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UTHM Lost and Found Management System

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Abstract

At the moment, Universiti Tun Hussein Onn Malaysia (UTHM) handles lost and found items by using casual digital platforms like Telegram and WhatsApp to share information about lost items. This method is not effective and is not safe. The goal of this project is to create a web-based system that will make it easier for UTHM to handle lost and found items. It is expected that the new system will mostly help students and people who work at the university. The Lost & Found Centre will be in charge of running the system. A prototype development method is being used in this project to build and improve the system over time. For writing code, the prototype uses Visual Studio Code (VSC), and for managing databases, it uses PHPMyAdmin. These tools were picked because they are strong at both building websites and managing databases, which makes the system reliable and effective. This project is important because it will make it easier to report, match, and keep an eye on lost items by centralising and streamlining the processes. The system has an easy-to-use interface that lets users report and keep track of lost items. It also has administrative tools that make management easier. The prototype that was made aims to make the UTHM lost and found process more efficient and safe by improving the steps, database management, and ways of communicating. This will benefit everyone at the university.

1. Introduction

Lost and found items are items that have been lost or misplaced by their owners [1]. It can be anything from valuable items to perishable goods. Lost and found items are often turned over to a business or organization, where they are kept until the owner is found [2]. Lost and found items are usually kept for a certain period, after which they are either thrown away or donated to charity [3]. Typically, lost and found objects are held for a predetermined amount of time before being discarded or donated to a worthy cause. The average retention period for goods is between 30 and 90 days, though this might vary depending on the organization.

On the other hand, the Lost and Found is a place in a public building where things that people have lost are stored. It is managed by actual individuals who are willing to help [4]. When someone finds a lost item, they bring it to the lost and found office, where the pleasant staff members record what it is, where it was found, and when it was found. They even keep a record of all reported lost things. When a person realizes they have misplaced anything, they can go to the lost and found office and describe what they have misplaced [5]. Although some institutions may not have a physical lost and found center, they often utilize digital platforms like Telegram and WhatsApp public groups. Students or staff members can report lost items by providing descriptions and relevant details. The members of the group can then participate in conversations and exchanges to help match missing

things with their owners. In the literature, there are also several developed tools or software that are used to assist in the management of lost and found items [6].

Like Universiti Tun Hussein Onn Malaysia (UTHM), it houses an unauthorized unit that handles lost and found goods both manually and through digital means. When an item is discovered, the finder takes the initiative to share the information in a Telegram group channel or a WhatsApp group. They give information on the item, such as its description and location. The goal is to spread the word to a larger audience in the hopes that the owner will see the message and reply to claim their lost property. This manual technique relies on the UTHM community's collaboration and participation to actively participate in sharing and spreading information to maximize the odds of reuniting lost objects with their owners.

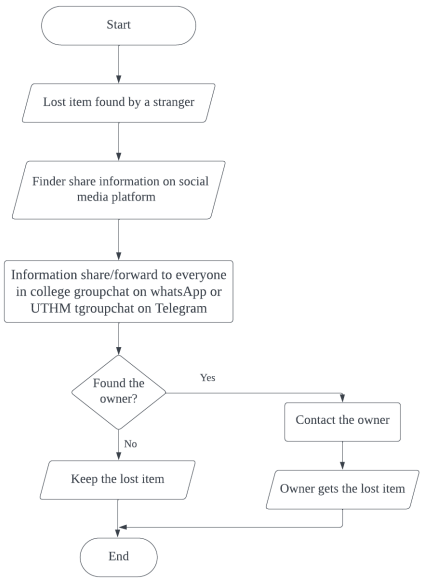


Fig. 1 *Existing System Flowchart*

The current Lost and Found system at UTHM utilizes open Telegram and WhatsApp groups for reporting lost items and connecting individuals who have found items. **Figure 1** illustrates the current process. The current process of lost and found item management has encountered several difficulties. One difficulty is verifying the reported missing objects and the authenticity of individuals claiming to have discovered them. Next, their lack of centralized control creates difficulties in enforcing consistent guidelines and processes across public groups. Finally, the system's reliance on public groups can lead to privacy concerns as personal details and descriptions of lost items are shared with larger audiences.

Therefore, a new system for handling lost and found items is proposed. This system provides a flexible set of modules created to improve both the overall user and administrative experience. These modular parts work together to provide a complete answer for effective lost item reporting, retrieval, and management. Each module makes a distinct contribution to the functioning and efficiency of the system, offering a seamless and user-friendly experience for all parties involved.

This report comprises several main sections. The first section introduces the project background. The related work of the study is presented in the next section. Section three describes the project methodology and findings from the analysis and design of the system. Section 4 demonstrates the system's implementation and testing as the project results. The conclusion then completes the article.

