

Department of CSE (AI & AIML)

Lost and Found App Using Deep Learning

Guide:

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Name of Projectees

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Introduction

***Justifications for Selecting
the Title***

Problem Statement

Literature Survey

Block Diagram

Expected Result

Work plan

References

The Lost and Found Using Deep Learning project introduces an AI-powered system designed to revolutionize the way we handle lost and found items. Key features include:

Utilization of state-of-the-art deep learning models:

- BLIP (Bootstrapping Language-Image Pre-training) for advanced image captioning
- BERT (Bidirectional Encoder Representations from Transformers) for sophisticated textual matching

Key Components:

- Automated process for identifying, describing, and matching lost items with found items
- Real-time notification system for potential matches
- User-friendly interface for reporting lost items and uploading found items
- Scalable solution capable of handling a large number of items and users
- Integration of image recognition and natural language processing technologies

Why “Lost and Found Using Deep Learning”?

- **Addresses a Universal Problem:** Losing personal items is a common issue that affects people worldwide, causing stress, inconvenience, and potential financial loss.
- **Innovative Approach:** By leveraging deep learning techniques, the project offers a novel solution to an age-old problem, moving beyond traditional manual systems.
- **Technological Relevance:** The use of cutting-edge AI technologies like BLIP and BERT showcases the practical applications of recent advancements in machine learning.
- **Efficiency and Scalability:** Deep learning models can process and analyze vast amounts of data quickly, making the system highly efficient and scalable for large-scale deployments.
- **Interdisciplinary Nature:** The project combines elements of computer vision, natural language processing, and user interface design, highlighting the versatility of AI applications.

The Core Problem:

The main challenge is to develop an AI-powered Lost and Found System that automates and optimizes the process of matching lost items with found items using advanced deep learning techniques.

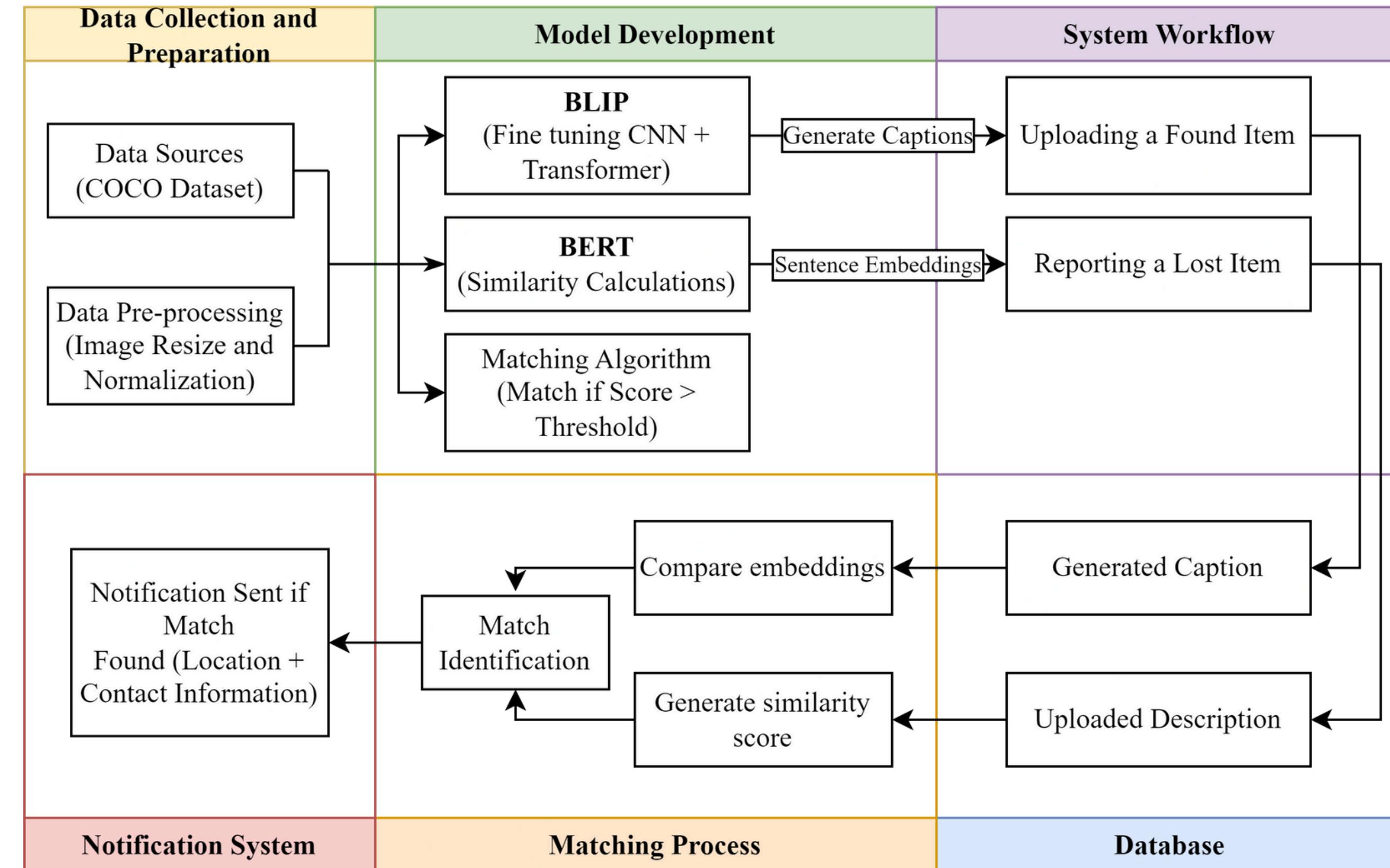
Sub-Problem:

- Efficiently analyze and process images of found items
- Generate accurate and detailed descriptions of found items using image captioning technology
- Compare user-submitted descriptions of lost items with generated captions of found items
- Provide a user-friendly interface for reporting lost items and uploading found items
- Implement a real-time notification system to alert users of potential matches
- Ensure high accuracy in item matching to minimize false positives and improve user satisfaction

Technical Challenges:

- Scale effectively to handle a large number of items and users across various locations
- Maintain user privacy and data security throughout the process
- Reduce the time and effort required to recover lost items compared to traditional manual systems

Sr. No.	Paper Title	Details of Publication	Findings
1	Automated Image Captioning System	Abu Musa Sakib, Sumyia Afnan Mukta and Md. Yakub Hossain - ResearchGate	This paper presents an image captioning model using CNNs and RNNs, trained on the COCO dataset to generate descriptive captions for images
2	Find Mine: Find the Lost Items via Mobile App	Akhilesh Kumar Choudhary Bharat Sanchar Nigam Limited - IEEE	This paper introduces the "FindMine" mobile app, which allows users to post and search for lost items by tagging their location and description.
3	Image Captioning: Transforming Objects into words	Simao Herdade, Armin Kappeler, Kofi Boakye, Joao Soares	The paper introduces the Object Relation Transformer, which improves image captioning by incorporating spatial relationships between objects using geometric attention.



Upon successful implementation of the Lost and Found Using Deep Learning system, the following outcomes are anticipated:

Automated Caption Generation:

- Highly accurate and detailed descriptions of found items generated by the BLIP model
- Consistent quality of captions across various types of items and image qualities

Efficient Database Management:

- A well-organized, searchable database of found items, including images, captions, and metadata
- Fast retrieval and comparison of items for matching purposes

High Matching Accuracy:

- Significant improvement in matching accuracy compared to traditional keyword-based systems
- Low false positive rate, ensuring users are not overwhelmed with incorrect matches

Real-Time Notifications:

- Instant alerts to users when potential matches for their lost items are found
- Reduced time between item loss and recovery

User Satisfaction:

- Measurable reduction in time and effort required to find lost items
- Positive user feedback on the system's ease of use and effectiveness

Scalability:

- Successful handling of a large number of items and users without significant performance degradation
- Ability to deploy the system across multiple locations or organizations

