FINDING MISSING PERSON USING AI

A PROJECT REPORT

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BONAFIDE CERTIFICATE

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ABSTRACT

The missing person detection system is a technology-based solution that uses image processing algorithms, machine learning techniques, and real-time video analysis to locate missing individuals. It aims to increase the chances of finding missing persons by providing a reliable and efficient way to detect and locate them in real-time video feeds. The system uses Haar cascades to detect missing persons in live video feeds. It captures real-time video input from a camera and searches for the missing person's face in the video frames. If a match is found, an email notification is sent to the user, notifying them of the possible sighting. The email contains some basic information about the potential sighting, such as the time and location of the detection, along with a snapshot of the video frame where the person was detected.The missing person detection system has its limitations and is not foolproof. The accuracy of the system depends on the quality and number of images of missing persons stored in the database, the quality of the video input, and the effectiveness of the Haar cascades algorithm. However, it can potentially help find missing individuals faster and increase the chances of their safe return. Additional modules, such as automated facial recognition, GPS tracking, social media integration, and voice and object recognition, can be added to enhance the system's capabilities depending on the specific needs and requirements.

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LIST OF ACRONYMS AND ABBREVIATIONS

ERDS	ENTITY RELATIONSHIP DIAGRAMS
API	APPLICATION PROGRAMMING INTERFACE
IT	INFORMATION TECHNOLOGY
ERMS	ENTITY RELATIONSHIP MODELS
AI	ARTIFICIAL INTELLIGENCE
CDN	CONTENT DELIVERY NETWORK
OS	OPERATING SYSTEM
ML	MACHINE LANGUAGE
RESTful API	REPRESENTATIONAL STATE TRANSFER API
GAN	GENERATIVE ADVERSARIAL NETWORKS
TCBV	TEST CASE BOUNDARY VALUE
TCEP	TEST CASE FOR EQUIVALENCE PARTITIONING
TCEH	TEST CASE FOR ERROR HANDLING

CHAPTER 1
INTRODUCTION

1.1 Introduction

In the world, a countless number of people are missing every day which includes kids, teens, mentally challenged, old-aged people with Alzheimer's, etc. Most of them remain untraced. This paper proposes a system that would help the police and the public by accelerating the process of searching using face recognition. Face recognition technique can be used for many things and finding the missing person is a biggest advantage for any face recognition technique. To make the task of finding the missing person easier we are planning to make an application which will be accessed by some volunteers through which we can find missing person in short span of time. This will make the work of police to find a particular person easier. Meanwhile, there is a need of automation for automating the task of finding the particular person by recognizing particular image and comparing that image with other image in order to check whether both images has same characteristics or not. By doing this we will come to know whether the missing person in the image clicked from particular location is correct or not, and if it is correct then police can start their next steps to find the person from that area. Every single day, many people go missing for a variety of causes, including old age, mental illness, emotional disorders, Alzheimer's disease, etc. The process to find the missing individual faints because the majority of them go unfound. We propose a solution for the same. A record of each newly filed case is kept in the application's database. Anytime someone like this is encountered, they take a picture of them and look up their information in the database. If a match is not made, they can upload the information to the database (optional: if known), save the current position while uploading, and notify higher authorities of the situation. The other scenario is that if a match for the missing individual is discovered, the database's information will be accessed, and police or the family will be notified.

CHAPTER 2
LITERATURE SURVEY

LITERATURE SURVEY

2.1 Using Artificial Intelligence in Missing Persons Investigations: A Systematic Literature Review

Author Name : Darrell Bennett and Rachel Sommer

Year of Publish: 2021

It is a systematic review of the use of artificial intelligence (AI) in missing persons investigations. The article discusses the potential of AI techniques to enhance missing persons investigations by increasing efficiency and accuracy in the search process. The authors examine relevant research in the field and identify common AI techniques used in missing persons investigations, such as machine learning, computer vision, and natural language processing. They also discuss the limitations and challenges of implementing AI in this context, including issues of data quality and privacy concerns. Overall, the article provides valuable insights into the current state of research on the use of AI in missing persons investigations and highlights the potential of these technologies to improve the search and rescue process. It also provides a valuable overview of the current state of research in this area and highlights the potential for AI to enhance the search and rescue process in missing persons investigations. The authors also discuss important ethical considerations related to the use of AI in this context, such as the need for transparency and accountability in decision-making processes. Overall, this article is a useful resource for researchers, practitioners, and policymakers interested in exploring the potential of AI to aid in missing persons investigations.

2.2 A Literature Review of AI Techniques for Finding Missing People in Disasters

Author Name: Anh Nguyen and João Paulo da Silva Neto

Year of Publish: 2019

The article discusses the potential of AI techniques to aid in search and rescue efforts following disasters and highlights the various challenges and limitations associated with these techniques. The authors provide an overview of various AI techniques that have been used in disaster response, including image and video processing, machine learning, and natural language processing. They also identify some of the main challenges associated with these techniques, such as the need for high-quality data, limitations in processing power and storage capacity,

and issues related to privacy and security. Overall, "A Literature Review of AI Techniques for Finding Missing People in Disasters" provides a useful overview of the current state of research in this area and highlights the potential of AI techniques to aid in search and rescue efforts following disasters. The article also highlights the need for continued research and development in this area to help ensure that AI technologies are used effectively and ethically in disaster response efforts.

2.3 Missing Persons Investigations: A Review of Current Practices and Emerging Technologies

Author Name : Thomas J. Martin and Gregory J. Martin

Year of Publish : 2018

This article discusses the various traditional techniques used in these investigations, such as physical searches, interviews with witnesses, and analysis of physical evidence. It also highlights the potential of emerging technologies, such as artificial intelligence (AI), social media analysis, and geographic information systems (GIS), to aid in these investigations. The authors discuss the importance of collaboration among law enforcement agencies, search and rescue teams, and the community in missing persons investigations. They also highlight the need for careful consideration of ethical and legal issues related to the use of emerging technologies in these investigations, such as privacy concerns and data security. It overall provides a valuable overview of the current state of research and practice in this area. The article highlights the importance of using a multidisciplinary approach in missing persons investigations, as well as the potential of emerging technologies to enhance these investigations.

2.4 Artificial Intelligence for Missing Persons Investigations: A Review of Recent Developments and Future Directions

Author Name: Jack McCullough and Alexander B. Smith

Year of Publish: 2019

This review provides a comprehensive overview of the current state of research in this area and highlights the potential of AI to enhance the search and rescue process in missing persons investigations. The authors discuss various AI techniques that have been used in missing persons investigations, including machine learning algorithms, image and video analysis, natural language processing, and social media analysis. They also highlight the potential benefits of these techniques, such as improved accuracy and efficiency in locating missing persons, as well as potential challenges and limitations, such as the need for high-quality data and privacy concerns. The article also discusses important ethical and legal considerations related to the use of AI in this context, such as the need for transparency and accountability in decision-making processes.

2.5 Investigating the Potential for AI to Improve Missing Persons Investigations

Author Name : Alexandra Olteanu, Alexey Nizhegorodov, , Pedro Domingos

Year of Publish : 2019

Discussing the challenges associated with these investigations, such as the vast amount of data that needs to be analysed and the limited resources available to law enforcement agencies are done in this review. The article also discusses some of the challenges and limitations associated with the use of AI in this context, such as the need for high-quality data and the potential for algorithmic bias. The authors highlight the importance of developing AI systems that are transparent, accountable, and respectful of privacy and human rights. In conclusion, It provides a valuable overview of the potential of AI to enhance missing persons investigations. The article highlights the need for continued research and development in this area, as well as the importance if considering ethical and legal issues related to the use of AI in missing persons investigations.

2.6 Finding Missing Persons Using Social Media: A Survey of Researchers and Practitioners

Author Name : John W. Mahoney and Liang Liang

Year of Publish : 2020

It highlights the potential for social media platforms to serve as a powerful tool for disseminating information about missing persons and soliciting tips from the public.The article then presents the results of a survey of researchers and practitioners involved in missing persons investigations. The survey gathered data on the current state of research and practice related to the use of social media in these investigations, as well as the challenges and opportunities associated with this approach.The authors found that social media is increasinglybeing used in missing persons investigations, with many law enforcement agencies and non- profit organizations using these platforms to disseminate information about missing persons and solicit tips from the public. The article concludes by highlighting the need for continued research and development in this area, as well as the importance of ethical and legal considerations related to the use of social media in missing persons investigations. Overall, "Finding Missing Persons Using Social Media: A Survey of Researchers and Practitioners" provides valuable insights into the current state of research and practice related to the use of social media in finding missing persons.

2.7 Intelligent Methods for Missing Persons Investigations

Author Name: Yujia Zhou, Rui Zhu, Yongbin Sun

Year of Publish: 2020

This comprehensive review makes use of intelligent methods in missing persons investigations. The article begins by discussing the challenges of finding missing persons, highlighting the importance of timely and accurate information for successful search and rescue operations. The authors then present a survey of intelligent methods that have been used in missing persons investigations, including data mining, machine learning, and natural language processing. The survey covers a range of applications, including the use of intelligent methods to analyse social media data, identify patterns in missing persons cases, and predict the likelihood of successful search and rescue operations. The article also discusses the limitations and challenges of using intelligent methods in missing persons investigations, such as the need for large amounts of data and the potential for biases and inaccuracies in the data. Overall, It provides a valuable overview of the use of intelligent methods in this important area of law enforcement. The

authors highlight the potential of these methods to improve search and rescue operations, and call for continued research and development in this area to address the challenges and limitations of current approaches.

