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FindMyStuff – An Automated Lost and Found Management System

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ABSTRACT

FindMyStuff is an automated, centralized web-based platform developed to address the inefficiencies of traditional lost-and-found systems within university campuses. Conventional methods, such as physical notice boards and scattered social media groups, lack structured organization, searchability, and data persistence, resulting in low recovery rates of misplaced items. The proposed system introduces an intelligent and systematic approach to asset recovery through the implementation of a heuristic matching algorithm. This algorithm automatically links “Lost” and “Found” reports by analyzing key parameters such as item category, textual similarity, location tags, and temporal proximity. The platform is designed using modern web technologies, including ReactJS and Tailwind CSS for the frontend, and Django with Django REST Framework for the backend, ensuring scalability, responsiveness, and cross-platform compatibility.

Keywords: Automated Matching Algorithm, Campus Asset Recovery, Heuristic Search, Cloud Image Hosting, Web-based Portal.

1. INTRODUCTION

In today's fast-paced academic environment, students and staff frequently face the issue of losing personal belongings such as mobile phones, ID cards, wallets, and important documents. Traditional lost-and-found methods, including physical notice boards and informal communication through social media platforms, are often inefficient due to their lack of structure, searchability, and data persistence. These limitations lead to low recovery rates and increased inconvenience for users.

To address these challenges, the proposed system, FindMyStuff, introduces a centralized web-based platform that digitizes and streamlines the entire lost-and-found process within a campus. The system allows users to report lost or found items, upload images for visual verification, and search through a structured database. One of the key features of the system is the implementation of a heuristic matching algorithm, which automatically identifies potential matches between lost and found items based on parameters such as category, keywords, location, and time.

The platform is developed using modern web technologies, including ReactJS, Tailwind CSS, and Django REST Framework, ensuring a responsive, scalable, and user-friendly interface. Additionally, the integration of a real-time notification system enables users to receive instant alerts whenever a potential match is detected, significantly reducing the time required for item recovery.

2. LITERATURE REVIEW

The evolution of lost-and-found systems has shifted from manual methods such as notice boards and registers to digital and web-based platforms, but many existing solutions still lack efficiency, automation, and intelligent processing. While modern systems improve data storage and accessibility, they often fail to provide features like automated matching, real-time notifications, and secure user interaction, which are essential in a dynamic campus environment.

The concept of lost-and-found management systems has evolved significantly with the advancement of web technologies, database systems, and intelligent search algorithms. Traditional systems primarily relied on manual approaches such as physical registers, notice boards, or word-of-mouth communication, which lacked efficiency, scalability, and reliability. These conventional methods often resulted in data loss, limited accessibility, and low recovery rates, highlighting the need for a more structured and automated solution.

Recent research has explored the development of web-based asset management systems that utilize centralized databases to store and manage information efficiently. Studies such as those by Kumar and Verma (2023) emphasize the importance of centralized platforms that allow users to report and track items in a systematic manner. These systems improve accessibility and data organization but often lack advanced features such as automated matching and real-time notifications, which are critical for improving recovery efficiency in dynamic environments like university campuses.

Key Findings from Literature Review

- i. Traditional lost-and-found methods rely on manual processes like notice boards and verbal communication, which lack structure, permanence, and efficient search capabilities.
- ii. Existing web-based systems provide centralized data storage but do not include intelligent matching mechanisms to automatically link lost and found items.
- iii. Many asset tracking systems are designed for industrial use and fail to address campus-specific needs such as user privacy, ease of use, and real-time communication.
- iv. Research on heuristic search algorithms mainly focuses on theoretical models and lacks practical implementation in real-time web applications.
- v. Current systems do not effectively utilize real-time notification systems, resulting in delayed communication and reduced recovery success rates.
- vi. Limited integration of cloud storage and image verification features affects the scalability and reliability of existing solutions.
- vii. There is a strong need for a system that integrates centralized data management, automated matching, real-time alerts, and secure communication into a single platform.

3. OBJECTIVES

The main objective of the FindMyStuff system is to develop an efficient, secure, and user-friendly platform that simplifies the process of reporting and recovering lost items. The system focuses on automation, centralized data management, and real-time communication to improve overall recovery efficiency within a campus environment.

- i. **Centralized Web-Based Platform:-** To develop a centralized system where all lost and found item data is stored in one place. This improves accessibility and eliminates dependency on scattered communication methods.
- ii. **Automated Matching Mechanism:-** To implement a heuristic algorithm that automatically matches lost and found items. This reduces manual effort and increases the accuracy and speed of item recovery.
- iii. **Real-Time Notification System:-** To provide instant notifications to users when a potential match is detected. This ensures quick communication and improves the chances of successful recovery.
- iv. **Security and User Experience:-** To ensure secure data handling along with a simple and user-friendly interface. This enhances user trust, privacy, and overall system usability.

