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Lost and Found Management System

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Abstract

The Lost & Found Management System (LFMS) is designed to improve the way lost items are reported and recovered by replacing traditional, inefficient lost-and-found methods with a centralized digital platform. The system allows users to submit details of lost or found items, including descriptions, dates, locations, and contact information, making the reporting process simple and structured. It uses intelligent matching techniques based on text similarity, fuzzy logic, and AI-assisted search to identify possible connections between lost and found reports. Secure access is maintained through user authentication, and notifications are sent when potential matches are detected to ensure timely communication. Location and time-based information further enhance search accuracy and help reduce the time required to recover items. The system can also support technologies such as QR codes and RFID for faster identification and retrieval. Overall, LFMS provides a practical, user-friendly solution that encourages community participation and improves item recovery in public and institutional environments such as universities, malls, and airports.

Keywords: Lost and Found Management, Matching Algorithm, Web Application, RFID, QR Code, AI-based Search, User Authentication, Item Recovery System

1. Introduction

Misplacing personal belongings such as wallets, mobile phones, keys, and identification cards is a common issue, especially in public environments like universities, workplaces, and transport hubs. Traditional lost-and-found methods rely on manual processes such as registers and verbal communication, which are inefficient, unorganized, and lack proper tracking, resulting in low recovery rates.

To address these challenges, the Lost and Found Management System (LFMS) provides a centralized digital platform for reporting, tracking, and recovering lost items. The system allows users to submit structured information and uses intelligent matching techniques such as fuzzy logic and AI-assisted search to identify potential matches. Additionally, features like secure authentication, automated notifications, and location-based filtering improve efficiency and reliability.

Overall, LFMS aims to simplify the lost-and-found process, reduce recovery time, and provide a secure and scalable solution for effective item management.

Some of the key features provided by the platform:

- Centralized digital platform for managing lost and found items
- Structured reporting of item details such as category, description, date, and location
- Intelligent matching using string similarity, fuzzy logic, and AI-assisted search
- Secure user authentication to prevent unauthorized access
- Automated notifications for real-time communication
- Location and time-based filtering for improved search accuracy
- Integration support for QR codes and RFID technologies

Overall, the Lost and Found Management System is designed with a simple, intuitive, and mobile-friendly interface that encourages user participation and community cooperation. It aims to reduce the time and effort required to recover lost items, improve recovery rates, and provide a secure, scalable, and reliable solution suitable for deployment in various public and institutional environments.

2. Literature Review

The problem of managing lost and found items has been addressed through various approaches over the years, ranging from traditional manual systems to modern digital solutions. In many public and institutional environments such as universities, offices, transportation hubs, and shopping complexes, lost-and-found management has traditionally depended on handwritten registers, notice boards, and verbal communication. Although these methods are simple and low-cost, they are highly inefficient due to the absence of structured record keeping, real-time access, and systematic tracking. As a result, items are often misplaced within the system itself, records become outdated, and the likelihood of reuniting owners with their belongings remains low.

With the advancement of information technology, several web-based and mobile-based lost-and-found platforms have been developed to digitize the reporting process. These systems typically allow users to submit basic details about lost or found items and search through existing records using keywords. While digitization improves accessibility and organization compared to manual methods, many of these systems still rely on exact keyword matching, which limits their effectiveness when item descriptions are incomplete, inconsistent, or ambiguous. In addition, some platforms lack a centralized database or provide limited functionality, making them unsuitable for large-scale or multi-location environments.

Recent research has focused on improving item matching accuracy through intelligent techniques such as string similarity measures, fuzzy logic, and machine learning-based approaches. These methods help identify approximate matches even when user-provided descriptions vary in wording or detail. However, in many existing studies, these techniques are implemented independently and are not integrated into a complete, end-to-end system that supports secure user interaction and real-time communication.

Security and authentication have also been identified as key concerns in digital lost-and-found systems. Several studies emphasize the importance of secure access control and user verification methods such as login credentials and role-based access. However, many existing solutions either lack strong authentication mechanisms or do not adequately address data privacy issues, increasing the risk of false reporting and unauthorized claims.

Other related work explores the use of location-based services and spatio-temporal data to enhance the accuracy of lost item searches. By incorporating information such as the last known location and time of loss, these systems can narrow down search results and improve retrieval efficiency. Some research has also investigated GPS-enabled tracking systems, though these approaches are often limited by device availability and environmental constraints.