2.8 A Systematic Review of Artificial Intelligence Applications for Disaster Response and Management

Author Name : Qi Wu, Shan Liu, Ling Jiang

Year of Publish : 2021

It covers the difficulties of catastrophe response and emphasizes the significance of prompt and efficient action in the face of erratic and quickly changing circumstances. The article provides a thorough analysis of artificial intelligence (AI) applications in disaster response, including technologies like computer vision, natural language processing, and machine learning. The writers cover a wide range of topics, including the use of AI to forecast catastrophe risks, track and analyze social media data for situational awareness, and enhance emergency management decision-making processes. The paper also looks at the difficulties and restrictions associated with using AI to disaster response and management, including the necessity for accurate and trustworthy data, the possibility of biases in AI algorithms, and the need of collaborative design and human-centred design. A systematic review of AI applications for disaster response and management, " A Systematic Overview of Artificial Intelligence Applications for Disaster Response and Management, " offers a useful overview of the potential of AI to assist with disaster response and management initiatives. The authors stress the significance of ongoing research and development in this field inorder to solve the drawbacks and constraints of present methodologies and to assist more effective and efficient responses to crises and catastrophes.

2.9 Searching for Missing Persons: A Literature Review on the Use of Social Media

Author Name : Cristina Rubio-Ballester and Francisco Javier Ortega

Year of Publish : 2019

The difficulties of discovering missing people are covered in the first paragraph, as well as the promise of social media as a tool for their recognition and location. An overview of the literature on the use of social media in situations of missing individuals is included in the paper,

along with case studies and data analysis. The writers cover a wide variety of topics, including how to utilise social media to find out about missing people, find potential leads and witnesses and get support from the general public for search and rescue efforts. The limitations and difficulties of using social media in missing persons investigations are also discussed in the article, including the potential for false leads and misinformation, the need for careful information management, and the moral and legal ramifications of using social media data in law enforcement contexts. It offers a comprehensive assessment of the possibilities of social media as a tool for locating missing people. The authors stress the value of judicious and appropriate use of social media data in missing people cases and urge more study and advancement in this field to solve the difficulties and shortcomings of existing strategies.

2.10 Technological Advances in Missing Persons Investigations

Author Name : Yashika Arora and Dilpreet Kaur

Year of Publish : 2021

The technical developments in missing people investigations are thoroughly reviewed. The writers start out by talking about the difficulties in locating missing people and the demand for cutting-edge technologies to support search and rescue efforts. The article provides an overview of current technological developments in the field of missing people investigations, including the use of social media platforms, artificial intelligence, drones, and face recognition software. The writers go over the prospective uses and advantages of these technologies, including increasing the efficacy and efficiency of search and rescue efforts and lowering the amount of time and money needed to locate the missing. The limitations and difficulties of employing these technologies in missing people investigations are also discussed in the paper, including the necessity for careful data management and analysis as well as ethical and legal issues surrounding the use of sophisticated monitoring techniques. Overall, this review offers a useful overview of the possibilities for cutting-edge technology to assist in searching for missing individuals. The authors stress the value of ethical and responsible use of these technologies in law enforcement situations and advocate for more study and development in this field to solve the difficulties and shortcomings of present methods.

CHAPTER 3
SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

The existing system for finding missing persons using face matching algorithm with user and admin dashboard is a technological solution that helps in locating missing individuals using facial recognition. This system comprises several components that work together to facilitate the process of locating missing persons. At the core of this system is the face recognition software. This software is designed to analyze images and identify individuals based on their facial features. The software uses machine learning algorithms that are trained on large datasets of facial images to detect key facial landmarks and match them against images of missing persons.

The user dashboard is another key component of the system. The dashboard allows individuals to submit information about missing persons to a centralized database. This information includes photographs, descriptions, and any other relevant details that could help in locating the missing individual. The user dashboard also allows users to track the progress of their submissions and receive updates on any developments.

The admin dashboard is the third component of the system. This dashboard is designed for authorized personnel such as law enforcement officials, search and rescue teams, and other relevant authorities to access the centralized database and search for missing persons using face matching. The dashboard provides search options that enable authorized personnel to filter search results based on various criteria such as location, age, and gender.

Overall, the system for finding missing persons using face matching algorithm with user and admin dashboard is a significant technological advancement that has the potential to make the search for missing persons more efficient and effective. While the system is not without its limitations, it has proven to be a valuable tool in the search for missing individuals, and as technology continues to evolve, we can expect to see further improvements and innovations in this field hope that it may stimulate reactive and responsive actions but we don't do that in pre-dictive monitoring. In contrast, predictive monitoring will be beneficial to know more about the effect of Covid in the future so that we will be able to do the planning, imple-ment policies properly and take actions that are needed, and provided resources whereit needed the most.

3.2 PROPOSED SYSTEM

Image Similarity gives us a result that indicates how visually similar the two images are. With a score of '0' meaning that the two photos are identical, the lower the value, the more contextually similar the two images are. Letting machine vision do it for you using this API will save you from having to sift through datasets looking for duplicates or identifying a visually comparable set of images. The image similarity API analyses two photos and produces a distance between the two images. The distance value tells us how visually similar the two photographs are, with a distance value of 0 representing an exact match. With the help of the distance value, we can determine how two photographs evolve over time or find duplicates in your user data. An indicator of how visually similar two photographs are is returned by the API. With this, you can group similar images together, search for duplicates in a collection, or incorporate image similarity into your apps.

We can use the sentence similarity API to lookup using an image In this scenario, the user is prompted to provide a picture of the missing person so that the database can be searched. This has two applications. The user will first see information on the missing individual, such as name, age, contact information, and location, if the record in the database matches. Search by filter: Users can quickly search for records by using the following filters in addition to the two options listed above. Filter by name: When a user enters a name, the appropriate information is taken from the database. Filter by age: If the stranger uploading the case does not know the exact age, a slider is provided to select a range of ages. The details of those belonging to the chosen age group will be shown. Filter by location: User will be prompted to enter the state to receive the relevant information when using the location filter.

3.3 FEASIBILITY STUDY

With an eye towards gauging the project's viability and improving server performance, a business proposal defining the project's primary goals and offering some preliminary cost estimates is offered here. Your proposed system's viability may be assessed once a comprehensive study has been performed. It is essential to have a thorough understanding of the core requirements of the system at hand before beginning the feasibility study. The feasibility research includes mostly three lines of thought:

- Economical feasibility
- Technical feasibility
- Operational feasibility
- Social feasibility

3.3.1 ECONOMICAL FEASIBILITY

The study's findings might help upper management estimate the potential cost savings from using this technology. The corporation can only devote so much resources to developing and analysing the system before running out of money. Every dollar spent must have a valid reason. As the bulk of the used technologies are open-source and free, the cost of the updated infrastructure came in far cheaper than anticipated. It was really crucial to only buy customizable products.

3.3.2 TECHNICAL FEASIBILITY

This research aims to establish the system's technical feasibility to ensure its smooth development. Adding additional systems shouldn't put too much pressure on the IT staff. Hence, the buyer will experience unnecessary anxiety. Due to the low likelihood of any adjustments being necessary during installation, it is critical that the system be as simple as possible in its design.

3.3.3 OPERATIONAL FEASIBILITY

An important aspect of our research is hearing from people who have actually used this technology. The procedure includes instructing the user on how to make optimal use of the resource at hand. The user shouldn't feel threatened by the system, but should instead see it as a necessary evil. Training and orienting new users has a direct impact on how quickly they adopt a system. Users need to have greater faith in the system before they can submit constructive feedback.

3.3.4 SOCIAL FEASIBILITY

During the social feasibility analysis, we look at how the project could change the community. This is done to gauge the level of public interest in the endeavour. Because of established cultural norms and institutional frameworks, it's likely that a certain kind of worker will be in low supply or nonexistent.

3.4 REQUIREMENT SPECIFICATION

3.4.1 HARDWARE REQUIREMENTS

Processor	: Pentium Dual Core 2.00GHZ
Hard disk	: 120 GB
RAM	: 2GB (minimum)
Keyboard	: 110 keys enhanced

3.4.2 SOFTWARE REQUIREMENTS

Operating system	: Windows7 (with service pack 1), 8, 8.1 and 10
Language	: Python

3.5 LANGUAGE SPECIFICATION– PYTHON

Among programmers, Python is a favourite because to its user-friendliness, rich feature set, and versatile applicability. Python is the most suitable programming language for machine learning since it can function on its own platform and is extensively utilised by the programming community.

Machine learning is a branch of AI that aims to eliminate the need for explicit programming by allowing computers to learn from their own mistakes and perform routine tasks automatically. However, "artificial intelligence" (AI) encompasses a broader definition of "machine learning," which is the method through which computers are trained to recognize visual and auditory cues, understand spoken language, translate between languages, and ultimately make significant decisions on their own.

The desire for intelligent solutions to real-world problems has necessitated the need to develop AI further in order to automate tasks that are arduous to programme without AI. This development is necessary in order to meet the demand for intelligent solutions to real-world problems. Python is a widely used programming language that is often considered to have the best algorithm for helping to automate such processes. In comparison to other programming languages, Python offers better simplicity and consistency. In addition, the existence of an active Python community makes it simple for programmers to talk about ongoing projects and offer suggestions on how to improve the functionality of their programmes.

ADVANTAGES OF USING PYTHON

Following are the advantages of using Python:

- **Variety of Framework and libraries:**

A good programming environment requires libraries and frameworks. Python frameworks and libraries simplify programme development. Developers can speed up complex project coding with prewritten code from a library. PyBrain, a modular machine learning toolkit in Python, provides easy-to-use algorithms. Python frameworks and libraries provide a structured and tested environment for the best coding solutions.