Results

Generated Caption: a blue backpack with a blue and yellow design



Generated Caption: a black usb cable with a white and black cable



Generated Caption: a wallet with a credit card in it

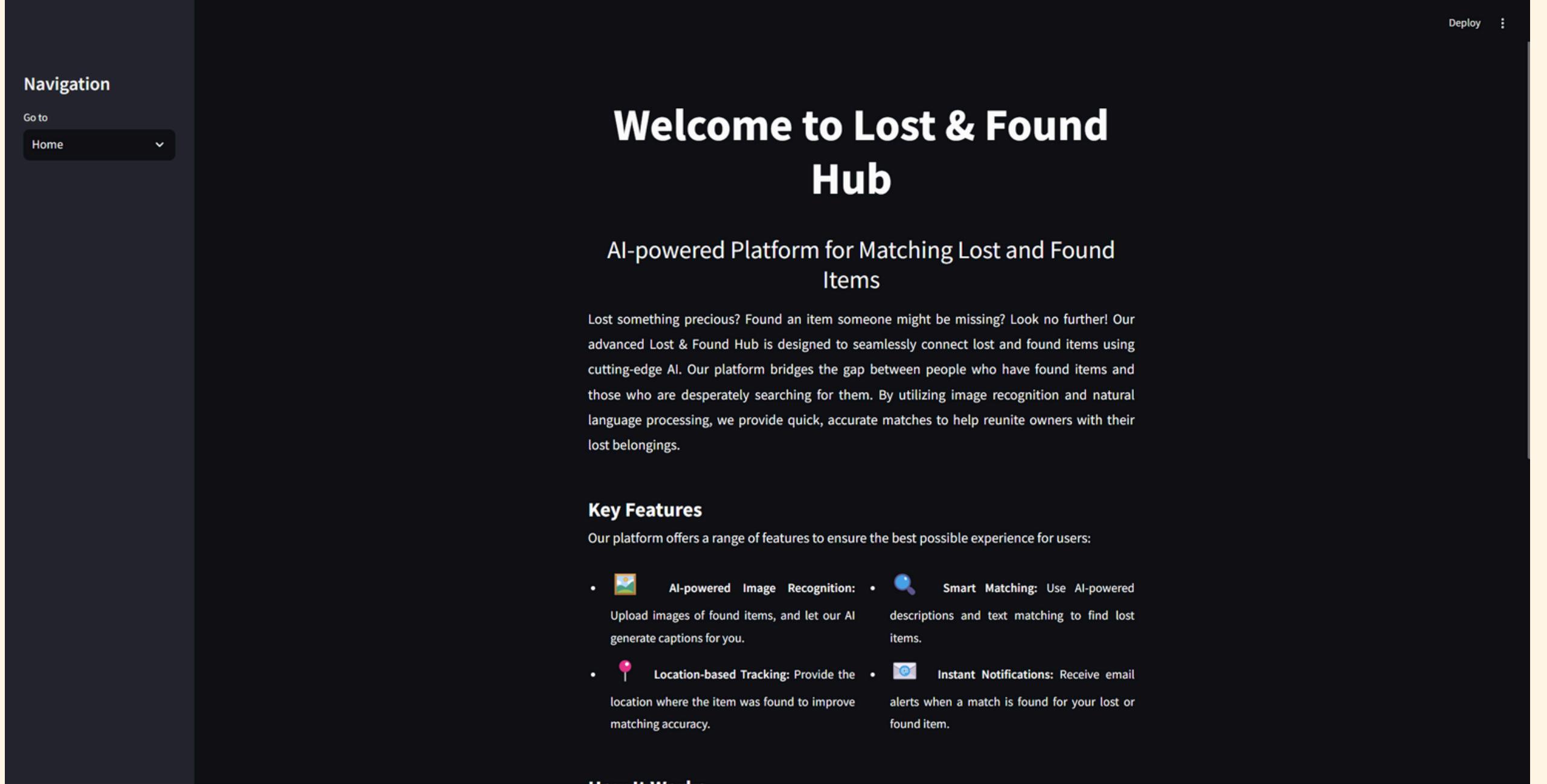


Generated Caption: the glasses are made from clear plastic and have a clear frame



Generated Caption: blank id badge with blank paper and blank tag on black background





The screenshot shows a dark-themed web application interface. On the left, there's a vertical navigation bar with a "Navigation" section, a "Go to" dropdown set to "Home", and a "Deploy" button. The main content area has a title "Welcome to Lost & Found Hub" and a subtitle "AI-powered Platform for Matching Lost and Found Items". Below this is a descriptive paragraph about the platform's purpose and how it uses AI for matching lost items. A "Key Features" section follows, listing five items with icons: AI-powered Image Recognition, Smart Matching, Location-based Tracking, Instant Notifications, and another unlabeled feature. At the bottom, there's a "Next" button.