4. PROBLEM STATEMENT

i. Inefficiency of Traditional Lost-and-Found Methods

Traditional methods such as notice boards, manual registers, and word-of-mouth communication are widely used for reporting lost items but are highly inefficient. These approaches lack proper organization, are timeconsuming, and often fail to reach a large audience, resulting in low chances of item recovery.

ii. Lack of Centralized and Searchable System

There is no centralized platform available within campuses to store and manage lost-and-found data in a structured manner. Information is scattered across different mediums like social media groups, making it difficult to search, track, and retrieve item-related information effectively.

iii. Absence of Automated Matching Mechanism

Existing systems do not provide any intelligent or automated method to match lost and found items. Users are required to manually browse through multiple entries, which is inefficient and reduces the probability of identifying correct matches quickly.

iv. Limited Real-Time Communication and Security Issues

Current methods lack real-time notification systems and secure communication channels between users. This leads to delays in response, increases the risk of fraudulent claims, and compromises user privacy due to the sharing of personal contact information.

5. METHODOLOGY

The development of the FindMyStuff platform follows a structured and modular approach that integrates intelligent matching with a user-friendly web-based system. The methodology includes System Architecture, Algorithm Integration, Backend Management, Frontend Development, and Deployment, ensuring efficiency, scalability, and reliability.

i. System Architecture and Flow

The overall system architecture is designed to provide a centralized and seamless interaction between users and the system. It consists of two primary modules: the User Panel and the Admin Panel, ensuring proper access control and functionality.

- **User Flow:** Authenticated users can access the system, submit details of lost or found items along with images, and view matched results generated by the system. The system continuously processes user inputs to identify potential matches and updates item status accordingly.
- **Admin Flow:** Administrators log in to the Admin Panel to manage system data through a dashboard that supports CRUD operations (Create, Read, Update, Delete). This ensures proper monitoring, removal of invalid entries, and maintenance of system accuracy.

ii. Heuristic Matching Algorithm Integration

The core functionality of the system is driven by a heuristic matching algorithm, which is responsible for identifying potential matches between lost and found items.

- **Algorithm Type:** A heuristic-based approach is used to compare multiple parameters such as item category, keywords, location tags, and timestamps to determine similarity.

- **Matching Output:** The system generates a match confidence score that indicates the probability of two items being related, helping users identify the most relevant matches quickly.
- **Continuous Improvement:** The system can be enhanced over time by incorporating user feedback and improving matching accuracy through refined logic or integration with advanced techniques like machine learning.