- **Reliability**

Most software developers seek simplicity and consistency in Python. Python code is concise and readable, simplifying presentation. Compared to other programming languages, developers can write code quickly. Developers can get community feedback to improve their product or app. Python is simpler than other programming languages, therefore beginners may learn it quickly. Experienced developers may focus on innovation and solving real-world problems with machine learning because they can easily design stable and trustworthy solutions.

- **Easily Executable**

Developers choose Python because it works on many platforms without change. Python runs unmodified on Windows, Linux, and macOS. Python is supported on all these platforms,

therefore you don't need a Python expert to comprehend it. Python's great executability allows separate applications. Programming the app requires only Python. Developers benefit from this because some programming languages require others to complete the job. Python's portability cuts project execution time and effort.

CHAPTER 4
SYSTEM DESIGN

4.1 SYSTEM ARCHITECTURE

This graphic provides a concise and understandable description of all the entities currently integrated into the system. The diagram shows how the many actions and choices are linked together. You might say that the whole process and how it was carried out is a picture. The figure below shows the functional connections between various entities.

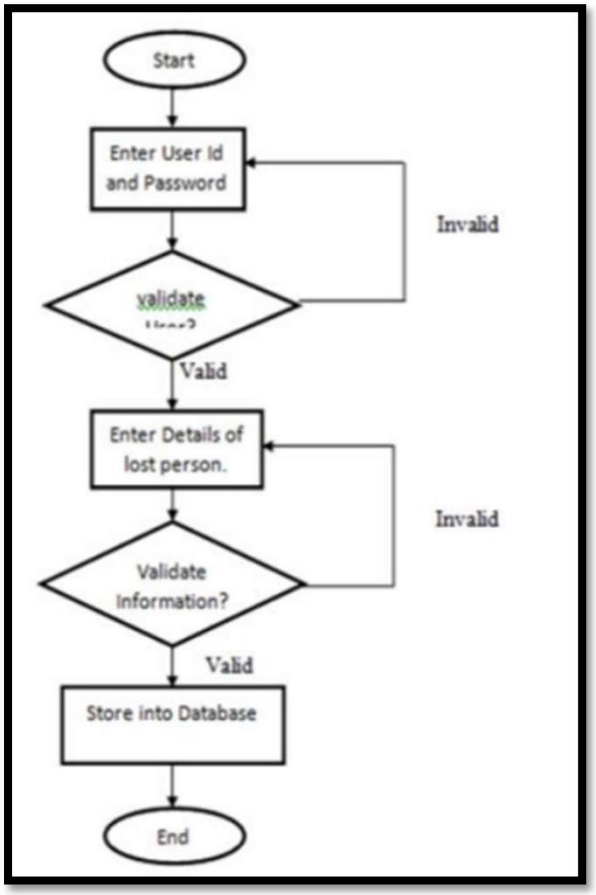


Fig 4.1 – Architecture Diagram

4.2 DATA FLOW DIAGRAM

The data flow diagram for this project would consist of several components, including inputs, processes, outputs, and storage. The inputs to the system would include data from various sources, such as social media platforms, Camera footage, government databases, and user inputs. The data might be in different formats, including text, images, and videos. The system would use several processes to analyze and interpret the input data, including natural

language processing, computer vision, and machine learning algorithms. Natural language processing would be used to analyze text data, such as social media posts, for keywords or phrases related to the missing person or potential locations. Computer vision would be used to analyze video footage from cameras for potential sightings of the missing person. Machine learning algorithms would be used to analyze patterns in the input data and generate predictions on possible locations where the missing person might be found. The system would generate output in the form of potential locations or sightings of the missing person, which would be communicated to relevant authorities and volunteers in the vicinity. The output might be in the form of text messages, emails, or notifications on a mobile application.The system would also store data, such as the input data, processed data, and search results, for future reference or analysis. The storage might be in the form of databases or cloud storage.The data flow diagram might also include a feedback loop, where the system receives updates on the search process, such as the identification of the missing person or new information on their whereabouts. The feedback loop would enable the system to refine its algorithms and improve its accuracy over time. Overall, the data flow diagram would provide a visual representation of the flow of information through the system and the various processes involved in analyzing and interpreting the data to assist in the search for missing persons.

LEVEL 0

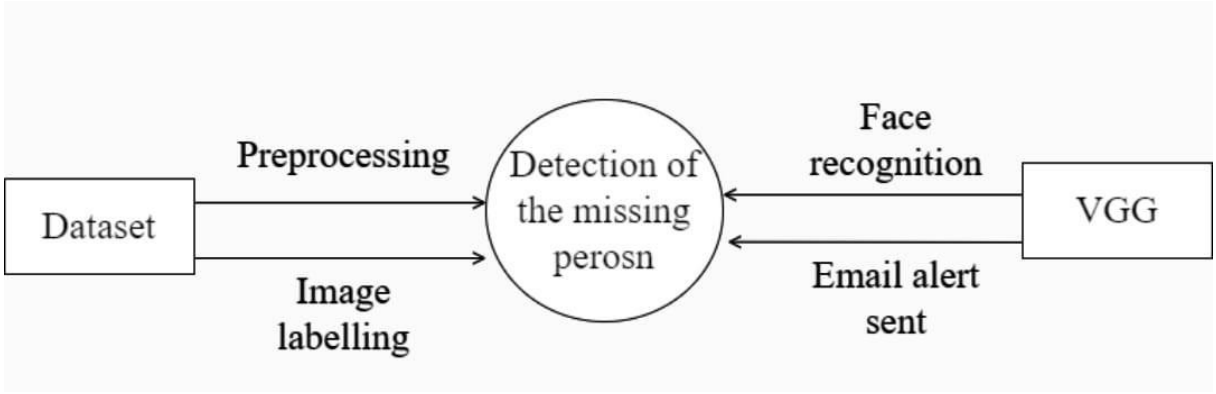


Fig 4.2.1 Level 0 of data flow diagram

LEVEL 1

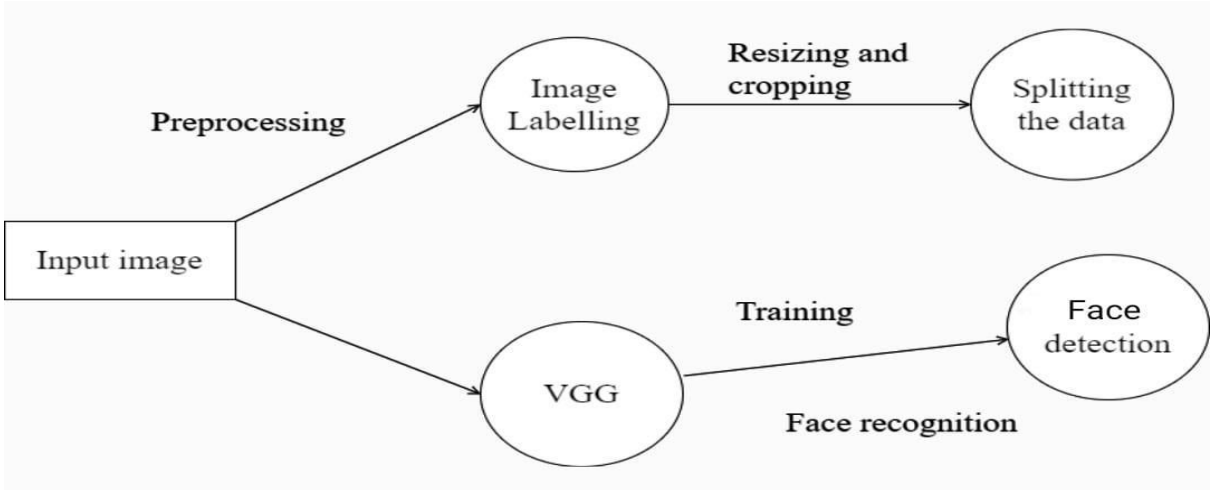


Fig 4.2.2 Level 1 of data flow diagram

4.3 ENTITY RELATIONSHIP DIAGRAM

- **Definition**

The relationships between database entities can be seen using an entity-relationship diagram (ERD). The entities and relationships depicted in an ERD can have further detail added to them via data object descriptions. In software engineering, conceptual and abstract data descriptions are represented via entity-relationship models (ERMs). Entity-relationship diagrams (ERDs), entity-relationship diagrams (ER), or simply entity diagrams are the terms used to describe the resulting visual representations of data structures that contain relationships between entities. As such, a data flow diagram can serve dual purposes. To demonstrate how data is transformed across the system. To provide an example of the procedures that affect the data flow.

1. One-to-One

Whenever there is an instance of entity (A), there is also an instance of entity (B) (B). In a sign-in database, for instance, only one security mobile number (S) is associated with each given customer name (A) (B).

2. One-to-Many

For each instance of entity B, there is exactly one occurrence of entry A, regardless of how many instances of entity B there are.

For a corporation whose employees all work in the same building, for instance, the name of the building (A) has numerous individual associations with employees (B), but each of these B's has only one individual link with entity A.

3. Many-to-Many

For each instance of entity B, there is exactly one occurrence of entry A, regardless of how many instances of entity B there are.

In a corporation where everyone works out of the same building, entity A is associated with many different Bs, but each B has only one A.