2. Related Work

Lost and found services, typically housed in public buildings and managed by individuals [4], aim to provide a centralized location for people to locate and claim their misplaced belongings [7] - [9]. Institutions like the University Tun Hussein Onn Malaysia (UTHM) utilize both manual and digital approaches for lost and found item management. Finders share information on discovered items through WhatsApp or Telegram groups to reach a wider audience and increase the chances of reuniting items with their owners, relying on UTHM community cooperation. The current system at UTHM employs open Telegram and WhatsApp groups, as shown in **Figure 1**, facing challenges in verifying reported items and maintaining consistent policies due to a lack of centralized control. This dependence on public groups raises privacy concerns as private information is shared with wider audiences.

Figure 2 illustrates announcements and scenarios within these groups, showcasing the challenges of managing information in open forums. The existing method, relying on open groups, makes it difficult to ensure regular procedures, responsiveness, and effective communication, causing delays for both finders and owners. Because it relies on public Telegram or WhatsApp groups, the current approach presents difficulties in maintaining centralized control and implementing conventional regulations. Ensuring regular routines, timeliness, and good communication becomes challenging in groups with multiple members. Inconsistent group management may confuse users and increase the possibility of misuse or rule disobedience. The information may also become disorganized and difficult to locate specific details regarding lost goods because it is stored in the conversation threads. This could cause delays for both the finder and the owners of the lost item.

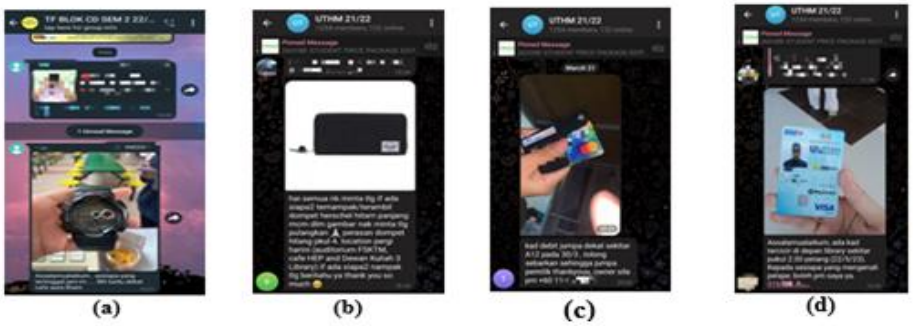


Fig. 2 *(a) WhatsApp Announcement; (b) Telegram Announcement; (c) Losing Debit Card; (d) Losing Matric Card*

To address these issues, a proposed centralized lost-and-found system aims to establish a comprehensive database and reporting system, facilitating efficient item retrieval and return to owners. The objectives include developing a centralized database and reporting system for effective lost item management and improving communication and coordination among UTHM community members for timely item retrieval.

It is recommended that the Lost and Found Management System include a web-based information system (WBIS). It effectively arranges and maintains data for tracking misplaced objects, and its analytical and reporting features offer insightful information [10] – [13]. Automation features that speed operations and lowers the chance of errors happening during those processes include item registration and claimant notification. Additionally, WBIS may be easily connected with other systems, safeguards sensitive data with user access control, and scales to accommodate increasing data volumes. Real-time updates facilitate prompt communication with claimants.

Table 1 *System Comparison*

Features / System	Crowdfind/Pixit [14]	Chargerback [15]	iLost for Business [16]	UTHM Lost and Found Management System
User registration and Login	√ user id and password	√ user id and password	√ user id and password	√ user id and password
Items management	√	X	√	√
Lost item reporting	√	√	√	√
Claimant verifications	√	√	√	√
Notification and report	√	√	√	X
Searching by classes (place/day/date)	√	√	√	√
Integration with Social Media Platforms	X	X	√	√
Language and Accessibility Options	X	X	√	X
Give away unclaimed items	X	X	X	√

As part of the design process for a new system, the existing system is also examined for inspiration and knowledge. Findings from these sources may offer informative information as well as spot and foresee possible issues. It is critical to consider user preferences, technical potential, and any potential limitations. This case study investigated three lost and found management programs. **Table 1** shows the comparison between existing lost and found management systems which are Crowdfind/Pixit, Chargerback, and iLost with the proposed system, UTHM Lost and Found Management System. According to studies on the current system, each key component has advantages and disadvantages of its own. This knowledge can be applied to enhance the proposed system.

Here are some features that a new Lost and Found Management could have that the current one does not. The most important part of this proposed system is that unclaimed items will be given away. This is because the current system has no way to deal with unclaimed items. With the new feature, unclaimed items that have been in the system for more than 30 days will be thrown away. This feature is meant to make it easier to keep track of lost and found items by automatically identifying and sorting things that have not been claimed within the time limit. Once this time has passed, these unclaimed items are marked for a giveaway process.