In addition, emerging technologies such as QR codes, RFID, and blockchain have been studied for improving item identification, verification, and ownership validation. QR codes and RFID enable faster identification and automated tracking, while blockchain-based approaches provide secure and tamper-proof records. Despite these advantages, such technologies are often implemented as standalone solutions and lack integration with a unified platform.

Overall, existing research demonstrates progress in individual areas but highlights a clear gap in developing a comprehensive lost-and-found management system that integrates intelligent matching, security, real-time communication, and scalability within a single framework.

3. Proposed Work

This research proposes the design and development of a Lost and Found Management System (LFMS) that overcomes the limitations of traditional and partially digital lost-and-found practices by offering a secure, centralized, and intelligent platform for item recovery. The proposed system is intended to serve public and institutional environments such as universities, workplaces, malls, and transport hubs, where the frequency of misplaced items is high and existing recovery mechanisms are often inefficient. The system is designed as a web-based application with a scalable architecture. Users are able to register, authenticate securely, and report lost or found items by providing structured information such as item category, description, location, time, and images. These reports are stored in a cloud-hosted database, ensuring reliable data management and easy access. To improve recovery efficiency, the system incorporates an automated matching mechanism that analyzes item attributes using keyword similarity, fuzzy logic, and basic AI-assisted techniques. This reduces dependency on manual searches and increases the likelihood of identifying correct matches even when item descriptions are incomplete or vary in wording.

To maintain trust and prevent misuse, the proposed system includes role-based access control and administrative oversight. Administrators are responsible for verifying claims, moderating suspicious or duplicate reports, and resolving conflicts between users. Automated notification services inform users in real time through email or SMS whenever potential matches are detected or item statuses change, enabling faster responses and smoother communication.

The proposed LFMS also emphasizes usability and accessibility through a clean, responsive user interface that works across web and mobile platforms. Analytical dashboards provide insights into recovery trends, frequently lost items, and system usage, supporting data-driven decision-making for institutions. Overall, the proposed work focuses on delivering a reliable, secure, and user-friendly solution that significantly improves the efficiency, transparency, and success rate of lost item recovery while remaining scalable for future enhancements.

4. System Architecture

The Lost and Found Management System is designed using a client-server architecture to ensure smooth interaction between users and the backend services. The client side is developed as a web application using React.js, allowing users to register and log in, report lost and found items, and claim items through a secure verification process. The server side is built with Spring Boot, which provides RESTful APIs to handle requests, process data, and manage business logic.

All information, including user profiles, item reports, claims, and notifications, is stored in a MongoDB database, ensuring scalability and efficiency. Security is maintained through JWT-based authentication and role-based access control, allowing administrators to manage reports and users while regular users can interact safely with the system.

Additionally, the system integrates external services, such as email notifications through the Spring Mail API to keep users informed about potential matches and item status updates, and location tagging using the Google Maps API to provide spatial context for lost and found items.