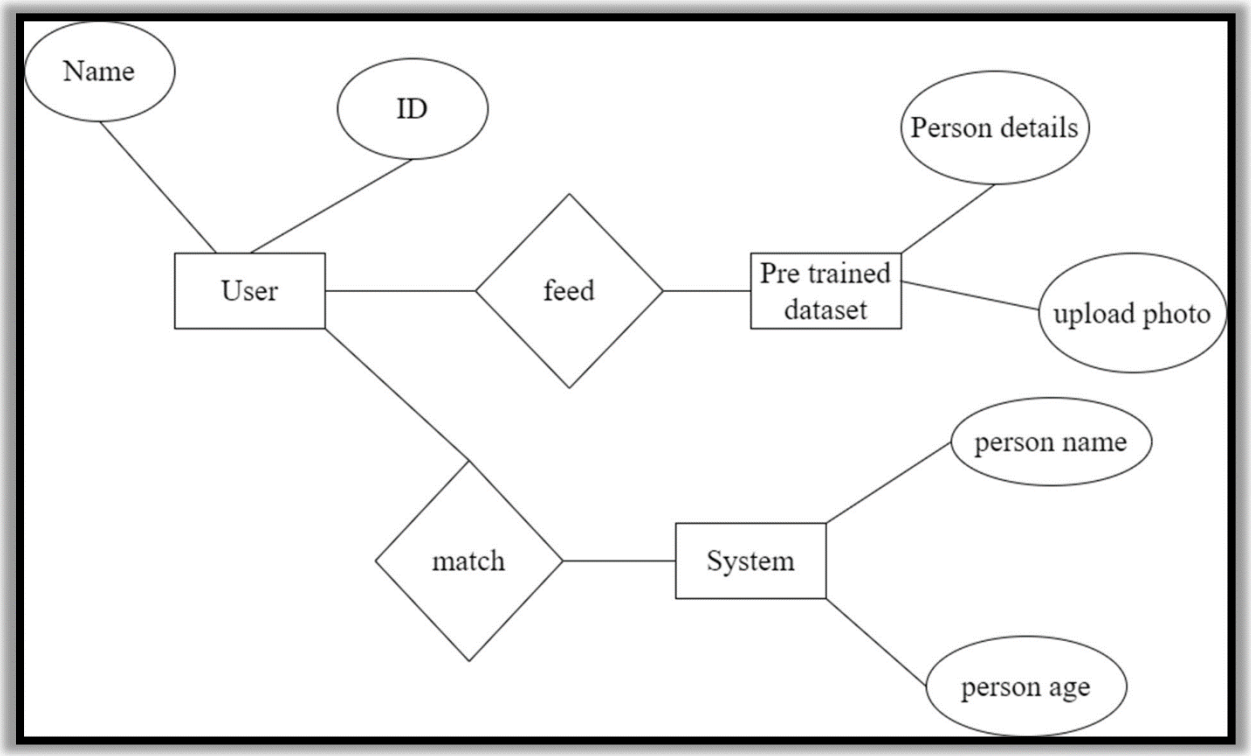


Fig 4.3 – Entity Relationship Diagram

4.4 USE-CASE DIAGRAM

The possible interactions between the user, the dataset, and the algorithm are often depicted in a use case diagram. It's created at the start of the procedure.

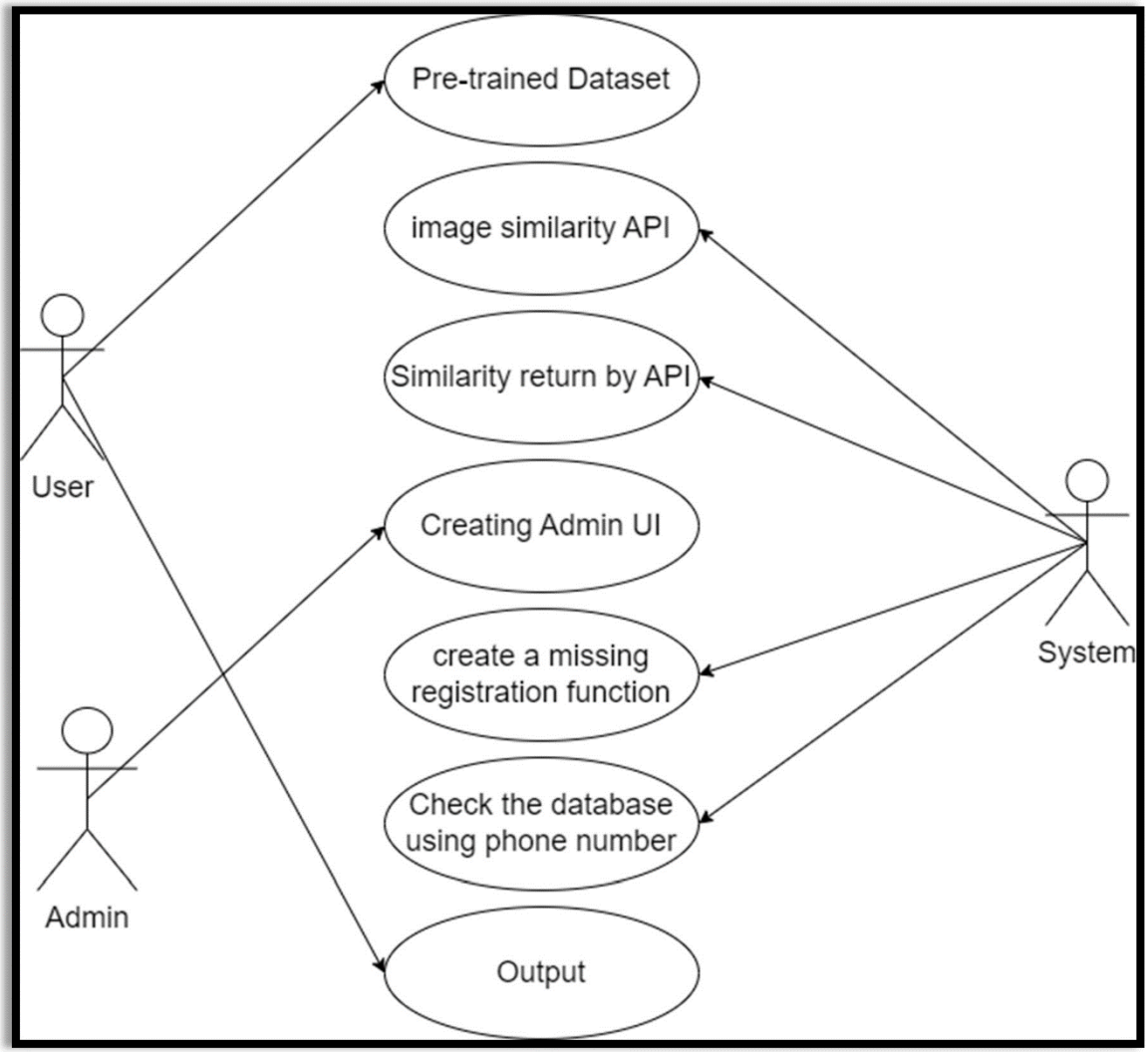


Fig 4.4 – Use-Case Diagram

4.5 ACTIVITY DIAGRAM

An activity diagram, in its most basic form, is a visual representation of the sequence in which tasks are performed. It depicts the sequence of operations that make up the overall procedure. They are not quite flowcharts, but they serve a comparable purpose.

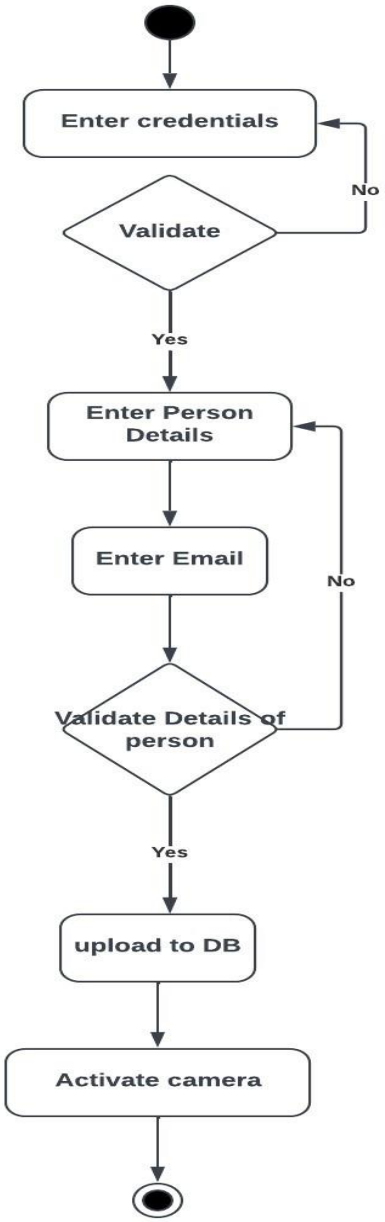


Fig 4.5 – Activity Diagram

4.6 SEQUENCE DIAGRAM

These are another another type of interaction-based diagram used to display the workings of the system. They record the conditions under which objects and processes cooperate.

