Digital Transformation: The implementation of web-based centralized systems is in line with these general trends of digital transformation in current educational settings, which make the campus community increasingly connected, efficient, and responsive [11].
- Issues of concern overcome and restrictions minimized.

- **Data Integrity and Data Security:** The system uses local storage of HTML5 to generate persistent client side data to enhance user experience through minimizing repetition of data as much as possible [12]. In the case of sensitive data, there is encryption and chunking that is applied to maintain the privacy of the users and also to increase security [12].
- **Database Maintaining:** Database updating, to have a relevant database, the items that are not viewed or claimed in 30 days are automatically updated, and the database is backed up on a daily basis in case needed restoration [13].
- **External System integration:** External systems can be easily integrated with the system through REST API to retrieve and update data using standard HTTP methods that increase system flexibility and usability [14].

Regardless of these developments, the effectiveness of the system greatly relies on the issue of active participation by the users [13]. Technical issues may also develop slow response time due to a rise of traffic pressure (extensive server or poor database processing) and the integration with third-party option can cause synchronization problems and greater risk of system malfunction [13]. Issues regarding privacy and security must also be well controlled to avoid violation of the data regulations [15].

Future Research Directions

The next stage of development should be the implementation of the combination of Artificial Intelligence (AI) and Machine Learning (ML) to raise the accuracy of the search and give them tailored recommendations regarding their behavior [16]. Additional development of the technologies such as QR codes and NFC should help to allow immediate identification and tracking of items, eliminating the need to use disconnected communication channels [17]. Furthermore, it is possible to establish collaborative networks within institutions and organizations to implement a single database of lost and found data, with real-time alerts and automatic reporting, to shorten recovery time and user experience [17]. All these strategic improvements will make sure that lost and found solutions will be efficient, scalable, and responsive in accordance with the changing expectations of users.

To sum up, the information system of Mewar Lost and Found is a great move towards the digitalization of the lost and found management. Through its use of web technologies it provides a powerful, user-centered and efficient solution that, in addition to being an immediate response to the problem of item recovery, also leads to a more interconnected and cooperative atmosphere within the institutions of learning..

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