Figure 1 System Architecture

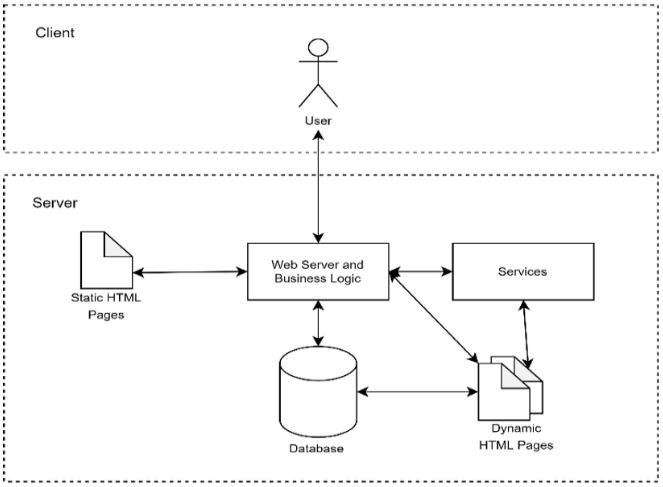


Figure 2 Use Case Diagram

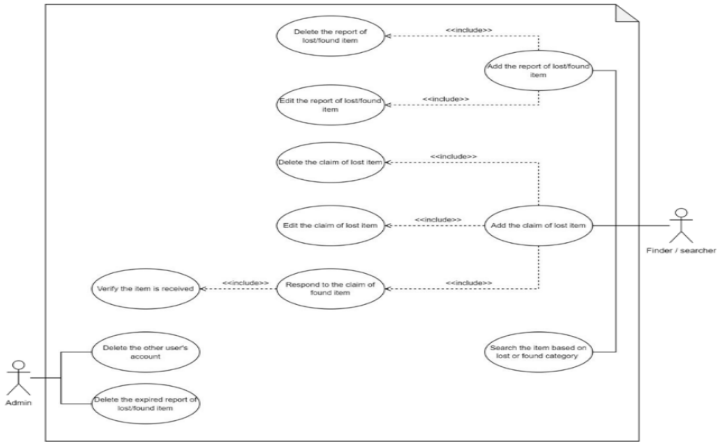


Figure 3 Sequence Diagram

