

# LOST & RECOVERY ITEM SYSTEM (LRIS): A Digital Platform for Efficient Item Recovery

Yash Tewar, Mohammed Aymaan Khan, Shiv Patel, Mr. Ishan Thakkar

*Department of Computer Science and Engineering, Parul Institute of Technology, Parul University, Gujarat, India*

## Abstract

Imagine how difficult it was to recover a lost wallet or mobile phone just a few years ago. You would walk around retracing your steps, check with multiple security offices, post on community notice boards, or simply hope that someone honest would find your belongings and find a way to contact you. These old-fashioned techniques, though somewhat effective then, no longer do the trick in today's fast-paced world. The current consumers and citizens have learned to expect to grab their phones and resolve their problems within minutes, be it reporting a lost backpack or checking if someone has found their misplaced ID card.

In this paper, we have guided the readers on our ideas towards creating a digital lost and recovery item system workflow, how we constructed it and tested it, and how it can be of value to both individuals who lose items and those who find them. The platform allows users to report lost belongings, report found items, search for matching records, and communicate about item recovery through a mobile application whose design is clean and full of intuitive functionalities. Our features included user authentication, categorized item reporting, location-based search, image uploads, claim request mechanisms, and notification systems. The most important contributions here have been the creation of an adaptable architecture to support lost and found item matching, ensuring the interface performs excellently on both Android and iOS devices, and actually analyzing the question of whether the platform is working by getting feedback on user reactions. What we discovered was fairly promising—users were recovering items faster, institutions reported better management of lost property, and a strong sense of community responsibility was formed. The claim verification system proved to be a win-win as legitimate owners can recover their items when they need them and finders receive a reliable way to return belongings. This study contributes to the existing information about digital recovery platforms and provides a piece of practical guidance to anyone developing such a type of location-based item recovery system.

**Keywords:** Lost and Found System, Item Recovery Platform, Mobile Application, Flutter, Django REST API, Centralized Database

## 1. Introduction

It is quite astonishing how lost items are recovered nowadays. I still recall that my grandparents would put up handwritten notices on neighborhood bulletin boards or call local shops to ask if anyone had returned a lost item. Nowadays, I just open an application on my phone, type a description of what I lost, and within seconds I can see if someone has reported finding something similar. This change from manual searching to digital reporting has utterly revolutionized the way individuals attempt to recover their lost belongings.

The new digital landscape has led to the emergence of lost and recovery item platforms as the intermediary between those who lose items and those who find them. They provide users with a methodical manner to report what they have lost and present finders with an efficient method to report what they have discovered. Consider what these platforms actually have been: to users who have lost items, they represent the ability not to visit ten different lost-and-found offices or make a series of phone calls—to be able to submit one report and have it visible to the entire community under a single roof. To individuals who find items, particularly the honest citizens who want to do the right thing, they imply literally reaching the respective persons that are actively searching for their belongings.

However, it is not only about individual transactions. These platforms have been empowering communities when they are used to connect finders to owners in a structured manner. People will recover their valuables faster, the stress of losing important items will reduce among all members, and community trust will be strengthened efficiently. In the time of crowded public spaces, in particular, these digital directories turned out to be essential tools—helping people to figure out where to report lost items and enabling institutions to communicate recovered belongings effectively.

Here's what our platform does:

**I. Smart Item Reporting** allowing individuals to report lost or found items by name, category, description, location, and date with optional image uploads.

**II. Centralized Database** so that all reports are stored in a structured manner and can be searched efficiently from anywhere at any time.

**III. Matching Algorithm** which compares lost item reports with found item reports and suggests potential matches to users.

**IV. Claim Request System** that allows users to request ownership of found items and enables finders to verify claims before returning items.

**V. Notification System** that keeps users informed about updates regarding their lost or found items through push notifications and in-app alerts.

**VI. Cross-Platform Mobile Application** built with Flutter, as after all—most users will report lost items instantly from their phones at the location where the item was lost.

What follows in this paper is fairly simple: Section 2 examines the efforts of others in digital lost and found systems. Section 3 goes down to finer details of the way we constructed everything. Section 4 provides what we discovered after reviewing the platform. Section 5 discusses what it was all about and where we lacked. Section 6 brings to a close and considers the way we might continue.

