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AI-Powered Lost and Found Platform

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Abstract— Losing personal belongings is a common problem in educational institutions, railway stations, shopping centres, offices, hospitals, and other public places. Traditional lost-and-found systems generally depend on manual reporting, physical registers, notice boards, or social media posts. These methods often make it difficult to identify matching items, especially when the number of reports increases. Differences in descriptions, missing photographs, delayed communication, and limited search facilities can further reduce the chances of recovering lost belongings.

This research paper proposes an AI-Powered Lost and Found Platform that uses artificial intelligence, machine learning, natural language processing, computer vision, and similarity-based retrieval to improve the process of locating lost items. The proposed system allows users to submit lost-item and found-item reports containing text descriptions, images, approximate locations, and dates. The platform processes the information and identifies potentially related reports by comparing visual features, semantic text representations, and contextual information.

INTRODUCTION

Losing valuable belongings can create inconvenience, financial loss, and unnecessary stress. Everyday objects such as mobile phones, wallets, identity cards, bags, books, keys, electronic accessories, and documents are frequently misplaced in crowded or unfamiliar environments. When an item is lost, its owner generally attempts to locate it by contacting nearby staff, visiting lost-and-found counters, searching online groups, or asking other people.

Although these methods can sometimes work, they are usually dependent on manual effort and the availability of accurate information. A person who loses an item may not know where it was found or whether another person has already submitted a report. Similarly, someone who finds an object may not know how to contact its owner safely.

Traditional lost-and-found systems also face difficulties when different people describe the same object differently. For example, one user may report a “dark blue college bag,” while another may describe the corresponding found object as a “navy backpack with a front pocket.” A basic keyword search may fail to identify these reports as related because the descriptions do not contain exactly the same words.

I. PROBLEM STATEMENT AND OBJECTIVES

A. Traditional lost-and-found systems rely on manual searching, physical registers, notice boards, and social media posts to locate missing belongings. These methods are time-consuming and often fail to identify matching items because users may provide incomplete descriptions, different keywords, or unclear photographs. Finding the correct item becomes more difficult when the number of reports increases and information is scattered across multiple platforms.

B. Objectives

1. To develop a centralized platform for submitting and managing lost-item and found-item reports.

2. To implement AI-based matching using text descriptions and photographs to identify potentially related items.

3. To use Natural Language Processing (NLP) to understand different descriptions of the same or similar objects.

4. To apply Computer Vision to extract visual features from item photographs and compare images.

5. To improve search accuracy by considering item categories, approximate locations, dates, and other available information.

Scope

The scope of the AI-Powered Lost and Found Platform is to develop an intelligent and secure system that helps users report, search for, and recover lost belongings. The platform uses artificial intelligence to compare lost-item and found-item reports and identify potential matches automatically.

II. EXISTING AND PROPOSED SYSTEM A.

Existing System

The existing lost-and-found system generally relies on manual methods to report, search for, and recover lost belongings. People usually report missing items to security staff, lost-and-found departments, reception counters, or through notice boards and social media platforms. The person who finds an item may submit it to the authorities or publish a description online so that the owner can identify it.

C. Proposed System

the proposed system is an AI-Powered Lost and Found Platform that uses Artificial Intelligence (AI), Natural Language Processing (NLP), Computer Vision, and similarity-based search to simplify the process of locating and recovering lost belongings

C. Expected Benefits

the platform aims to make lost-and-found services more efficient, accessible, and secure by combining AI-based matching with centralized reporting and a structured recovery process. Actual improvements in matching accuracy and recovery rates will need to be verified through testing.

Module	Technology	Output
Management	Python, FastAPI	Registration
Report	HTML, CSS, JavaScript	Lost/found item details and images
Text Processing	NLP, Sentence Transformers	Semantic description analysis
Image Processing	Computer Vision	feature extraction
AI Matching Engine	Python, AI Models	Potential matching items
Similay Search	Vector Database	Ranked matching results
Database Management	SQLite / PostgreSQL	User and item records

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A. Dependency Analysis

Dependency analysis for the AI-Powered Lost and Found Platform identifies the software, hardware, libraries, and services required for the system to function properly

B. Local AI Explanation

Local AI refers to running artificial intelligence models on a local computer or server instead of relying entirely on external cloud-based AI services.