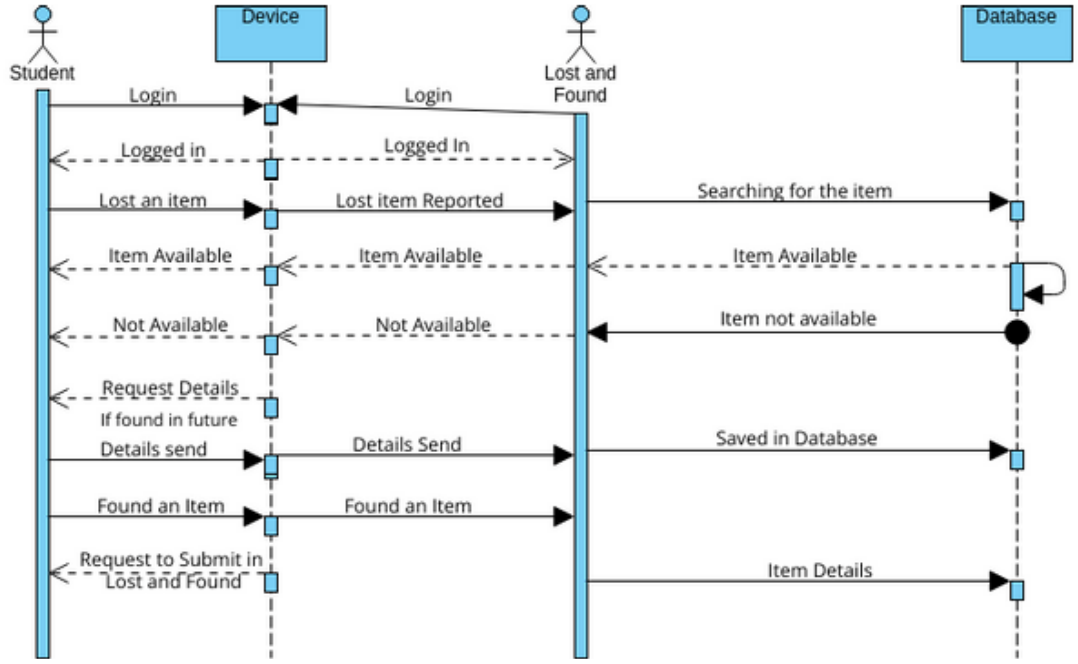


Figure 4 Data Flow Diagram

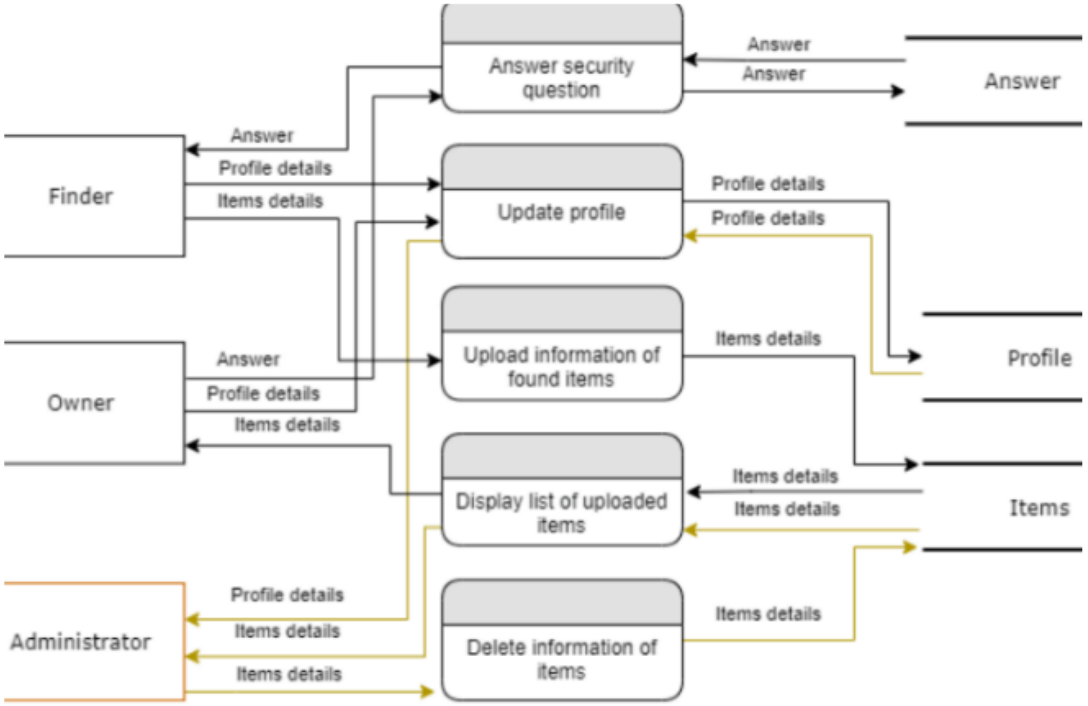


Figure 5 Activity Diagram

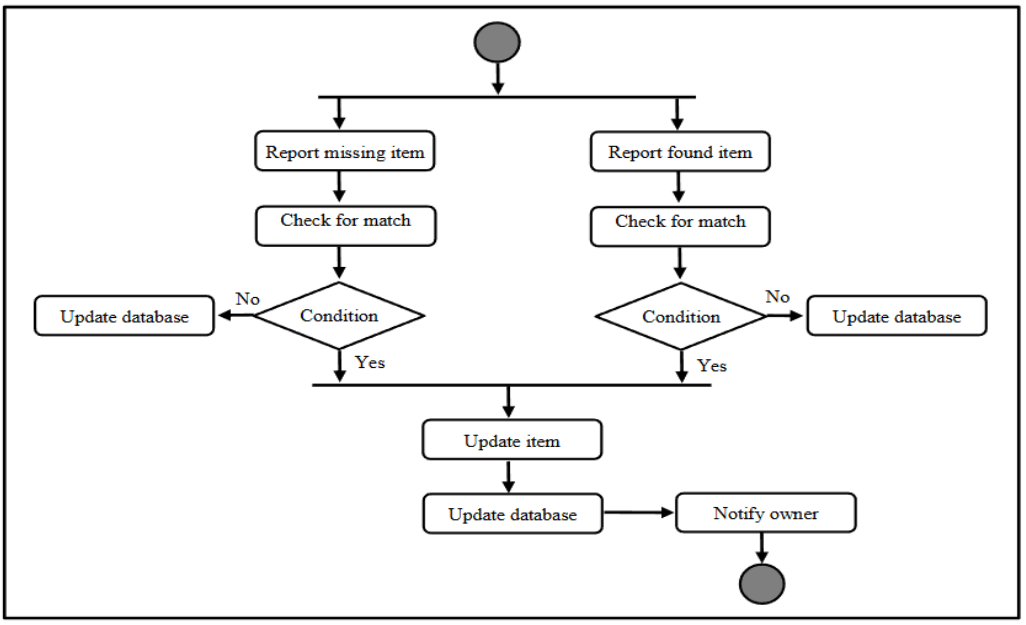


Figure 6 Lost Item Submission Flowchart