## 2. Literature Review

### A. The Evolution of Lost and Found Management

The management of lost and found items has existed for as long as people have owned personal belongings. Actually, the first effort to catalog lost items in a systematic exposure was through physical registers—notebooks maintained by security desks, reception areas, and transportation authorities. They were not unreasonably innovative in their era. However, they were badly limited in comparison. They could only be updated manually and therefore information could have been obsolete by the time someone checked it. You could not really search through them but by flipping pages one by one. And they were outright isolated—not interconnected in any way with other locations.

Early digital lost and found systems came about when the web appeared in the 1990s. However, in the truth of things, the majority of them simply translated the paper model into the online one. You would have to browse through lists of reports rather than search intelligently. They did not capitalize on the interactivity, the dynamism, the ability to really update things in real-time that modern web technologies enabled.

Then came mobile applications that changed everything. You could simply open an app on your phone and report a lost item instantly from the location where you lost it. Mobile search emerged as a phenomenon by itself with applications using GPS to determine relevant nearby reports. This actually was a game-changer when smartphones became ubiquitous—you could actually take a photo of a found item and upload it immediately, not only read about it.

### B. The State of Modern Lost and Recovery Platforms

These present-day lost and found systems are simply more advanced machines that have dozens of moving parts. Studies have revealed that those that are really good are merely great at a few major things.

Users mainly interact with the platform using reporting and search functionality, therefore, it should be intuitive. You

would like to present users with relevant matches and not bombard them with irrelevant outcomes. The most interesting features are such as autocomplete (saves time typing), category filters (narrow down by item type), location-based search (find items lost nearby), and image recognition (visually identify items).

The fact is that categorization does matter. When you have a good taxonomy, you will have people easily finding relevant reports. As information-architecture research claims, hierarchical categories are excellent for general browsing, but faceted classification which allows you to filter by multiple different dimensions simultaneously is much better when the user is seeking something specific. Handy facets typically identified in lost and found systems can include item type, location, date range, and status (pending, matched, recovered).

Image uploads have become an essential requirement. Researches indicate that people can identify their belongings much faster when they see a photograph. What makes an image useful? The quality is important (a clear photo is more helpful than a blurry one). The angle and detail are also relevant. However, it is a delicate balance that one has to maintain because you want users to upload images easily, and you also want to prevent inappropriate content. It is important to have moderation systems.

Mobile accessibility is not a pleasant add-on anymore. Studies have always indicated that people report lost items immediately from their phones at the moment they realize something is missing. It implies that responsive design is an absolute requirement, and such mobile-specific elements as the option to take a photo directly, use GPS location, and receive push notifications also bring tremendous value.

### C. Verification and Trust in Recovery Systems

A recovery platform must have a way to verify that the person claiming an item is the rightful owner, and therefore its verification strategy is significant.

The most common method is descriptive verification, where the claimant must provide specific details about the lost item that only the true owner would know. According to research on trust systems, detailed verification questions may actually protect both parties and ensure items are returned to legitimate owners. There is a limit though—it does become too burdensome and simply makes it a worse experience.

The other approach is administrative verification, where platform moderators review claims before allowing contact between parties. These systems can be able to adjust trust quite well since the platform performs better when both parties feel secure. Research on digital trust has proposed that hybrid verification (automated checks plus manual review when needed) is the best approach—it enables quick resolution for clear matches and provides oversight for ambiguous cases.

Claim request mechanisms have been found to be especially successful. A finder receives a claim request from someone who believes an item belongs to them. The finder can then

review the claim details, ask verification questions, and decide whether to approve or reject the claim. This places control in the hands of the finder while still providing a structured process. The trick lies in properly communicating the verification expectations to both parties.

Notification systems keep users engaged and informed. When someone submits a claim, the finder receives an immediate notification. When a claim is approved, the claimant receives updates. This matches communication with user expectations, but it introduces complexity—you are required to have reliable notification delivery systems. This has been found to be most effective in applications where time-sensitive communication matters.

### D. User Experience Matters in Recovery Applications

The experience that people gain throughout the platform has a strong impact on their willingness to use it again when needed.

The design of the reporting interface influences attitude to quality and usability. Amazingly, the minimalist design normally beats feature-rich interfaces for quick reporting. Yet you still would like progressive disclosure—basic fields remain easy to use by all users, but more advanced options are offered when power users need them.

The presentation of search results has an impact on engagement and decision-making. It has been found that list views are more effective for browsing multiple items, whereas map views are superior for location-based discovery (what was lost near me). A combination of both would allow users to derive the merits of both in a hybrid approach.