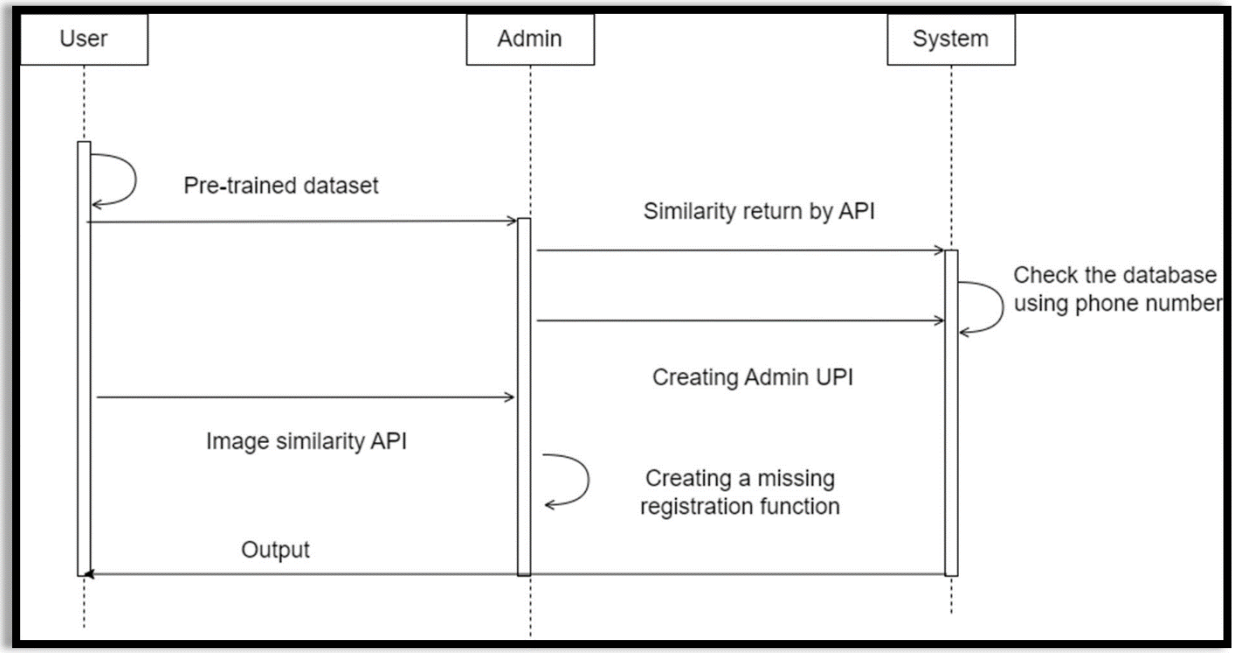


Fig 4.6 – Sequence Diagram

4.7 CLASS DIAGRAM

In essence, this is a "context diagram," another name for a contextual diagram. It simply stands for the very highest point, the 0 Level, of the procedure. As a whole, the system is shown as a single process, and the connection to externalities is shown in an abstract manner.

- A + indicates a publicly accessible characteristic or action.
- A - a privately accessible one.
- A # a protected one.
- A - denotes private attributes or operations.

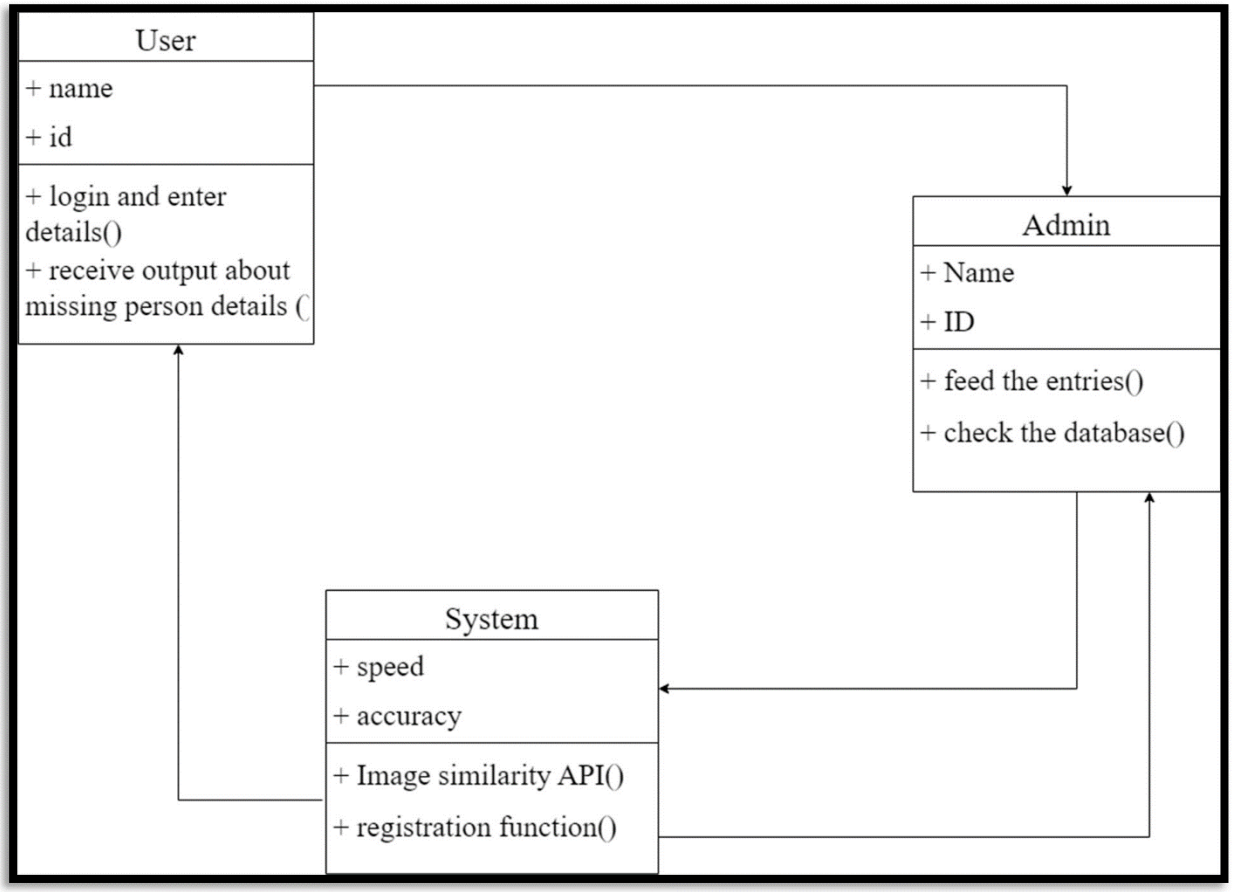


Fig 4.7 – Class Diagram

CHAPTER 5
MODULE DESCRIPTION

5.1 Module 1: Creating User & Admin UI

The project's User Interface (UI) module would be created to offer a simple way for users to interact with the system. A search page, results page, notification page, and feedback page would all be included in the UI module. Users may enter information on the search page, such as the name and picture of the missing individual, and start a search. Options for refining the search results, such as by date or location, may also be included on the search page. The search results, including possible locations or sightings of the missing individual, would be shown on the results page. The notification page would show emails or mobile app messages on possible sightings of the missing individual. The messages might contain details about the probable sighting's location, timing, and description. The goal of the UI module is to give users an easy-to-use interface via which they may interact with the system and help with the search for the missing. Clear instructions and assistance on how to use the system would be provided via the user interface, which would be accessible and user-friendly. The Admin UI module for the "Finding Missing Person Using AI" project would provide a user-friendly interface for administrators to manage and oversee the system. The Admin UI module would enable administrators to monitor the system's performance and customize the search algorithms. Administrators might alter the system's search algorithms using the page for algorithm administration. The flexibility and customizability of the algorithm administration page would allow administrators to adjust the search algorithms to raise the precision and efficiency of the system. Administrators could manage notifications sent to users about possible missing person sightings on the notification management page. It would be possible to customise the content of the alerts, the frequency at which they are sent, and the channels through which they are sent on the notification administration page. In general, the Admin UI module would give administrators a full range of tools to control and personalise the system's performance. With simple instructions and direction on how to utilise the system, the Admin UI would be created to be user-friendly and intuitive. The "Finding Missing Person Using AI" project would not be complete without the Admin UI module, which would provide administrators control over the system's operation, allow them to manage user accounts and alter the search algorithms to increase the system's precision and efficiency.