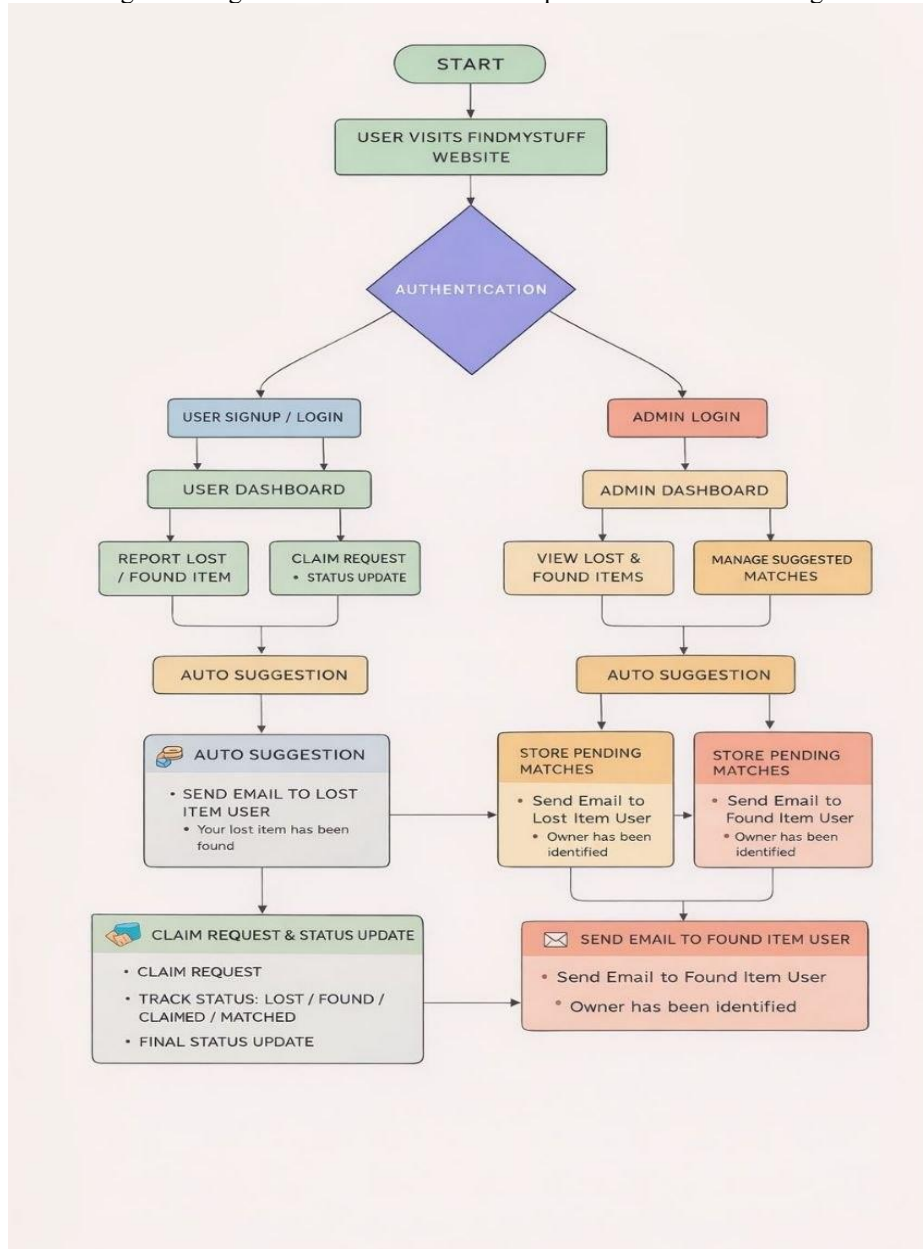


Chart -1: Data Flow Diagram of the FindMyStuff Platform

iii. Backend and Data Management

The backend is developed using Django and Django REST Framework, which handles API requests, authentication, and business logic efficiently.

- A structured database (SQLite) is used to store user data, item details, images, and status updates in an organized manner.
- Secure authentication mechanisms such as JWT tokens are implemented to ensure data privacy and controlled access.
- The system ensures efficient data retrieval and storage through optimized database design and indexing techniques.

iv. Frontend and User Interface (UI/UX)

The frontend of the system is designed using ReactJS and Tailwind CSS, focusing on responsiveness and ease of use.

- **User Authentication:** The login interface clearly distinguishes between user access and administrative access, ensuring secure and role-based functionality.
- **User Interaction:** Users can easily submit item details, upload images, search records, and view match results through an intuitive dashboard. **Responsive Design:** The interface is optimized for multiple devices, including desktops, tablets, and smartphones, ensuring accessibility across platforms.

v. Real-Time Notification and Communication System

The platform includes a real-time notification system that alerts users when a potential match is found.

- Notifications are delivered via email or in-app alerts, ensuring immediate communication.
- A secure internal communication mechanism allows users to coordinate item returns without sharing personal contact details, maintaining privacy and safety.

vi. Deployment and Scalability

The system is deployed on cloud platforms such as AWS, Render, or Heroku, ensuring high availability and scalability.

- Cloud deployment enables 24/7 accessibility and efficient handling of multiple users simultaneously.
- Regular backups and monitoring ensure data reliability and system performance.

This methodology ensures that the FindMyStuff system effectively integrates modern web technologies with intelligent matching techniques to provide a reliable, scalable, and user-friendly solution for lost-and-found management.

6. RESULTS

6.1. System Efficiency and Core Functionality

The FindMyStuff platform successfully achieved its primary objective of improving the efficiency of lost-and-found item recovery within a campus environment.

- Successful Item Matching: Upon submission of lost and found item details, the system successfully identified potential matches using the heuristic matching algorithm.
- Match Confidence Score: The system generated a match confidence score based on parameters such as category, keywords, location, and time, helping users identify the most relevant matches accurately.
- Automated Processing: The system reduced manual searching efforts by automatically linking related entries, thereby increasing recovery success rates.

6.2. Smart Retrieval and Notification System

The platform goes beyond simple data storage by providing intelligent retrieval and real-time communication features.