This means that they will be given to people or groups who may find them useful or need them. By adding this feature, the Lost and Found Management System not only frees up storage space but also makes sure that unclaimed items are put to beneficial use. This helps both the community and the efficiency of the system, it is a proactive way to handle unclaimed items, and, in the end, it makes things run more smoothly and in an organized way. Finally, the feature that integrates with social media platforms lets users easily share lost and found items on Facebook, Twitter, and Instagram from the Lost and Found Management System. This increases the system's reach and visibility beyond its registered users by tapping into the extensive social media user networks. Users can quickly upload a photo and brief description of a discovered or found item to share it with their connections and followers. This feature draws the community into reuniting owners with their belongings and speeds up resolution.

3. Methodology

The prototype model is constructed with a total of six steps. As shown in **Table 2**, each phase of a project's development has its tasks and outputs that need to be made. Aside from that, the output was made within the days that had been given.

Table 2 *Task of software development*

Phase	Task	Output	Tools
Planning	• Proposed the project. • Determine the project schedule, activities, and output.	• Project Proposal • Gantt Chart • Raw Data	• Word 2019 • ProjectLibre • Google form
Requirement Analysis	• Perform the feasibility analysis based on the financial, operational, and technical aspects. • Gather, analyze, and validate the information.	• functional & non-functional requirements • UML and Class Diagram • Flowchart	• LucidChart • Draw.io
Design	• Quick design user interface according to feature requirements	• system architecture • database schema • data dictionaries • user interface design	• LucidChart • Canva • XAMPP
Develop Prototype	• Create a prototype using requirement analysis and design	• Prototype of system	• HTML, PHP, XAMPP, Visual Studio Code
Testing and Review	• Validate and demonstrate features. • Get a review from the UTHM community	• Testing report of prototype • Review report of prototype	• Laptop
Implementation	• Implement the final system design and code. • Deploy the system	• Workable system • Full report for the project	• Laptop

3.1 System Requirements

Tables 3 and **4** show the functional and non -functional requirements for the developed system.

Table 3 *Functional requirements*

	Modules	Function
1.	Login and Registration Module	• Allow users to login into the system through username and password. • Allow direct valid users to the main dashboard of the UTHM Lost and Found Management System. • Allow the system to show error messages to invalid users. • Allow everyone, including administrators and staff or students to create new accounts for accessing the system. • Allow administrators to change user permissions based on the Lost and Found Management System user roles and responsibilities, where provide different access and functionality.
2.	Items Management Module	• Allow users to record item descriptions, locations, and dates. • Allow administrators to track whether items are claimed, returned, or unclaimed. • Allow administrators to manage the items using keyword filters by categories, dates, or locations. • Allow users to upload images of found items. • Allow unclaimed items to be managed after 30 days through giveaway. • Allow administrators to record each item's registration, claim, and status or detail changes in the system. • Allow users to share information about found items on popular social media platforms.
3.	Lost Item Reporting and Claimants Verification Module	• Allow users to search for items using keyword filters by categories, dates, or locations. • Allow users to record their lost item claim information, including contact. • The system should allow administrators to check the claimant's identity by matching information with the lost item report. • Allow the administrators to authorize the claimant to retrieve the lost item after identity verification.
4.	Give away Module	• Allow administrators to find items that have been left unclaimed for a certain amount of time and can be given away. • The system should be able to sort unclaimed items into groups based on their type, condition, and suitability for giveaway. • Allow administrators to manage the process of getting rid of things that cannot be given away by following the right procedure.

Table *4* *Non-functional requirements*

Requirements	Description
Operational	• The system should be user-friendly. • The system should be easily maintained and updated • The system should be able to work on most web browser
Performance	• The system should be available 24 hours per day. • The system should get access to the Internet easily
Security	Users can only access their account with user email and password

Table 5 lists the user requirements. The users of the system consist of UTHM students or staff and the Lost and Found Management Center as administrators.

Table 5 *User requirements*

No.	User Requirements
1	Users should be able to input a username and password to log into the system.
2	The user should be able to create a new account
3	Users should be able to directly view the main dashboard of the system
4	The user should be able to report the found items.
5	The user should be able to input an image of a lost item.
6	User should be able to filter the found items by their category, place, and dates found.
8	The user should be able to view lost items.
9	Users should be able to share the found item to social media platforms.
10	User should be able to notify the giveaway ads for unclaimed items

11	The user should be able to log out from the system
12	The administrator should be able to input the administrator's username and password to login into the system.
13	The administrator should be able to approve a new user.
14	The administrator should be able to add, insert, update, and delete the reported found item.
15	The administrator should be able to track the status of the found items.
16	The administrator should be able to edit the status of the found items.
17	The administrator should be able to check the claimant's identity.
18	The administrator should be able to find unclaimed items.
19	The administrator should be able to manage the giveaway process.
20	The administrator should be able to log out from the system.