5.1 Module 2: Missing Persons Image Upload and Storage System

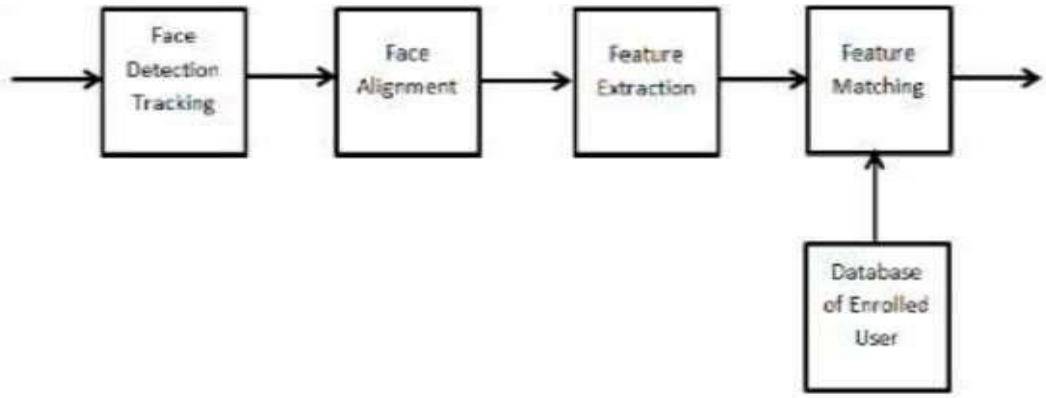
Module 1 is an essential part of the missing person detection system, designed to create a database of positive samples for training the classifier. This module comprises three main components: image upload, image storage, and image retrieval. The first component of Module 1 is image upload, where users can upload images of missing persons via a web interface. In this step, users can select an image file and provide some basic information about the missing person, such as their name, age, gender, and any other relevant details. It is important to ensure the quality and integrity of the images, so basic image processing techniques such as resizing and cropping can be implemented to ensure uniformity and compatibility with the image processing algorithms used in later stages. The second component of Module 1 is image storage. One common option for storing images is to use file storage systems. This approach involves storing the images as files on a server's file system. The server can then be accessed using protocols such as FTP, SFTP, or SSH to upload, download, and manage the images. While this method is relatively simple, it can be challenging to manage and scale, especially when dealing with a large number of images. Another popular option for storing images is to use relational databases. This approach involves creating a table to store image data, including the image file itself, along with metadata such as the image's name, size, and format. The database can then be queried to retrieve and display images. While relational databases offer many advantages, including the ability to search, sort and filter images, they can be slower than file storage systems when it comes to handling large volumes of images .A more modern option for image storage is to use a content delivery network (CDN). CDNs are distributed networks of servers that can store and serve large volumes of data, including images, videos, and other types of content. When an image is uploaded, the CDN stores multiple copies of the image in different geographic locations. When a user requests the image,the CDN serves it from the server closest to the user, providing fast and reliable access to the image. Image retrieval is a critical component of Module 1 in a missing person detection system. The primary goal of image retrieval is to enable the efficient and accurate retrieval of images from a database of missing persons, which can then be used for training the missing person detection algorithm. There are several approaches to image retrieval, and in this section,we will explore two popular methods: RESTful API and search engine. A RESTful API is a standard way of interacting with web services that use HTTP methods such as GET, POST, PUT, and DELETE to perform various operations on resources. In the context of image

retrieval, a RESTful API can be used to query a database of missing persons and return the images as JSON objects. This approach is simple and effective, as it allows developers to easily integrate image retrieval functionality into their applications. To implement a RESTful API for image retrieval, we need to first create a database of missing persons and their associated images. The images can be stored in a file system or a cloud storage service such as Amazon S3 or Google Cloud Storage. Once the images are stored, we can create a RESTful API that accepts parameters such as the missing person's name, age, and gender, and returns a list of matching images. In conclusion, Module 1 is a critical component of the missing person detection system. By allowing users to upload images of missing persons, it creates a database of positive samples that can be used to train the classifier for detecting missing persons in real-time video input using Haar cascades. The module can be implemented using a combination of web-based interfaces, image processing algorithms, database technologies, and RESTful APIs to provide a seamless and user-friendly experience for both uploaders and administrators. Overall, Module 1 can help increase the chances of finding missing persons by providing a reliable and efficient way to collect and store images of missing individuals, which can then be used to train algorithms fo real-time detection in live video feeds.

5.2 Module 3: Real-time Missing Person Detection and Alert System

Module 2 plays a vital role in a missing person detection system, as it enables the detection of missing individuals in real-time video feeds and alerts users through email notifications when a potential match is found. This module can be broken down into four main parts: video input, face detection, email notification, and alert management. The first part of Module 2 is video input, which involves capturing real-time video input from a camera. There are various methods for obtaining video input, such as streaming video from an IP camera, capturing video from a webcam, or using pre-recorded video footage. It is essential to ensure that high-quality video input is obtained to increase the accuracy of the missing person detection algorithm. To achieve this, basic video processing techniques such as frame rate control, resolution scaling, and lighting correction can be implemented to ensure that the input video is uniform and consistent. The second part of Module 2 is face detection, which involves using HAAR cascades to detect missing persons in the video frames. The HAAR cascade is a machine learning-based object detection algorithm that is used to detect objects in images or video. It works by sliding a window of a fixed size over each frame of the video and comparing the features of each sub-region of the image with the classifier. If a match is found, the module can mark the sub-region as a detection and extract the face image from the video frame. This face

image can then be compared to the images of missing persons stored in the database created by Module 1. The third part of Module 2 is email notification, which involves sending an email notification to the user who uploaded the missing person's image in Module 1. This can be done using a third-party email API, such as SendGrid or Mailgun, which can handle the email sending and delivery process. The email can contain some basic information about the potential sighting, such as the time and location of the detection, along with a snapshot of the video frame where the person was detected. The email can also include a link to a web interface where the user can view the video footage and manage their alerts. The fourth part of Module 2 is alert management, which involves providing users with a web interface where they can manage their alerts and view the video footage of potential sightings. The web interface can include features such as search filters, sorting options, and image comparison tools to help users quickly find and review relevant alerts. The interface can also include settings for configuring email preferences, such as frequency and priority, and for managing their uploadedimages of missing persons. Module 2 can be implemented using a combination of video processing algorithms, machine learning techniques, email APIs, and web interfaces to providea seamless and user-friendly experience for both uploaders and administrators. However, thereare some challenges to implementing this module. One challenge is the need for high-quality video input to ensure accurate face detection. This can be challenging in low light conditions or when the subject is moving quickly. Another challenge is the need for efficient email delivery, as email notifications should be sent as soon as a potential match is detected. Overall,Module 2 is an essential component of a missing person detection system. By providing real- time detection of missing persons using Haar cascades and email notifications to alert users ofpotential sightings, this module can help increase the chances of finding missing persons. Themodule can also provide users with a web interface to manage their alerts and view potential sightings, which can make the process more user-friendly and efficient.



CHAPTER 6
SYSTEM IMPLEMENTATION

6.1. APP.PY

```
import streamlit as st
import pandas as pd
from utils import *
from mail import send_email

def app():

    st.title('Missing Person Identification System')

    tab1, tab2 = st.tabs(['Report', 'Find'])

    with tab1:
        st.header('Report a Missing Person here')

        name = st.text_input('Enter Name')
        date = st.date_input('Select date of Missing')
        contact_email = st.text_input('Enter E-Mail for contact')
        up_img = st.file_uploader('Upload the person image', type=['jpg', 'jpeg', 'png'])

        if st.button('Add Data'):
            with open('./database/data/details.json') as json_file:
                json_decoded = json.load(json_file)

            if up_img is not None:
                save_dir = f'./database/missing_persons/{name}.png'
                with open(save_dir, 'wb') as f:
                    f.write(up_img.read())


                json_decoded[name] = contact_email

                with open('./database/data/details.json', 'w') as json_file:
                    json.dump(json_decoded, json_file)

                encode_folder()
                st.warning('Data Added Sucessfully')

    with tab2:
        st.header('Finding a Missing Person')

        if st.button('Start Camera'):
            match_status, name = detect()
            name = name.title()
            if match_status:
                st.warning('Match Found')
```

```
            try:
                json_file = open('./database/data/details.json')
                json_obj = json.load(json_file)
                con_email = json_obj[str.lower(name)]

                lat, long = get_coordinates()

                send_email(str.lower(name), (lat, long))

                json_file.close()

            except:
              print('Error Occured')

if __name__=='__main__':
    app()
```

6.2. ENCODING.PY

```
import os
import cv2
import face_recognition
import json
import numpy

class Encode:
    def __init__(self, path):
        self.path = path
        self.images = []
        self.classNames = []
        self.myList = os.listdir(self.path)
        self.encodeList = []

    def names(self):
        for cl in self.myList:
            curImg = cv2.imread(f'{self.path}/{cl}')
            self.images.append(curImg)
            self.classNames.append(os.path.splitext(cl)[0])

        return self.classNames

    def findEncodings(self):
        for img in self.images:
            img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
            encode = face_recognition.face_encodings(img)[0]
            self.encodeList.append(encode)
```

```
        return self.encodeList

    def save(self):
        clist = []
        for i in range(len(self.classNames)):
            clist.append(self.encodeList[i].tolist())

        data = {"encodeList":clist, "classNames":self.classNames}
        with open("./database/encodings.json", 'w') as file:
            json.dump(data, file)
```

6.3. MAIL.PY

```
from email.message import EmailMessage
import ssl
import smtplib

def send_email(name, location ):
    mail_receiver='harishvellaisamy2@gmail.com'
    mail_sender = 'findthemissingperson@gmail.com'
    mail_password = 'xruvlicnzayeaorq'


    subject = 'Missing Person - Match Found'
    lat, long = location[0], location[1]
    body = f"There is a person who matches to the your missing report\nName: {name}\nLocation: {lat, long}"

    em = EmailMessage()
    em['From'] = mail_sender
    em['To'] = mail_receiver
    em['subject'] = subject

    em.set_content(body)
    context = ssl.create_default_context()
    with smtplib.SMTP_SSL('smtp.gmail.com', 465, context=context) as smtp:
        smtp.login(mail_sender, mail_password)
        smtp.sendmail(mail_sender, mail_receiver, em.as_string())
```