- Real-Time Notifications: Users received instant alerts via email or in app notifications whenever a potential match was detected, ensuring timely action.
- Detailed Item Information: The system displayed complete item details, including description, category, location, timestamp, and images, enabling easy verification.
- Secure Communication: Users were able to interact through a secure internal communication system, ensuring coordination without exposing personal information.

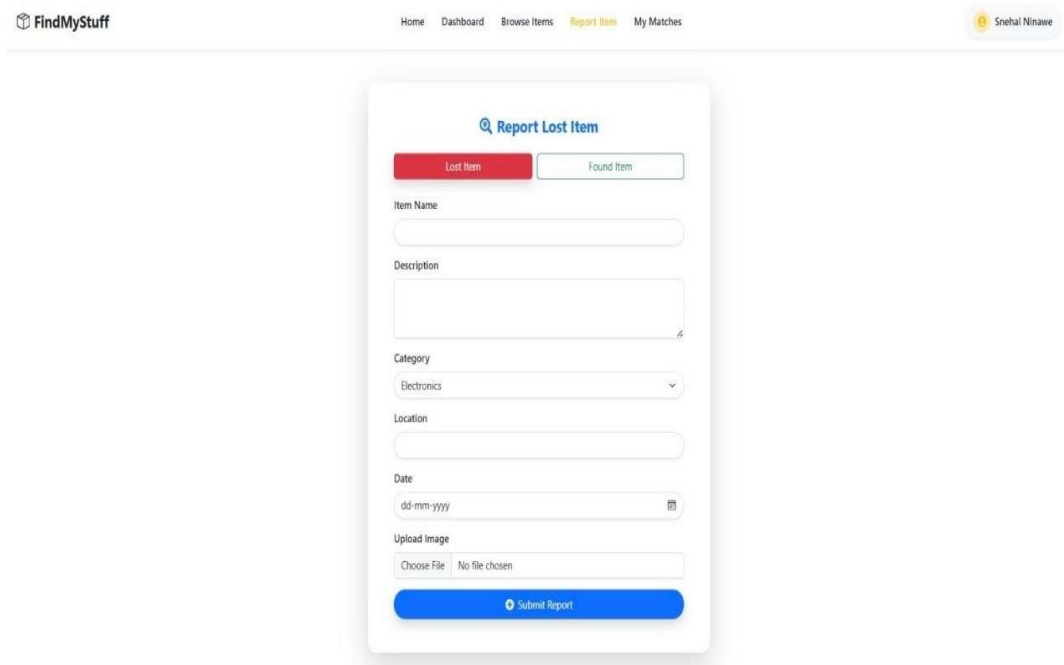


Chart -2: User Interface for Item Registration and Data Acquisition.

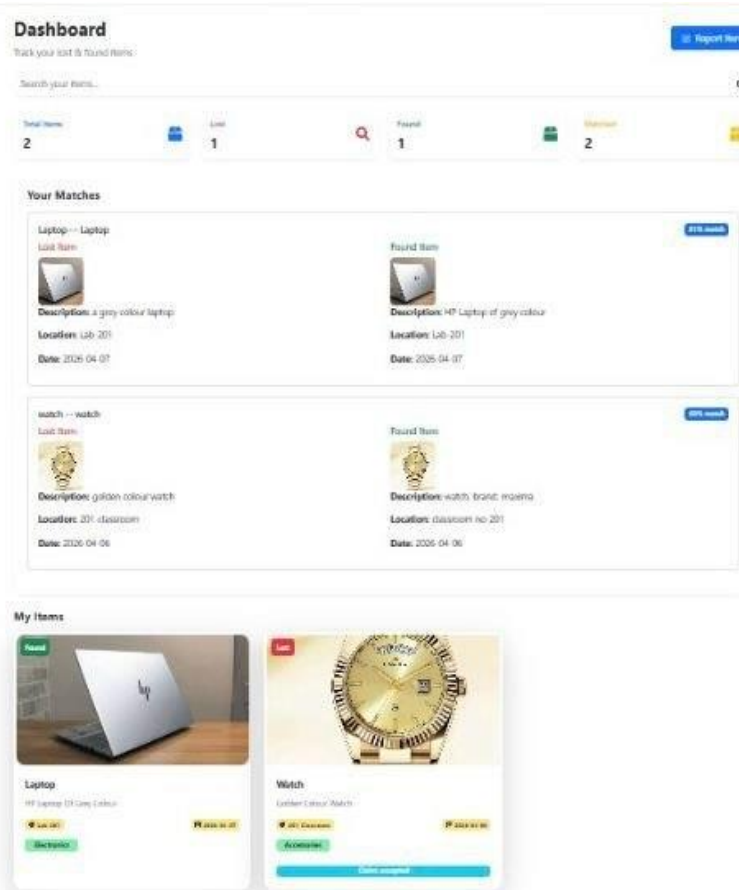


Chart -3: User Interface for Item Registration and Data Acquisition.