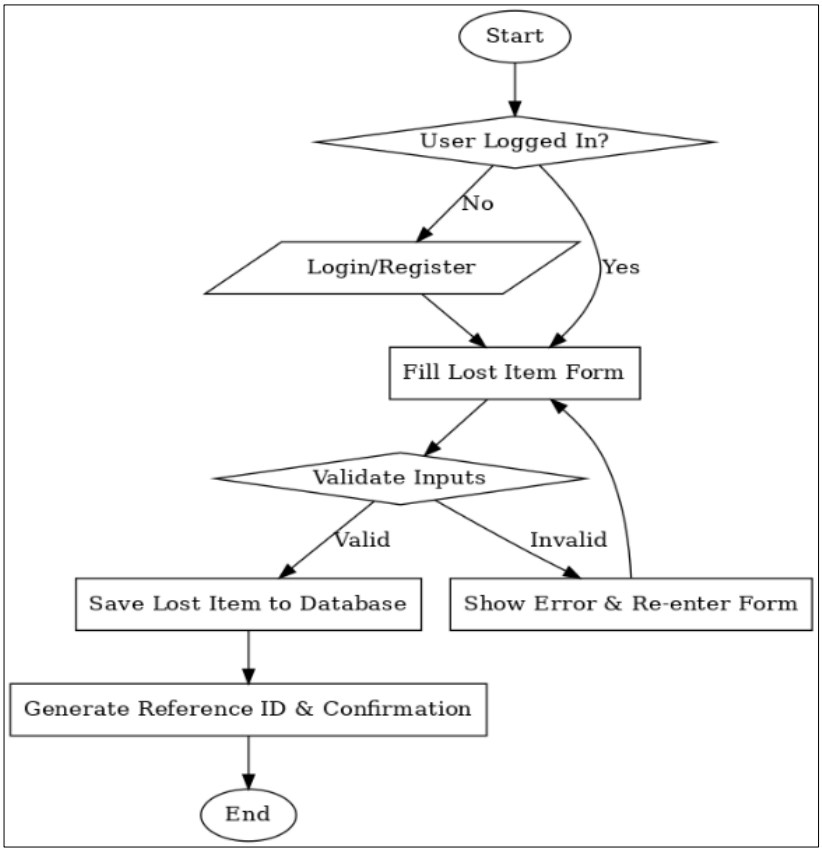


Figure 7 Found Item Submission Flowchart

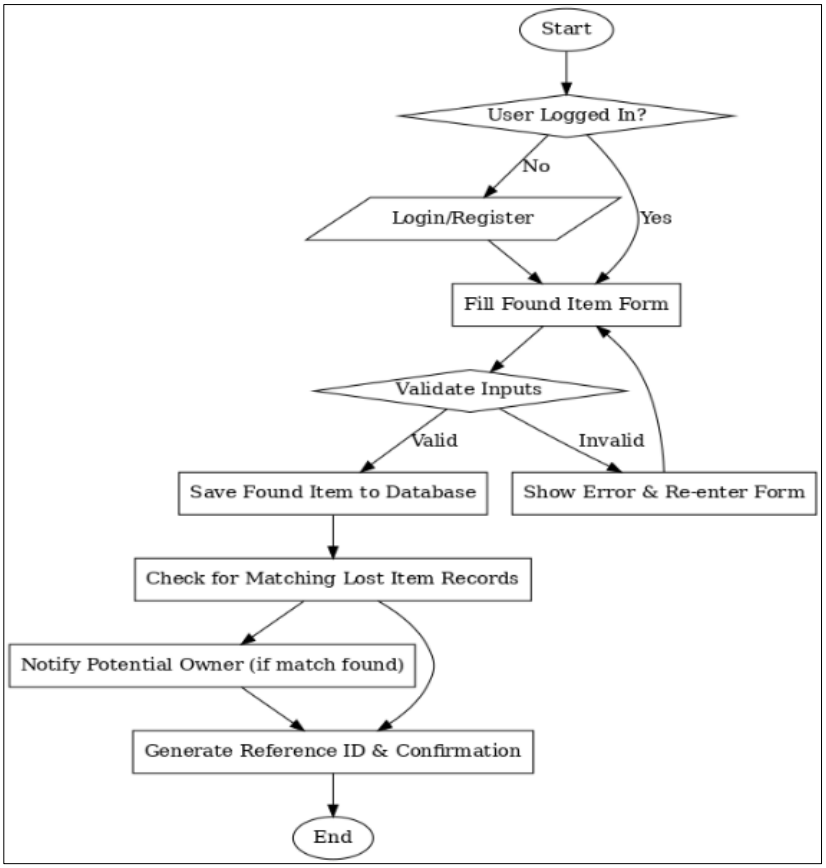
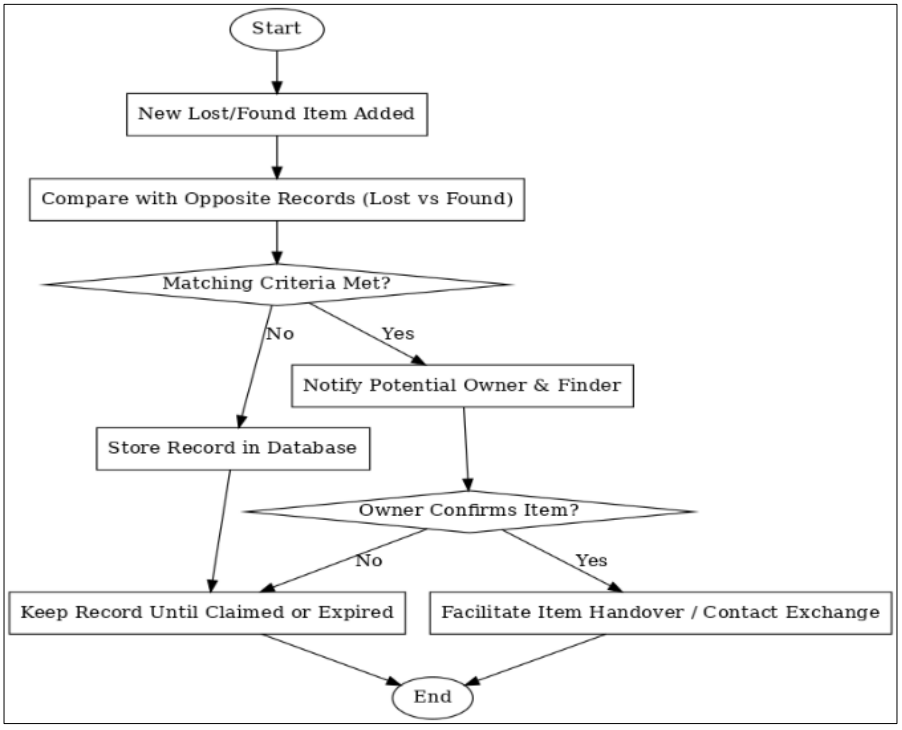