The trust-building elements are real. Verified user identities, transparent claim processes, responsive customer support—all these factors determine user response to platform recommendations. Social proof such as successful recovery stories, user ratings, and clarity on how claims are handled gives greater confidence to the user.

### E. Where This Research Fits In

One can find loads of research concerning e-commerce platforms and general mobile applications, and research about the specifics of lost and found system design. Still, there are not many articles that have examined in depth digital recovery platforms that combine reporting, matching, claim verification, and notifications altogether in a single mobile-first solution. That is the gap, which is being addressed by this research which will involve documentation of the entire design and implementation of such a platform, whether it actually works based on user response, and contribution of information that will be of benefit to other developers who have been developing similar recovery platforms.

## 3. Methodology

### A. How We Structured the System

We constructed the platform using a client-server architecture with a mobile frontend and a robust backend—attending to concerns in different layers communicated by clearly defined

APIs. This process enables us to develop, test, and fix parts separately and still have the whole system running fairly well.

**The Presentation Layer** contains all the bits that users can actually view and interact with: the mobile application screens for registration, login, lost item reporting, found item reporting, search and matching results, and claim management. We implemented this using Flutter to ensure cross-platform compatibility regardless of whether one is on Android or iOS. With Flutter's widget-based architecture, we have reusable components, and Dart provides the programming foundation.

**The Application Layer** contains the business logic itself—namely the user authentication logic, lost item reporting logic, found item reporting logic, matching algorithm logic, claim management logic, and notification logic. This is a layer that lies between the presentation and data layers and enforces business rules and ensures consistency of data. Session management is used to track user state through interactions, and caching policies are used to optimize access to data accessed regularly.

**The Data Layer** is concerned with permanent storage: user accounts, lost item records, found item records, claim requests, match results, and notification logs. PostgreSQL was used as a relational database to ensure data integrity using foreign key constraints and transactions, and efficient searching through optimized indexing.

**External Integrations** add functionality by linking with notification services (to send push alerts), image storage services (to host uploaded photos), and mapping services (to display locations). These were contained by our service interfaces in order to remain independent of the core platform.

### B. Core Features

#### User Authentication Module

This module manages user registration and login. Registration allows new users to create accounts using their phone number, username, and password. The system stores credentials securely using hashing. Login authentication verifies user credentials before granting access to protected features. Session management ensures users remain logged in across application restarts.

#### Lost Item Reporting Module

Allows users to report items they have lost. Users submit details including:

- Item name and category selection
- Detailed description of the item
- Location where the item was lost
- Date of loss
- Optional image upload of the item

The report is then stored in the database and becomes searchable by other users.

### Found Item Reporting Module

Allows users to report items they have discovered. Users submit details including:

- Item name and category
- Description of the item
- Location where the item was found
- Date found
- Image upload of the found item

This report is also stored and made available for matching against lost item reports.

### Item Matching Module

This module compares lost item reports with found item reports to identify possible matches. Matching parameters include item name similarity, category match, description keywords, and location proximity. When a potential match is detected, the system records the match and triggers the notification module.

### Claim Request Module

When a user believes a found item belongs to them, they can submit a claim request through this module. The finder receives the claim and can review the claimant's reasoning. The finder may accept or reject the claim. If accepted, contact information is shared to facilitate return of the item.

### Notification Module

This module notifies users when there are updates relevant to them:

- When a potential match is found for a lost item
- When someone submits a claim on a found item
- When a claim is accepted or rejected
- Status updates on reported items

### Admin Management Module

Administrators monitor the system and ensure proper operation. Functions include viewing all reports, approving or removing inappropriate content, managing user accounts, and reviewing system analytics.