3.2 System Analysis

Figure 3 shows the Level 0 Data Flow Diagram (DFD 0) of the developed system. It shows where the process begins—logging in. Students, staff, and administrators must use valid usernames and passwords to access the system, which leads to role-specific dashboards. Lost items can be reported through the system, including category, date, and location. After receiving this report, the Lost and Found Centre catalogs and records it. Location or date keywords can help claimants find their items. The system marks the item as "claimed" and manages its return after the system verifies the claimant. After 30 days, unclaimed items are distributed or disposed of, with all details securely stored in the database for future reference.

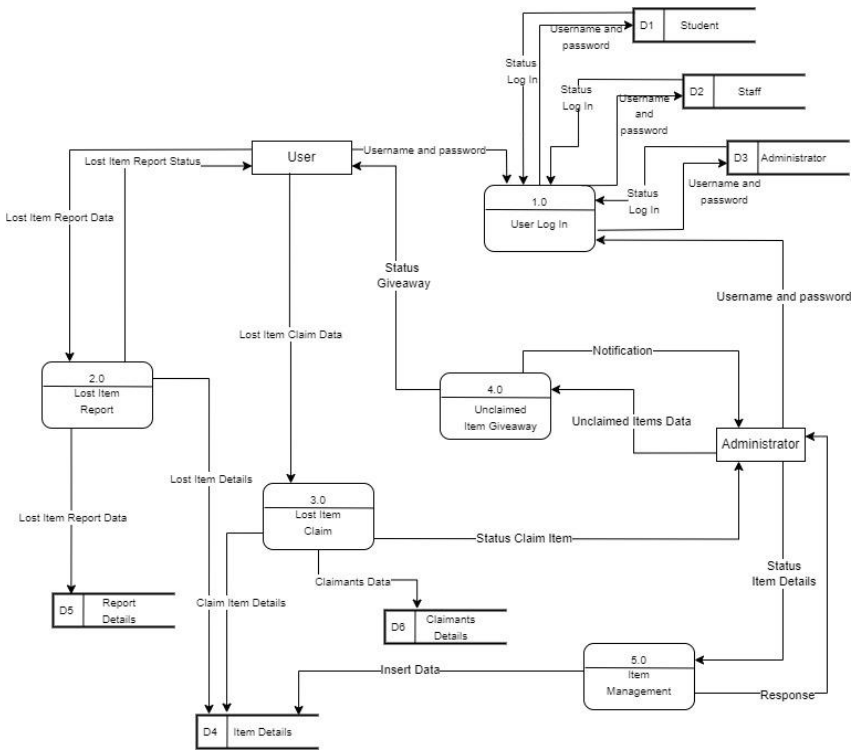


Fig. 3 *Data Flow Diagram Level 0*

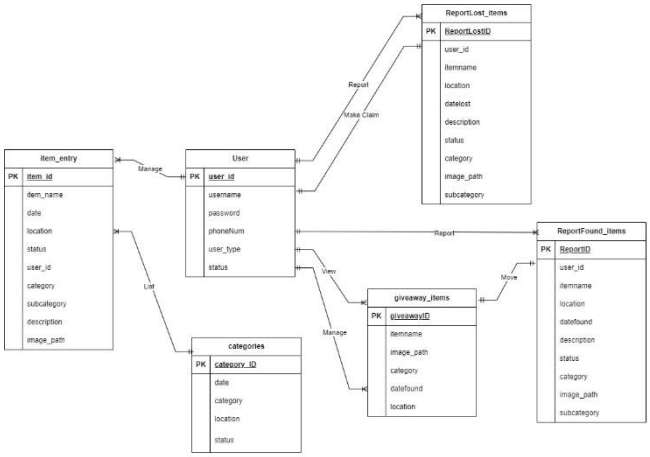


Fig. 4 *Entity Relationship Diagram*

Figure 4 shows the Entity Relationship Diagram for this system. It contains six tables related to the system's database.