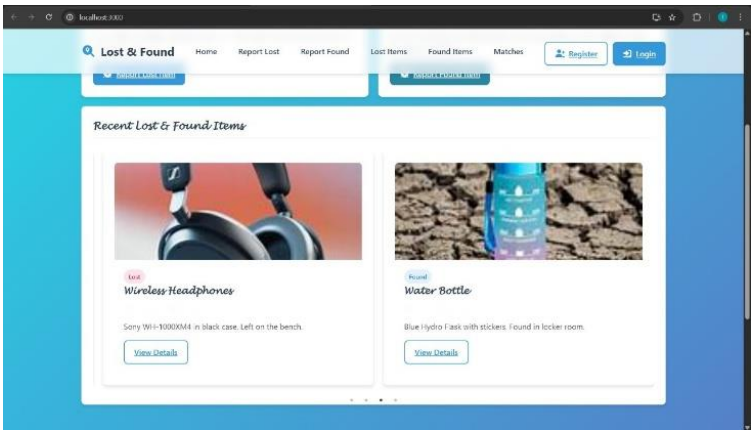
Figure 8 Matching Lost & Found Items Flowchart



5. Results and Discussion

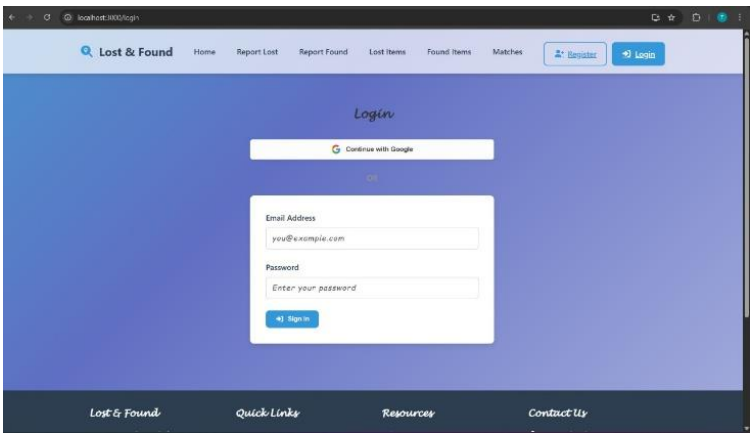
We successfully developed a web-based application that fulfills all the objectives defined in the proposed work. The system was thoroughly tested across multiple possible scenarios to ensure reliability and correctness. The implemented search mechanism and automated notification feature significantly enhance the efficiency and effectiveness of the existing college lost and found process by reducing manual effort and improving response time.