Navigation

Go to

Home

Deploy

Welcome to Lost & Found Hub

AI-powered Platform for Matching Lost and Found Items

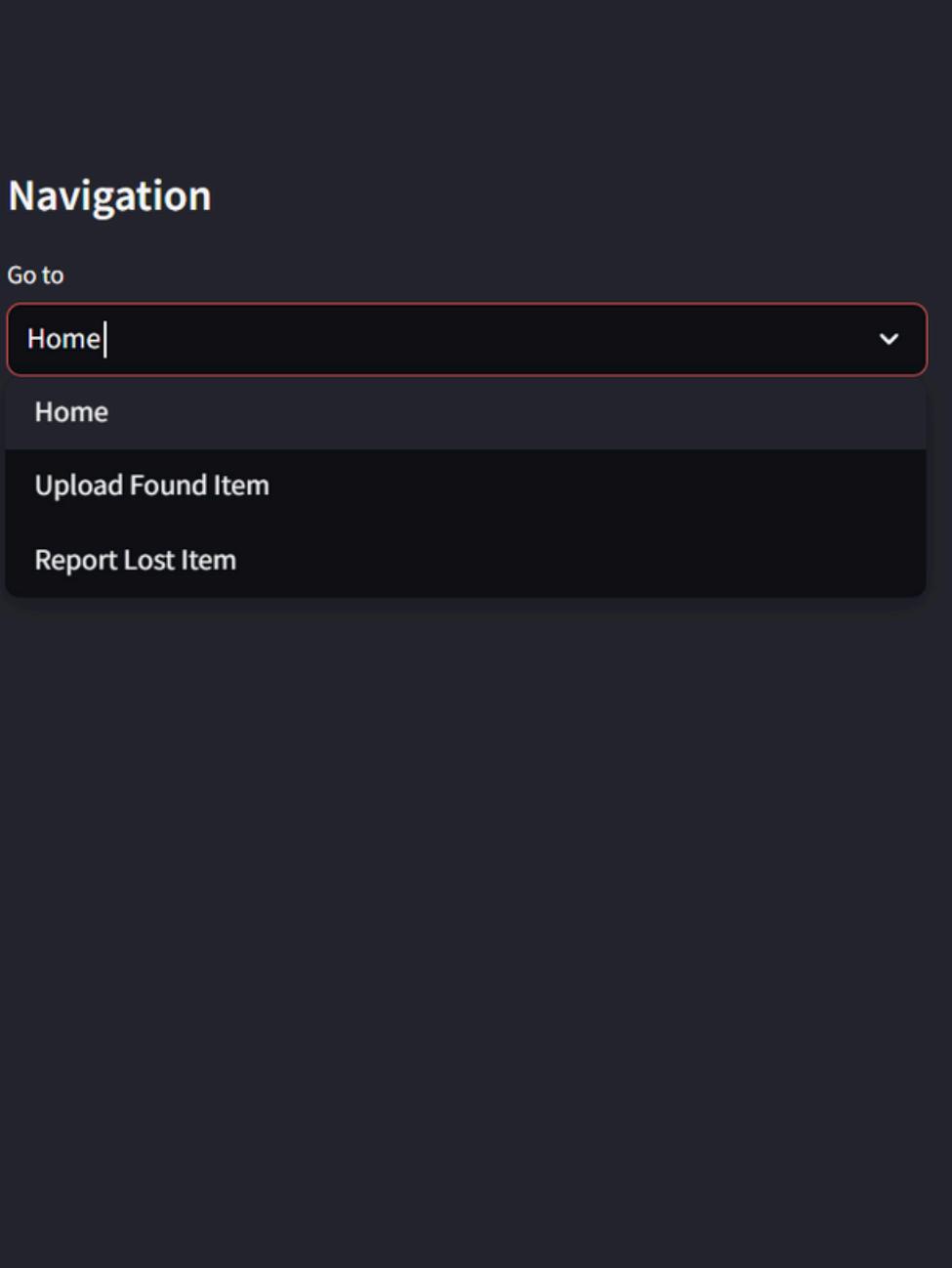
Lost something precious? Found an item someone might be missing? Look no further! Our advanced Lost & Found Hub is designed to seamlessly connect lost and found items using cutting-edge AI. Our platform bridges the gap between people who have found items and those who are desperately searching for them. By utilizing image recognition and natural language processing, we provide quick, accurate matches to help reunite owners with their lost belongings.

Key Features

Our platform offers a range of features to ensure the best possible experience for users:

-  **AI-powered Image Recognition:** Upload images of found items, and let our AI generate captions for you.
-  **Smart Matching:** Use AI-powered descriptions and text matching to find lost items.
-  **Location-based Tracking:** Provide the location where the item was found to improve matching accuracy.
-  **Instant Notifications:** Receive email alerts when a match is found for your lost or found item.

Next



The screenshot shows a dark-themed web application interface. On the left, there's a vertical navigation bar with a "Navigation" section, a "Go to" dropdown set to "Home", and a "Deploy" button. The main content area has a "Home" link highlighted in red, and other links for "Upload Found Item" and "Report Lost Item".