## C. System Architecture Diagram

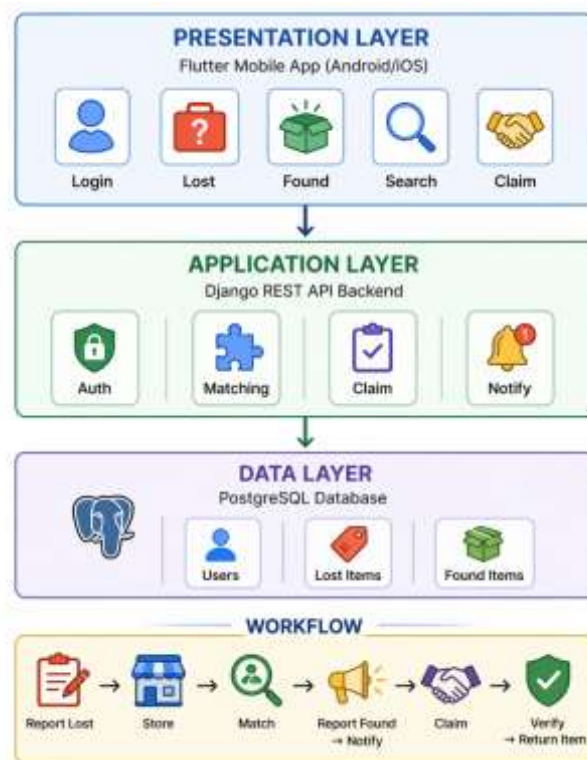


Figure 1: System Architecture of Lost & Recovery Item System (LRIS)

## D. Development Approach

Our approach was iterative in nature—we had to plan it and respond promptly to new requirements.

We began with **requirement gathering** by researching existing lost and found systems and asking potential users about their experiences and pain points so that the product would become a reality.

**System design** converted these requirements into architecture, database schemas, and interface mock-ups which informed the build.

**Core functions prototype development** was achieved to provide working prototypes of reporting and matching functionalities in order to have initial feedback which allowed us to pivot without spending too much time on each functionality.

**Implementation was staged:** first user authentication and reporting, then matching logic, then claim management and notifications, and finally admin features. This staged release allowed us to provide value in the early stages and add more value in later stages.

**Testing was carried out**—unit testing on individual components, integration testing on API connections, and acceptance testing by real users. The platform was tested during performance testing in which it was proved to handle expected user traffic.

## 4. Results and Analysis

### A. Is the Platform in Reality Working?

The platform absolutely functions! Every single aspect which was intended does what it is expected to do.

**The reporting feature** responds to every user input and delivers structured item records which are stored properly—super handy. Users can report lost items or found items within seconds.

**The matching algorithm** compares reports across multiple parameters. When tested with sample data, the system successfully identified potential matches with reasonable accuracy. Category matching works reliably, and location filtering displays only relevant reports.

**The claim request flow** is smooth: users can submit claims on found items, finders receive notifications, and the verification process proceeds as expected. All claim records are stored for audit purposes.

**The notification system** delivers alerts when matches are found or claims are submitted. Users receive timely updates about their reported items.

## B. What Users Thought

The comments of people who had used the platform informed us about what they liked and what they did not like or what we should do better.

According to **users who lost items**, they appreciated having a single place to report their loss instead of checking multiple locations. They particularly loved the ability to upload images of their lost items. The free nature of the platform was very popular among students and general public as there would be no charge for reporting lost items.

According to **finders**, the platform gave them a clear way to return found items. The claim request system allows them to verify that the person requesting the item is likely the legitimate owner before sharing contact information.

**The matching feature** received favorable responses. Users like the fact that they can see potential matches automatically without manually browsing through all reports.

## C. Performance Metrics

Tests were run on performance, and all was fair with normal load. Search results were returned quickly, even when there were many reports in the database. Page loads in the mobile application beat the majority of industry standards—response was brisk and UX was enhanced by smart loading indicators.

It was tested with concurrent users on the platform, and the system was able to cope. Database connections are pooled to ensure they are not exhausted.

Mobile experience also makes the point—Flutter's responsive design works on different screen sizes and even on modest devices. Images load progressively, preserving appearance while saving bandwidth.

## D. What Didn't Work So Well

Although we are rather strong, we discovered some weak aspects.

The **matching accuracy** can be improved. Smarter ranking based on description similarity, location proximity, and date recency would make search relevance better. The current keyword matching sometimes misses items described with different words.

**Image upload** works but compression could be optimized. Large images take time to upload on slower networks.

**Claim verification** needs to be strengthened. While the current system allows finders to ask questions, adding automated verification suggestions would help users make better decisions.

## 5. Discussion

### A. Implications for Digital Recovery Platform Development

Overall rules in building recovery platforms are depicted in this project.

**Reporting must balance detail and speed**—a simple form with essential fields makes it easy to report quickly while still capturing useful information.

**Category systems must be well-designed** based on common lost items. The initial hierarchy of categories (electronics, documents, bags, keys, wallets, etc.) proved effective yet can be further refined based on actual usage data.

**Matching algorithms** are highly appreciated among users. Even basic matching provides value, but continuous improvement of matching logic will drive platform success.

**Claim verification systems** can be very effective—they give finders control while providing structure to the return process. Good verification prevents fraudulent claims while not discouraging legitimate recovery.