6.4. RECOGNITION.PY

```
import cv2
import numpy as np
import face_recognition.api as face_recognition
import os
from datetime import datetime


class Recognition:
    def __init_(self, encodeList, classNames):
        self.cap = cv2.VideoCapture(0)
        self.encodeListKnown = encodeList
        self.classNames = classNames
        self.nameList = []


    def recog(self):
        match_status = 0
        name = ''
        while True:
            face_recognition.tolerance = 0.75
            ret, img = self.cap.read()
            imgS = cv2.resize(img,(0,0),None,0.25,0.25)
            imgS = cv2.cvtColor(imgS, cv2.COLOR_BGR2RGB)

            facesCurFrame = face_recognition.face_locations(imgS)
            encodesCurFrame = face_recognition.face_encodings(imgS, facesCurFrame)

            for encodeFace,faceLoc in zip(encodesCurFrame,facesCurFrame):
                matches = face_recognition.compare_faces(self.encodeListKnown, encodeFace)
                faceDis = face_recognition.face_distance(self.encodeListKnown, encodeFace)
                matchIndex = np.argmin(faceDis)

                if matches[matchIndex]:
                    name = self.classNames[matchIndex].upper()
                    y1, x2, y2, x1 = faceLoc
                    y1, x2, y2, x1 = y1*4, x2*4, y2*4, x1*4
                    cv2.rectangle(img, (x1,y1), (x2,y2), (0,255,0), 2)
                    cv2.rectangle(img, (x1,y2-35), (x2,y2), (0,255,0), cv2.FILLED)
                    cv2.putText(img,name, (x1+6,y2-6), cv2.FONT_HERSHEY_COMPLEX, 1,
(255,255,255), 2)

                    match_status += 1

                # else:
```

```
            #     y1, x2, y2, x1 = faceLoc
             #     y1, x2, y2, x1 = y1*4, x2*4, y2*4, x1*4
             #     cv2.rectangle(img, (x1,y1), (x2,y2), (0,255,0), 2)
             #     cv2.rectangle(img, (x1,y2-35), (x2,y2), (0,255,0), cv2.FILLED)
             #     cv2.putText(img,"Unknown", (x1+6,y2-6),
cv2.FONT_HERSHEY_COMPLEX, 1, (255,255,255), 2)

          cv2.imshow('Webcam', img)
          if match_status>3:
             return True, name


          if cv2.waitKey(1)==ord('q'):
             break

       self.cap.release()
       cv2.destroyAllWindows()

       return match_status, name
```

6.5. REQUIREMENT.TXT

```
streamlit
pandas
numpy
face-recognition==1.3.0
cmake
dlib==19.24.0
opencv-python
openpyxl
```

6.6. UTILS.PY

```
from encoding import Encode

from recognition import Recognition

import numpy as np

import json

from urllib.request import urlopen



def encode_folder():

    enc = Encode('./database/missing_persons/')

    enc.names()
```

```
    enc.findEncodings()
    enc.save()


def detect():
    with open('./database/encodings.json') as f:
        data = json.load(f)

    eList = []
    cNames = data['classNames']
    for i in range(len(cNames)):
        eList.append(np.array(data['encodeList'][i]))


    rec = Recognition(eList, cNames)
    status, name = rec.recog()
    return status, name
def get_coordinates():
    urlopen("http://ipinfo.io/json")
    data = json.load(urlopen("http://ipinfo.io/json"))
    lat = data['loc'].split(',')[0]
    lon = data['loc'].split(',')[1]

    return lat, lon
```

CHAPTER 7
TESTING

7 TESTING

Discovering and fixing such problems is what testing is all about. The purpose of testing is to find and correct any problems with the final product. It's a method for evaluating the quality of the operation of anything from a whole product to a single component. The goal of stress testing software is to verify that it retains its original functionality under extreme circumstances. There are several different tests from which to pick. Many tests are available since there is such a vast range of assessment options.

1. Who Performs the Testing: All individuals who play an integral role in the software development process are responsible for performing the testing. Testing the software is the responsibility of a wide variety of specialists, including the End Users, Project Manager, Software Tester, and Software Developer.

2. When it is recommended that testing begin: Testing the software is the initial step in the process. begins with the phase of requirement collecting, also known as the Planningphase, and ends with the stage known as the Deployment phase. In the waterfall model, the phase of testing is where testing is explicitly arranged and carried out. Testing in the incremental model is carried out at the conclusion of each increment or iteration, and the entireapplication is examined in the final test.

3. When it is appropriate to halt testing: Testing the programme is an ongoing activity that will never end. Without first putting the software through its paces, it is impossible for anyone to guarantee that it is completely devoid of errors. Because the domain to which the input belongs is so expansive, we are unable to check every single input.

7.1 TYPES OF TESTING

There are four types of testing:

Unit Testing

The term "unit testing" refers to a specific kind of software testing in which discrete elements of a program are investigated. The purpose of this testing is to ensure that the software operates as expected.

Test Cases

1. Test case for input validation: Verify that the system can handle invalid or missing input data, such as missing person's name, age, or photo, and that it provides appropriate error messages.

2. Test case for data preprocessing: Verify that the system is properly preprocessing the input data, such as cleaning and normalizing images, before feeding them into the AI algorithm.

3. Test case for model training: Verify that the AI model is being trained properly on a representative dataset of missing persons, and that the training process is producing reasonable results.

Integration Testing

The programme is put through its paces in its final form, once all its parts have been combined, during the integration testing phase. At this phase, we look for places where interactions between components might cause problems.

Test Cases

1. Test case for end-to-end system integration: Verify that all the components of the system, including the data preprocessing, AI model, and user interface, are integrated and working together properly.

2. Test case for search accuracy: Verify that the system is able to accurately identify missing persons from a set of candidates, based on their photos and other relevant information.

3. Test case for search speed: Verify that the system is able to perform searches within a reasonable time frame, even when dealing with a large number of missing persons and candidates.

Functional Testing

One kind of software testing is called functional testing, and it involves comparing the system to the functional requirements and specifications. In order to test functions, their input must

first be provided, and then the output must be examined. Functional testing verifies that an application successfully satisfies all of its requirements in the correct manner. This particular kind of testing is not concerned with the manner in which processing takes place; rather, it focuses on the outcomes of processing. Therefore, it endeavours to carry out the test cases, compare the outcomes, and validate the correctness of the results.

Test Cases

1. Test case for search functionality: Verify that the system is able to perform a search for a missing person based on their photo and other relevant information, and return a list of candidate matches.

2. Test case for filtering functionality: Verify that the system is able to filter candidate matches based on various criteria, such as age, gender, location, and other relevant factors.

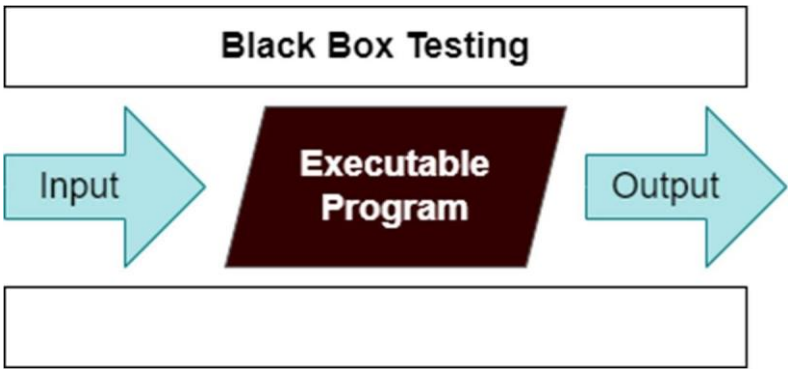
3. Test case for notification functionality: Verify that the system is able to notify relevant authorities or family members when a missing person is identified, and that the notification includes all relevant information.

7.2 TESTING TECHNIQUES

There are many different techniques or methods for testing the software, including the following:

BLACK BOX TESTING

During this kind of testing, the user does not have access to or knowledge of the internal structure or specifics of the data item being tested. In this method, test cases are generated or designed only based on the input and output values, and prior knowledge of either the design or the code is not necessary. The testers are just conscious of knowing about what is thought to be able to do, but they do not know how it is able to do it.



For example, without having any knowledge of the inner workings of the website, we test the web pages by using a browser, then we authorise the input, and last, we test and validate the outputs against the intended result.

Test Cases

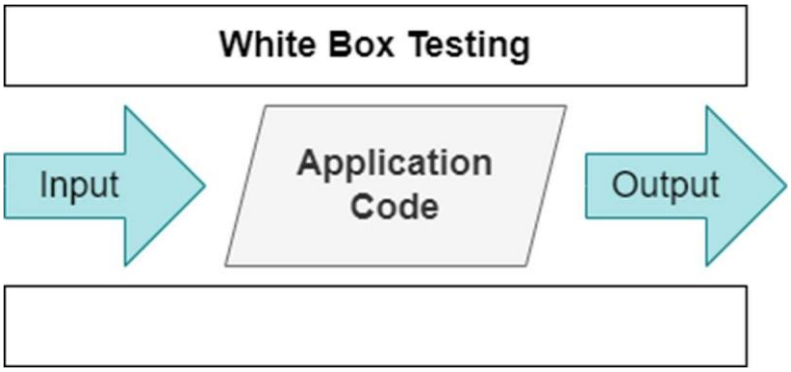
1. Test case for boundary values: Verify that the system is able to handle extreme or unexpected input values, such as very young or very old missing persons, and that it provides appropriate feedback to the user.

2. Test case for equivalence partitioning: Verify that the system is able to handle different categories of missing persons and candidates, such as those with different ages, genders, or ethnicities, and that it provides appropriate filtering options.

3. Test case for error handling: Verify that the system is able to handle errors and exceptions gracefully, such as when a photo is of poor quality or when the input data is missing or invalid, and that it provides appropriate error messages.

WHITE BOX TESTING

During this kind of testing, the user is aware of the internal structure and details of the data item, or they have access to such information. In this process, test cases are constructed by referring to the code. Programming is extremely knowledgeable of the manner in which the application of knowledge is significant. White Box Testing is so called because, as we all know, in the tester's eyes it appears to be a white box, and on the inside, everyone can see clearly. This is how the testing got its name.



As an instance, a tester and a developer examine the code that is implemented in each field of a website, determine which inputs are acceptable and which are not, and then check the output to ensure it produces the desired result. In addition, the decision is reached by analyzing the code that is really used.