Figure 9 Home Page



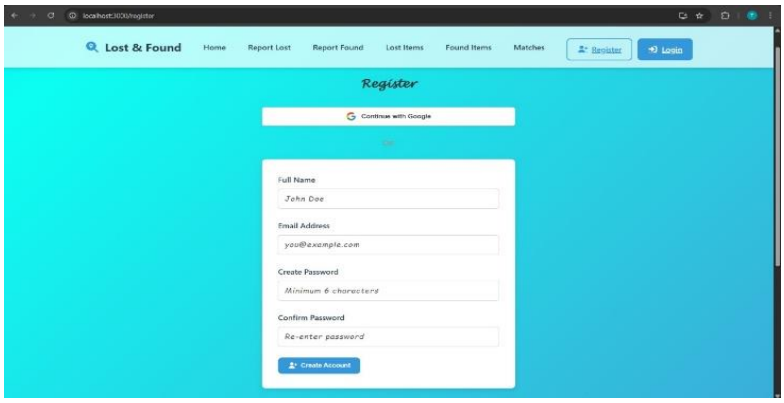
The home page provides an overview of the Lost and Found system by displaying recently reported lost and found items, allowing users to quickly browse and access item details.

Figure 10 Login Page



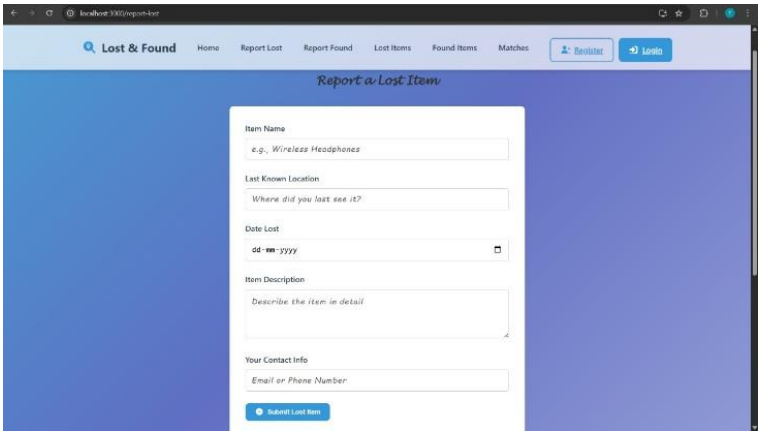
The login page allows users to securely access the Lost and Found system using their registered email credentials or Google authentication.

Figure 11 Register Page



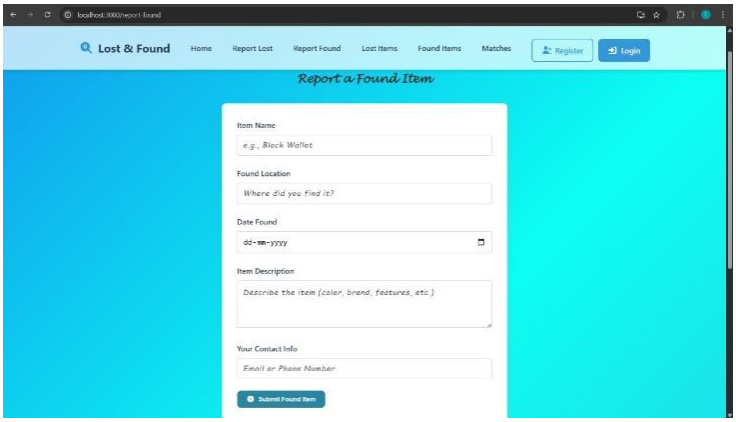
The registration page enables new users to create an account by providing basic details or signing up quickly using Google authentication.

Figure 12 Lost Item Reporting Form



The lost item reporting form enables users to provide complete information about a missing item by entering its name, last known location, date of loss, detailed description, and contact details. This structured data helps the system accurately store the information, search for potential matches with found items, and notify users when relevant updates are available.

Figure 13 Found Item Reporting Form



The found item reporting form allows users to submit detailed information about an item they have found so that it can be stored, matched with reported lost items, and returned to its rightful owner.

6. Conclusion

The Lost and Found Management System successfully simplifies the process of reporting, tracking, and recovering lost items within the institution. By bringing all activities onto a single web platform, the system reduces confusion and manual effort while making it easier for users to report lost or found items. The automated matching and notification features help connect owners and finders more quickly, improving the chances of item recovery. Overall, the system offers a practical, user-friendly, and efficient solution that improves the traditional lost and found process and makes it more reliable for everyday use.

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