C. Handover Report Generation

the Handover Report Generation module is an important feature of the proposed AI-Powered Lost and Found Platform. It generates a structured report when a lost item is successfully matched with a found item and handed over to its verified owner.

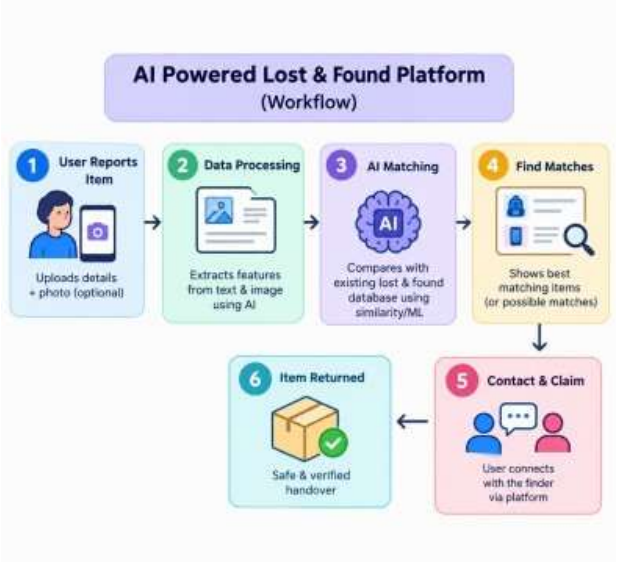
D. Supporting Change Impact Analysis

Supporting Change Impact Analysis is the process of identifying and evaluating the effects of proposed changes on the AI-Powered Lost and Found Platform. It helps developers understand which system components may be affected before modifying existing features or introducing new functionality.

E. Testing and Security Checks

Pytest can run the project's available tests before and after a change. The system compares pass/fail outcomes and reports newly failing tests as possible regression signals. Optional secret and dependency scanners may identify exposed credentials or known vulnerable packages; each finding should include its source and require validation

F. Overall workflow of the proposed AI powered lost and found platform platform.



SYSTEM MODULES

A. Project Scanner and Code Analyzer

The scanner inventories the project, locates supported Python files and test files, and passes source files to the AST analyzer. The analyzer extracts functions, classes, and imports into structured records.

Technical Information and Dependency Module

This module stores lost and found item details, including descriptions, images, categories, dates, and locations, in a centralized database..

B. Local AI Explanation and Report Module

This module uses NLP and computer vision to identify similar lost and found items and generate match recommendations for users.

C. Change, Test, and Security Modules

D. This module notifies users about potential matches, supports ownership verification, and protects personal information through secure access controls.

TOOLS AND TECHNOLOGIES

The AI-Powered Lost and Found Platform uses Python for backend development, FastAPI for API integration, and HTML, CSS, and JavaScript for the user interface. Natural Language Processing (NLP) matches item descriptions, while computer vision compares uploaded images.

III. EVALUATION PLAN AND LIMITATIONS

The platform will be evaluated using sample lost and found reports. Precision, recall, F1-score, matching accuracy, and response time will measure performance. Limitations may include incomplete descriptions, similar-looking objects, and insufficient data. Human verification will be necessary before returning items to claimants.
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Local AI refers to running artificial intelligence models on a local computer or server instead of relying entirely on external cloud-based AI services.

CONCLUSION

The AI-Powered Lost and Found Platform combines NLP and computer vision to identify potential matches between lost and found items. It aims to simplify item recovery through automated matching, notifications, and secure ownership verification. Future improvements will focus on accuracy, multilingual support, scalability, and privacy protection.

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