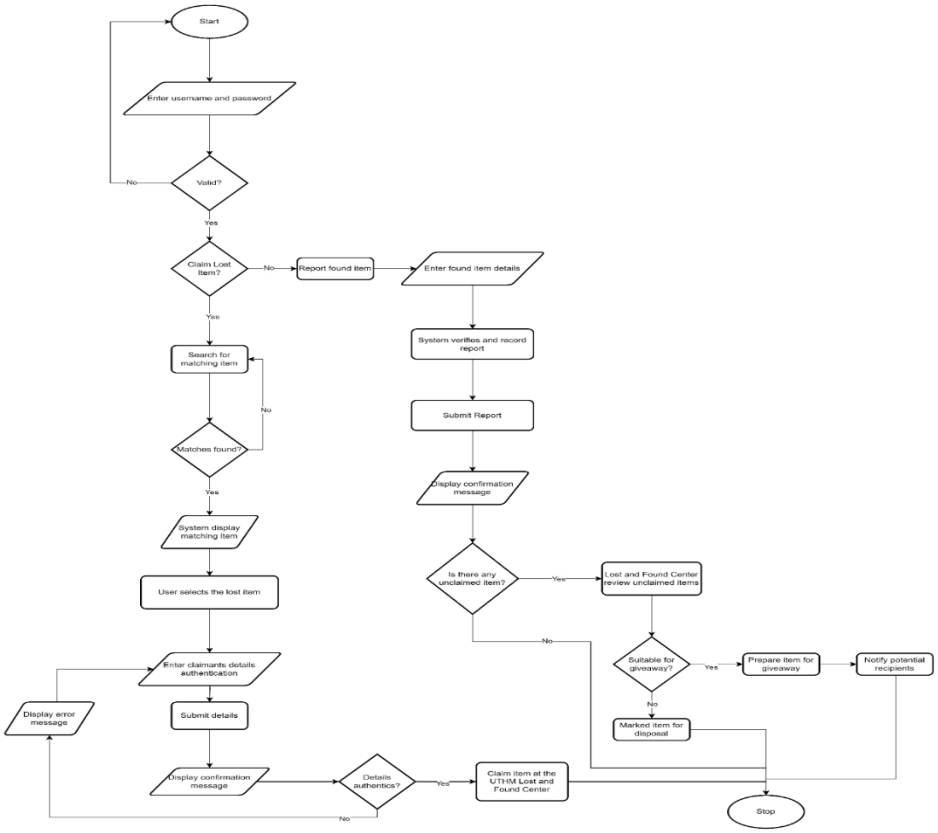


Fig. 5 *System Flowchart*

Figure 5 shows the flowchart for this system. The procedures, actions, and decision points of the system are shown visually in a flowchart. It facilitates a better understanding of the system's logic and workflow among stakeholders such as developers and users alike, than written descriptions alone.

3.3 System Design

Figure 6 shows the architecture design of the UTHM Lost and Found Management System. It is separated into 3 sections where each floor with its unique job. The first floor is where users interact, it is where the users form for entering and changing information. The second floor plays roles where the real work happens. Here, the system handles requests, manages data, and makes decisions. It ensures that when the user edits something on the first

floor, it is done correctly. The third floor is the storage room. It is where all the information is kept in the database, it manages storing and retrieving data whenever needed.

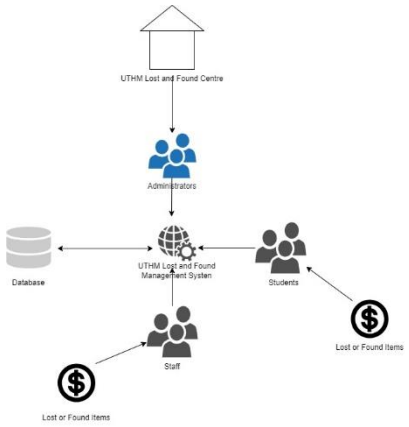


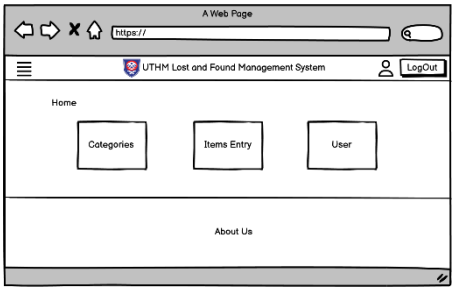
Fig. 6 *System Architecture*

The following are the tables from the database that have been designed and extracted from the class diagram.

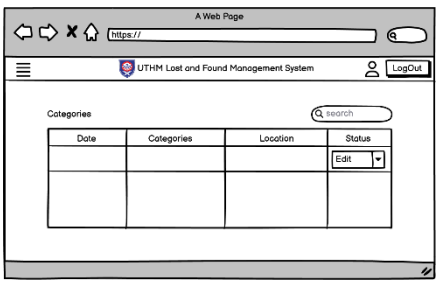
i. `user (user_ID, username, password, phoneNum, user_type, status)`
ii. `reportLost_Item (ReportLostID, user_ID, itemname, location, datelost, description, status, category, image_path, subcategory)`
iii. `reportFound_Item (ReportID, user_ID, itemname, location, datefound, description, status, category, image_path, subcategory)`
iv. `categories (category_ID, date, category, location, status)`
v. `giveaway_items (claim_id, found_id, claim_date, user_id, status)`

The following are the interfaces that have been designed based on each process described in the analysis. They are designed by using Balsamiq Wireframe. **Figure 7** gives the illustration.