Test Cases

1. Test case for code coverage: Verify that the code for the system has been thoroughly tested, covering all branches, loops, and error handling scenarios.

2. Test case for data processing: Verify that the system is properly processing and normalizing input data, such as images and text descriptions, before passing them to the AI model for analysis.

3. Test case for AI model performance: Verify that the AI model has been trained properly on a representative dataset of missing persons, and that it is producing accurate results.

CHAPTER 8
CONCLUSION

8 CONCLUSION AND FUTURE ENHANCEMENT

In conclusion, the "Finding the Missing Person Using Face Match Making Algorithm with User and Admin Dashboard" project is a valuable tool for locating missing persons and enhancing public safety. The project utilizes advanced technologies such as facial recognition and machine learning algorithms to increase the accuracy and speed of the search process. By creating a database of known individuals and continuously updating it, the system is able to compare images of missing persons with potential matches, thus increasing the chances of locating the missing person. The user-friendly interface and admin dashboard make it easy for users to submit images of missing persons and for administrators to manage the system. The success of the project will be measured by its ability to locate missing persons and reunite them with their families. The project has the potential to revolutionize the way missing persons are located, and it represents a significant step forward in the use of technology for public safety. Overall, the "Finding the Missing Person Using Face Match Making Algorithm with User and Admin Dashboard" project is a valuable contribution to society, and it has the potential to save lives and bring peace of mind to families affected by missing persons.

APPENDICES

9.1. APPENDIX

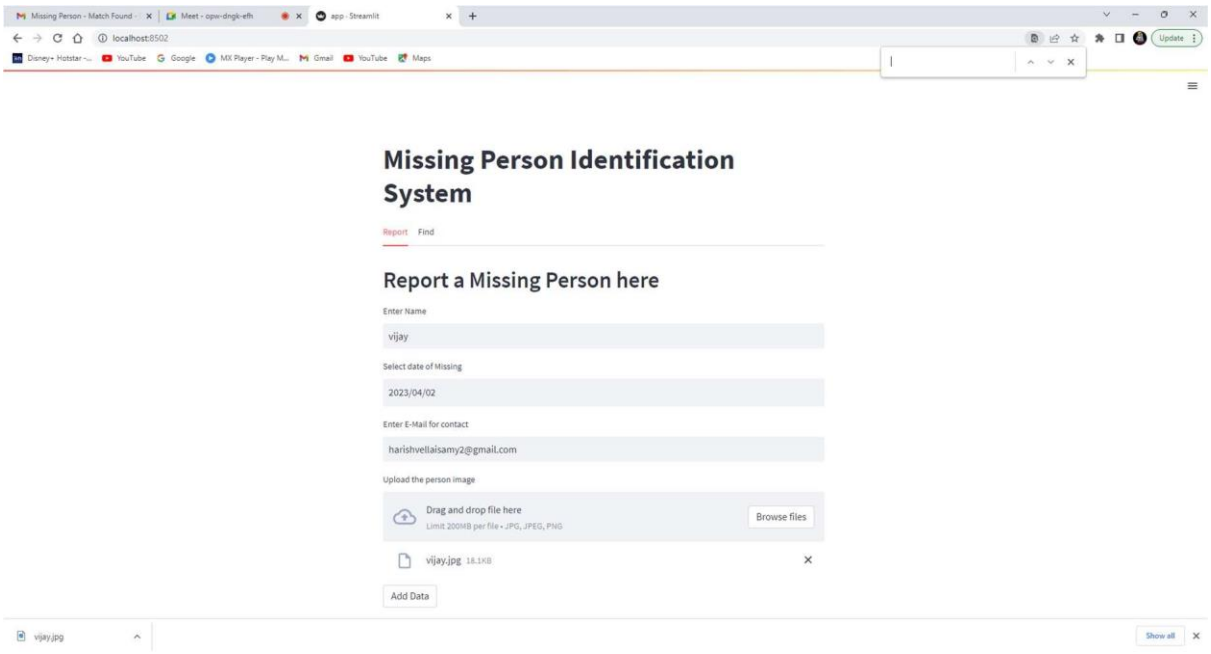


Fig.1

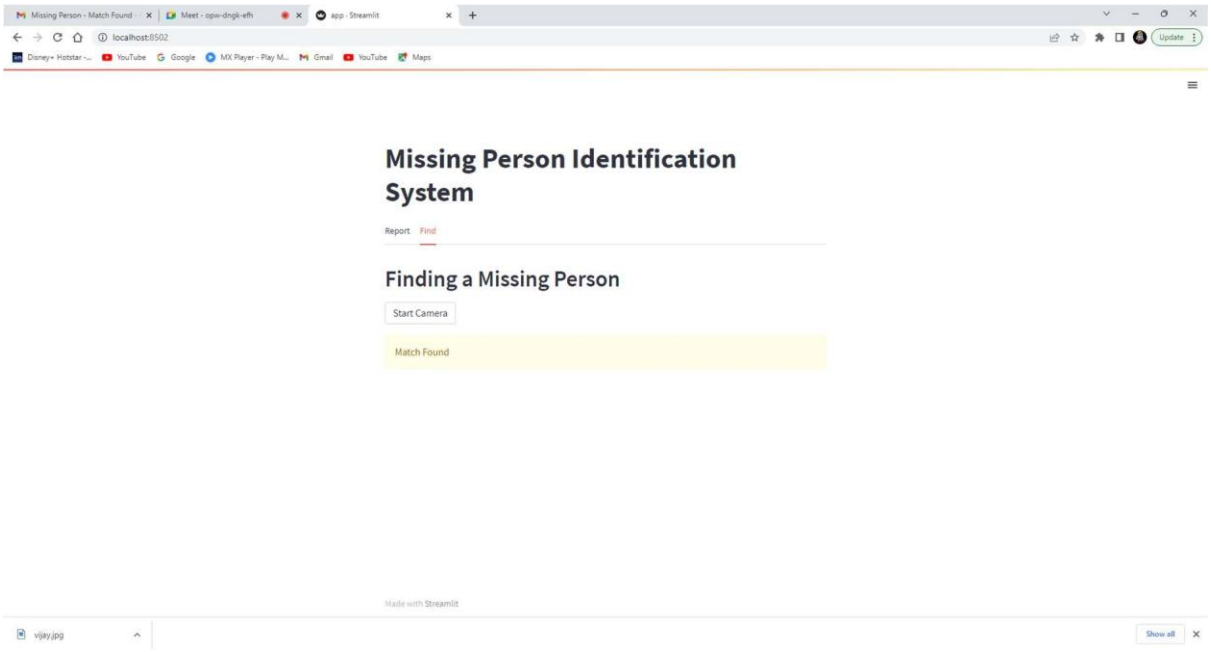
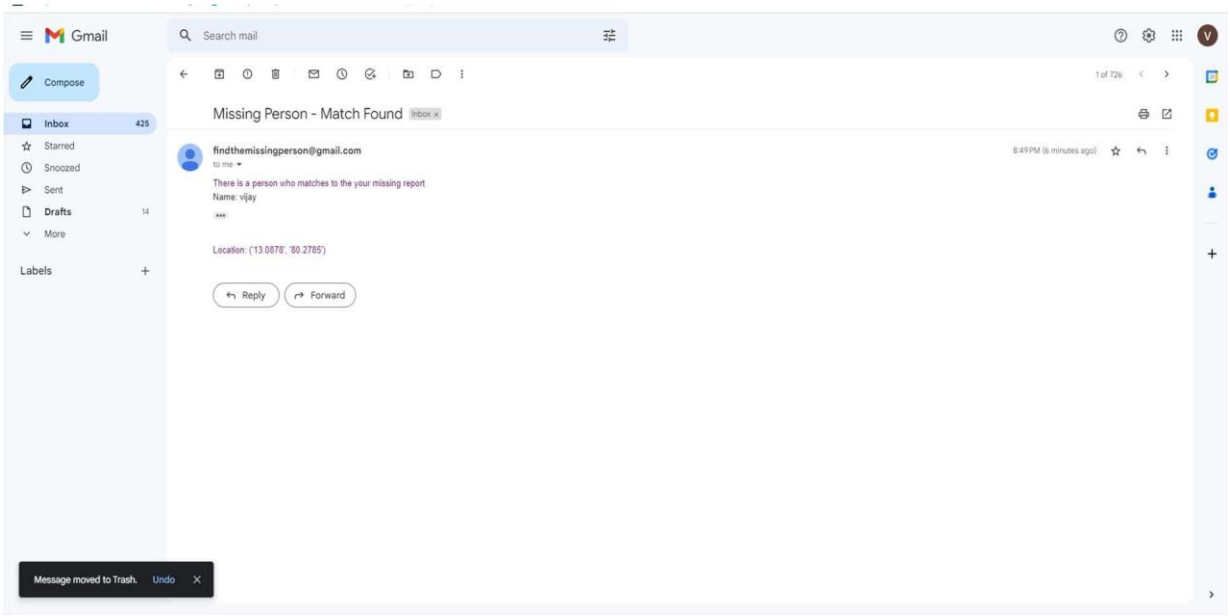


Fig.2


Gmail
Search mail
Compose
Inbox 425
Starred
Snoozed
Sent
Drafts 14
More
Labels
1 of 726
Missing Person - Match Found
Inbox ×
findthemissingperson@gmail.com
to me
8:49 PM (6 minutes ago)
There is a person who matches to the your missing report
Name: vijay
Location: ('13.0878', '80.2785')
Reply
Forward
Message moved to Trash.
Undo

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10 REFERENCES

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