Navigation

Go to

Home

Upload Found Item

Report Lost Item

Upload Your Found Item

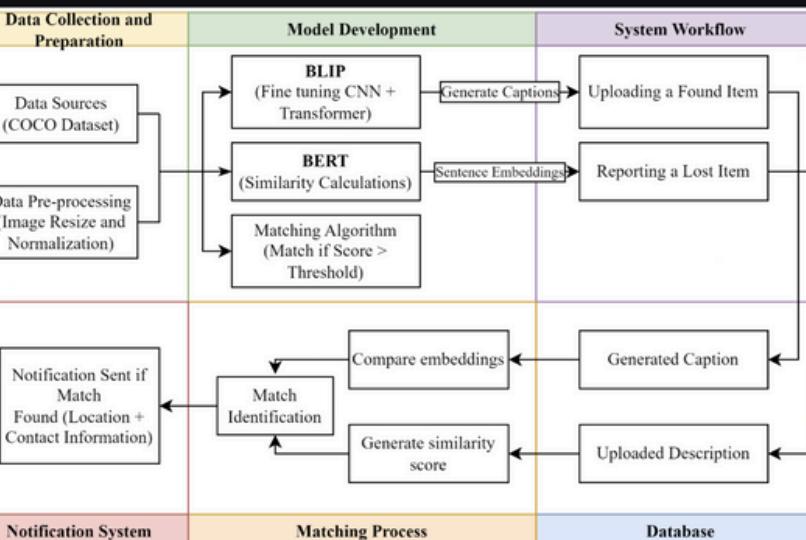
Upload an image of the found item

+
Drag and drop file here
Browse files

How Our AI Models Help with Matching

Our platform leverages two powerful AI models to help match lost and found items efficiently.

Here's how they work:



```

graph TD
    subgraph DataCollection [Data Collection and Preparation]
        DS[Data Sources (COCO Dataset)]
        DPP[Data Pre-processing (Image Resize and Normalization)]
    end
    subgraph ModelDevelopment [Model Development]
        BLIP[BLIP (Fine tuning CNN + Transformer)]
        BERT[BERT (Similarity Calculations)]
        MA[Matching Algorithm (Match if Score > Threshold)]
    end
    subgraph SystemWorkflow [System Workflow]
        UAI[Uploading a Found Item]
        RL[Reporting a Lost Item]
    end
    subgraph NotificationSystem [Notification System]
        NS[Notification Sent if Match Found (Location + Contact Information)]
    end
    subgraph MatchingProcess [Matching Process]
        CE[Compare embeddings]
        GI[Match Identification]
        GS[Generate similarity score]
        UD[Uploaded Description]
        GC[Generated Caption]
    end
    subgraph Database [Database]
        DS --> BLIP
        DS --> BERT
        BLIP --> GC
        BERT --> GC
        MA --> RL
        MA --> NS
        GC --> GI
        GI --> NS
        GI --> RL
        UD --> GS
        GS --> GI
    end

```

AI Workflow for Lost & Found Matching

Upload Your Found Item

Upload an image of the found item

+
Drag and drop file here
Browse files

Where did you find the item?
Near the Classroom

Enter your contact number
9763718343



Uploaded Image

How would you like to generate the caption?

Manually Enter
 AI-generated

Generated Caption: the cat eye sunglasses

Proceed


raisoni
EDUCATION

Nagpur | Pune | Jalgaon | Amravati | Pandhurna | Bhandara

Navigation

Go to Report Lost Item

Report Your Lost Item

Describe Your Lost Item
Provide a detailed description of your lost item
Cat eye Sunglasses

Your Contact Information
Enter your contact number
9421580640
Enter your email address
test.minorp@gmail.com
Submit Report

How Reporting Works
If you've lost something valuable, we're here to help! Simply provide a detailed description of the item, along with your contact details. Our AI system, powered by BERT, will analyze the description and continuously scan through the database of found items. When a match is found, you'll be notified immediately via email.
To increase the chances of finding your item, please be as specific as possible when describing

Report Your Lost Item

Describe Your Lost Item
Provide a detailed description of your lost item
Cat eye Sunglasses

Your Contact Information
Enter your contact number
9421580640
Enter your email address
test.minorp@gmail.com
Submit Report

Your lost item report has been submitted successfully! We will notify you if a match is found.

Matching in Progress...
Our system is now scanning the database to find potential matches for your lost item. If a match is found, you will receive an email with details about the found item and instructions on how to recover it.

Match found! The item was found at Near the Classroom. Contact: 9763718343.

Months Activities	July'24	August'24	Sept'24	Oct'24
Literature Reviews	√			
Requirement Analysis	√			
Designing	√			
Experimental Analysis	√	√	√	
Module wise Implementation		√	√	
Testing and Debugging			√	√
Preparation of Project Report				√

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Thank you !