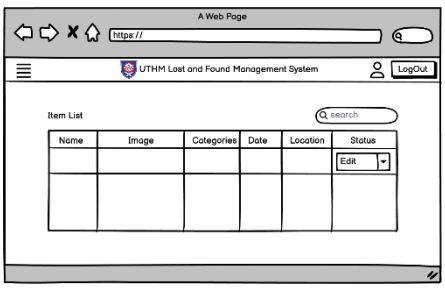
(a) Login Page



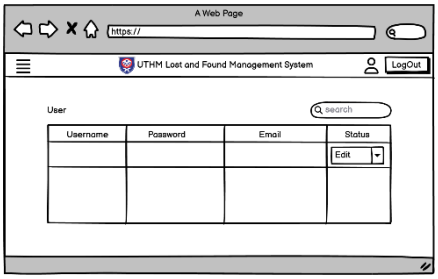
(b) Home page



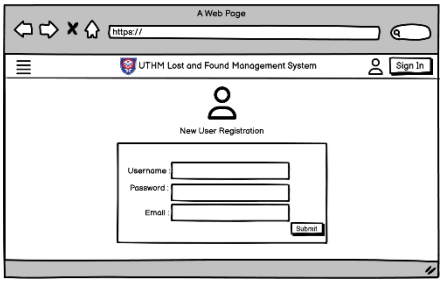
(c) Categories Page Design



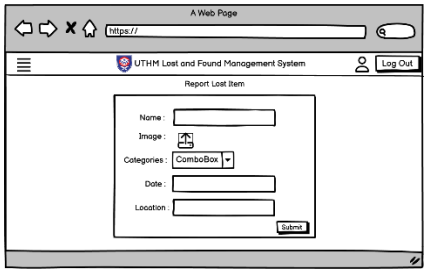
(d) Item Entry Page Design



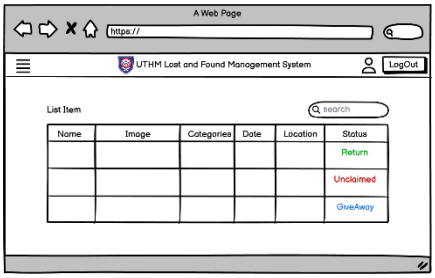
(e) Users Page Design



(f) Registration Page Design



(g) Report and Find Page Design



(h) Find Page Design

Fig. 7 *System's User Interface Design*

4. Result and Discussion

Figure 8 and **Figure 9** show the user interface of the login and account registration module page. Generally, the user interface only consists of an input box that takes the username, password, and phone number input and chooses whether they are an administrator or user, and one button. Once a user registers it will need approval from the administrator.

After that **Figure 10** Administrators have access to item management features, allowing them to view all reported lost and found items. Each item is listed with details such as a unique ID, name, image, category (e.g., documents, electronics, jewellery), the date it was reported, and the location where it was lost or found. The status of each item is shown and can be updated via a dropdown menu with options like "Available" for unclaimed items, "Returned" for claimed items, "Giveaway" for unclaimed items for a certain amount of time, and "Rejected" for invalid reports.

Based on **Figure 11** and **Figure 12** the interfaces for lost items and reporting and claimant's module are similar, with a clear objective at the top. The name, category, date, and description of the item are all included in the report. A visual aid, most likely an image of the lost item, is available to help with identification and return. There are two main buttons: "Claim Item" or "Report Item" to submit a claim for the lost item or report the lost item, and "Return to Home" to return to the main lost and found homepage. This user interface prioritizes clarity and usability, simplifying the process of claiming lost items and reporting found items. **Table 6** to **9** lists the test cases.