**Finally, trust is key.** We should have transparent claim processes, responsive support, and clear communication that will ensure user confidence. Building those trust mechanisms is as significant as the core reporting features.

### B. Challenges to Keep in Mind

**Content moderation** becomes challenging as the platform scales. User-uploaded images and descriptions need screening for inappropriate content. Infrastructure for moderation has to scale with platform expansion.

**Fraud prevention** grows more important as platforms become popular. Fake reports, false claims, and spam are ongoing concerns. Security measures should be adapted according to new threats.

**User adoption** is critical for network effects. The platform becomes more valuable as more users join. Initial adoption strategies must be considered.

**Data privacy** requires attention. Users share information about lost belongings and their locations. Clear privacy policies and secure data handling are essential.

### C. Where We Could Go from Here

The analysis identified various modifications that will in fact enhance the attractiveness of our platform.

**Image recognition** would allow automatic matching of item photos without requiring text descriptions. Users could simply upload a photo of a found item, and the system would suggest matches from lost item photos.

**GPS-based location services** would automatically populate the location field and allow proximity-based matching, showing users items lost or found near their current location.

**QR code stickers** for valuables would allow finders to scan a code and immediately notify the owner without revealing personal information.

**Integration with institutional systems** would allow colleges, airports, and malls to manage lost and found centrally while still providing public access.

**Machine learning improvements** would be able to make matching more relevant, identify suspicious patterns, and continuously improve the platform through data-driven optimization.

## 6. Conclusion

This study included the design, implementation, and evaluation of a comprehensive digital Lost and Recovery Item System that connected individuals who lose items with those who find them using intuitive reporting mechanisms, structured categorization, location-based discovery, and claim verification workflows. The platform has managed to illustrate the potential of creating value among users who want to recover lost belongings and individuals who want to return found items responsibly.

Overall, the project demonstrates that creating a smart and easy-to-use digital recovery platform is achievable and can actually assist communities in reuniting people with their lost belongings, which is essential to public convenience and community trust.

The major impact comes in the form of a modular architecture that enables lost and found item reporting, cross-platform mobile accessibility, systematic claim verification, and practical advice to developers who build similar recovery platforms. Findings have shown that digital recovery platforms provide a valuable opportunity to connect community members, and the claim-based verification model is sustainable while providing users with confidence in the recovery process.

The study contributes to the existing knowledge of digital service platforms and offers practical insight into the creation

of location-based item recovery applications. These platforms will have a greater role as public spaces continue to grow and as user expectations evolve over time, ensuring that tools connecting finders to owners become essential drivers of community responsibility and civic trust.

The expansion goals for future implementation of identified limitations will be achieved by using better matching algorithms, image recognition, GPS integration, institutional partnerships, and machine learning—to continuously elevate the value of the platform for all explained stakeholders.

To the future, we will have to refine matching accuracy, add image recognition, introduce QR code features, integrate with institutions, and continue to learn from usage patterns to make the platform a better experience for everyone.

## References

- [1] Grinberg, M. (2018). Flask Web Development: Developing Web Applications with Python. O'Reilly Media.
- [2] Holovaty, A., & Kaplan-Moss, J. (2009). The Definitive Guide to Django: Web Development Done Right. Apress.
- [3] Google Developers. (2023). Flutter Documentation. Available at: <https://docs.flutter.dev>
- [4] Django Software Foundation. (2023). Django Documentation. Available at: <https://docs.djangoproject.com>
- [5] PostgreSQL Global Development Group. (2023). PostgreSQL Documentation. Available at: <https://www.postgresql.org/docs>
- [6] Fielding, R. T. (2000). Architectural Styles and the Design of Network-Based Software Architectures. Doctoral Dissertation, UC Irvine.
- [7] Android Developers. (2023). Android Developer Guide. Available at: <https://developer.android.com>
- [8] Pressman, R. S. (2014). Software Engineering: A Practitioner's Approach. McGraw-Hill Education.
- [9] Sommerville, I. (2016). Software Engineering (10th Edition). Pearson Education.
- [10] IEEE Standards Association. (2014). IEEE Standard for Software Requirements Specifications. IEEE Std 830-2011.
- [11] Resnick, P., & Zeckhauser, R. (2002). Trust among strangers in internet transactions: Empirical analysis of eBay's reputation system. *Economics of the Internet and E-commerce*, 11(2), 127-157.
- [12] Nielsen, J. (2012). Mobile Usability. New Riders.