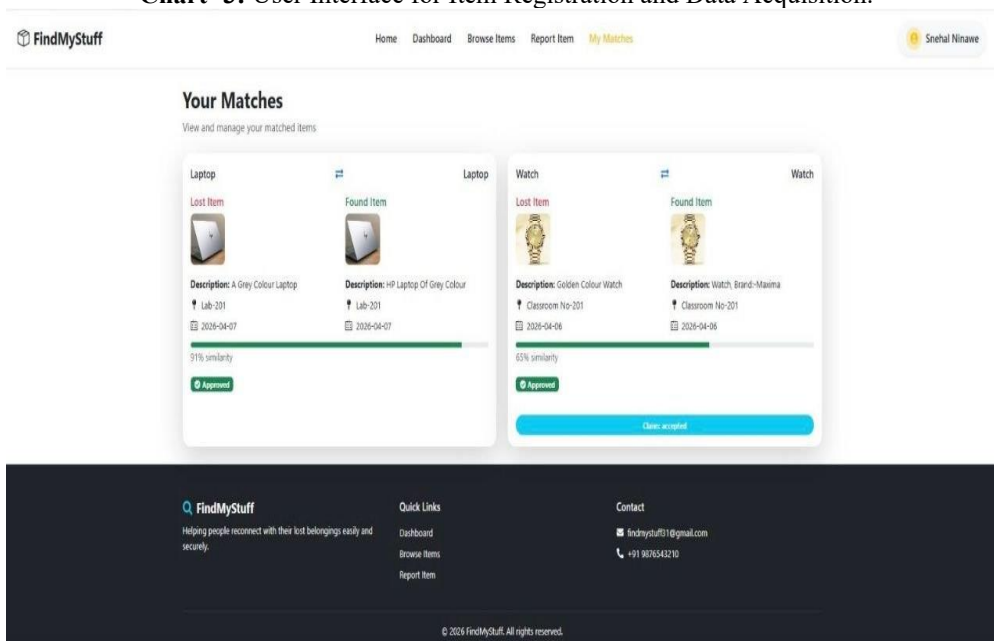


Chart-4: Automated Match Correlation displaying similarity percentages between reported items.

6.3. User Experience and Accessibility

The frontend design significantly enhanced usability and accessibility for all users.

- i. User Dashboard: The platform provided an intuitive dashboard where users could upload items, track status, and view matches efficiently.
- ii. Search and Filter Features: Users could easily search and filter items based on category, location, and keywords, improving navigation and usability.
- iii. Responsive Design: The application functioned smoothly across devices, including desktops, tablets, and smartphones, ensuring accessibility for all users.

6.4. Data Management and System Control

The backend system demonstrated effective data handling and administrative control.

- i. Authentication and Access Control: The system successfully differentiated between User Access and Admin Access, ensuring secure and role-based functionality.
- ii. Data Integrity and Management: The Admin Panel enabled efficient management of item records through add, update, and delete operations, maintaining database accuracy.

- iii. Database Performance: The structured database ensured fast data retrieval and efficient storage of item details, images, and user information.
- iv. Overall, the results demonstrate that the FindMyStuff system effectively improves lost-and-found management by combining automation, real-time communication, and user-friendly design into a reliable and scalable solution.

7. CONCLUSION

In conclusion, the FindMyStuff system successfully addresses the limitations of traditional lost-and-found methods by introducing automation, intelligent matching, and real-time communication. The system provides a scalable and secure solution for managing lost items within a campus environment. Its ability to integrate modern web technologies with practical problem-solving makes it a valuable tool for educational institutions.

8. FUTURE SCOPE

The system can be further enhanced by integrating mobile applications for better accessibility. Advanced features such as AI-based image recognition can improve matching accuracy. GPS-based location tracking and QR code integration can provide additional functionality. The system can also be expanded to support multiple campuses and integrated with official university platforms for wider adoption.

- i. Develop a mobile application to improve accessibility and ease of use.
- ii. Integrate AI-based image recognition for better item matching.
- iii. Add GPS-based tracking for accurate location details.
- iv. Implement QR code tagging for easy item identification.
- v. Integrate with university systems for wider usage.
- vi. Add analytics dashboard to track system performance.

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