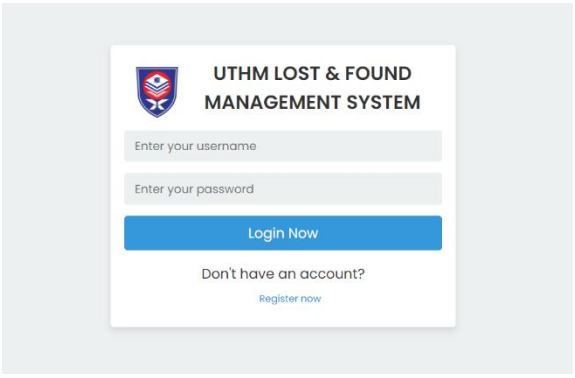


Fig. 8 *Login Interface*

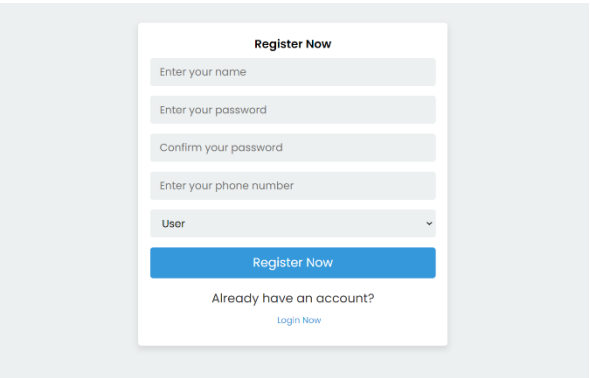


Fig. 9 *Registration Interface*

Table 6 Test Case for Login and Registration Module

Module: Log in and Registration				
Test Case ID	Description	Expected Result	Actual	Result
M1-1	To check whether the administrator can register for an account	The user should be able to create an account	The user has successfully created an account	Pass
M1-2	To check whether an administrator can log into the system	The user should be able to log into the system	The user has successfully logged into the system	Pass
M1-3	To check whether the system will restrict login whenever a wrong credential is entered	The system should restrict login when incorrect credentials have been entered	The system restricted the login when incorrect or no credentials had been entered	Pass

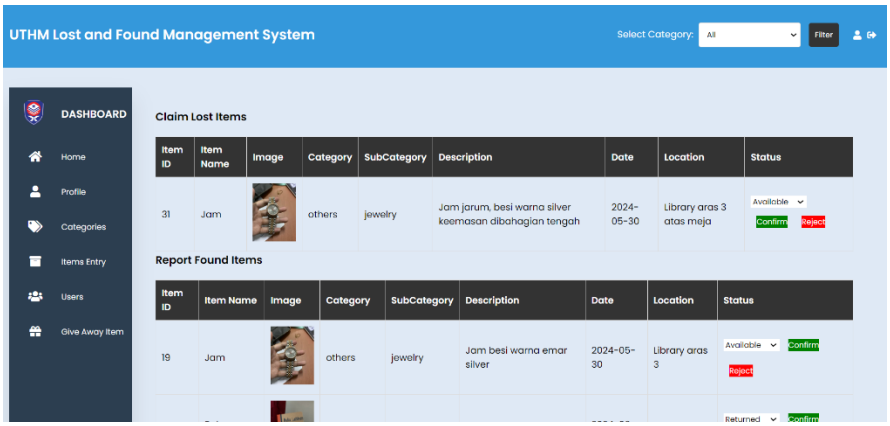


Fig . 10 *Item Management Module*

Table 7 Test Case for Item Management Module

Module: Item Management				
Test Case ID	Description	Expected Result	Actual	Result
M1-1	Fetch a new reported lost or found item	The system should successfully add a new item to the claim lost item or reported found item.	The system fetches the new item with details matching the input data from the user.	Pass
M1-2	Search for items by category	The system should display a list of items belonging to the selected category.	The system displays a list of items that belong to the chosen category.	Pass
M1-3	Change the status of an item	The system should update the status of a selected item (e.g., Available to Returned).	The system successfully changes the status of the item to the chosen option.	Pass
M1-4	Mark an item as "Give Away"	The system should move the selected item to the "Give Away" list and update its status.	The system successfully transfers the item to the "Give Away" list and marks it as "Give Away".	Pass

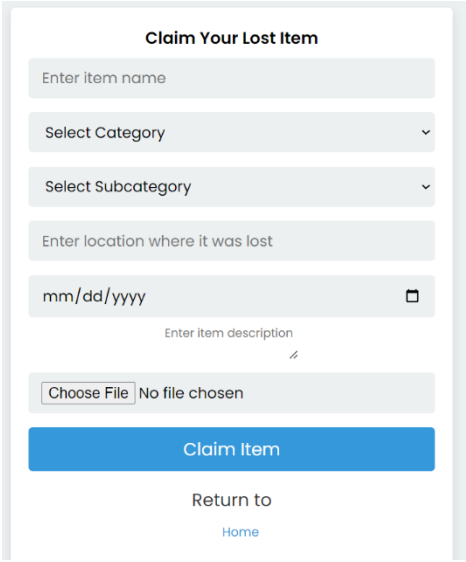


Fig. 11 *Claim Lost Item Reporting*

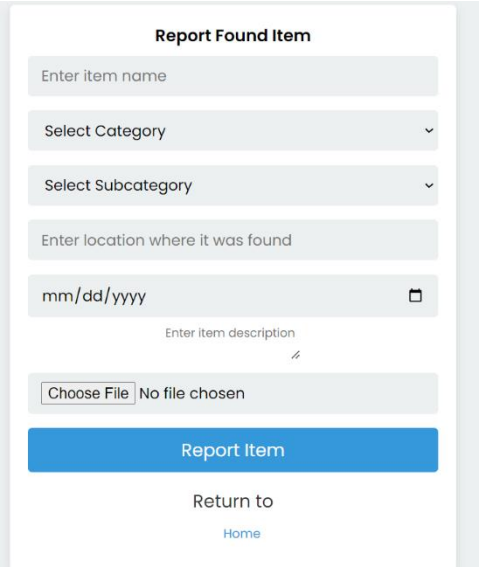


Fig.12 *Found Item Reporting*

Table 8 *Test Case for Lost Item Reporting and Claimants Module*

Module: Lost Item Reporting and Claimants				
Test Case ID	Description	Expected Result	Actual	Result
LR-1	Report a new lost item	The system should successfully create a new lost item report with details matching the user input.	The system creates a new lost item report and assigns it a unique identifier.	Pass
LR-2	Search for lost items by category (claimed by the user)	The system should display a list of lost items belonging to the selected category on the administrator page.	The system displays a list of lost items that belong to the chosen category.	Pass
LR-3	Claim a found item by entering its ID (user claiming a lost item)	The administrator should verify the claim and update the item status if the details match a reported lost item.	The administrator validates the claim and marks the item as "Claimed" if the information aligns with a reported lost item.	Pass
LR-4	Reject a claim (admin)	The system should allow the administrator to reject a claim if details don't match a reported lost item.	The administrator can reject a claim and the item status is updated accordingly (e.g., back to "Available").	Pass

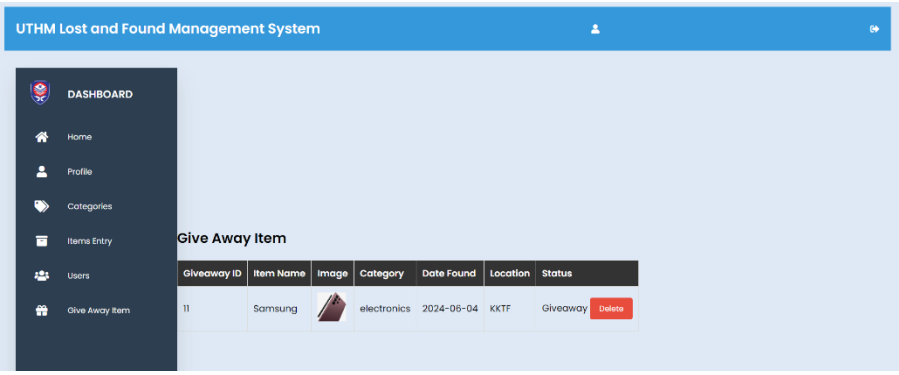


Fig . 12 *Give Away Module*

Table 9 *Give Away Module Tests*

		Module: Give Away		
Test Case ID	Description	Expected Result	Actual	Result
GA-1	Marking an item as "Give Away" (admin)	The system should allow the administrator to designate an unclaimed item as "Give Away" and update its status.	The administrators successfully mark the selected item as "Give Away," and the item is transferred to the "Give Away" list/section.	Pass
GA-2	Displaying the list of "Give Away" items (user/admin)	The system should display a list of items currently designated as "Give Away."	The system displays a list of items categorized as "Give Away," including details like description and date found.	Pass

Figure 12, the item status update feature in the administrator view allows administrators to change the status of items to "Give Away" using a dropdown menu. When this option is selected, the system updates the item's status in the database. This action also triggers the transfer of relevant item information to a separate "Give Away" page. This page likely displays details such as the item ID, name, category, date found, and possibly an image. Users can then browse this page to see items available for giveaway and claim them if interested.

5. Conclusion

In conclusion, implementing a Lost and Found Management System with suitable data management capabilities will considerably reduce the problems while also providing a more efficient and safe approach for dealing with missing things. It intends to simplify the process of tracking down and reclaiming misplaced things at our university. We hope to improve convenience, communication, and transparency by creating a centralized and user-friendly system.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

The authors confirm contribution to the paper as follows: ***study conception and design:*** *Nurul Fatihah Shahzan, Nureize Arbaiy;* ***data collection:*** *Nurul Fatihah Shahzan, Nureize Arbaiy;* ***analysis and interpretation of results:*** *Nurul Fatihah Shahzan, Nureize Arbaiy;* ***draft manuscript preparation:*** *Nurul Fatihah Shahzan, Nureize Arbaiy. All authors reviewed the results and approved the final version of the manuscript.*

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