

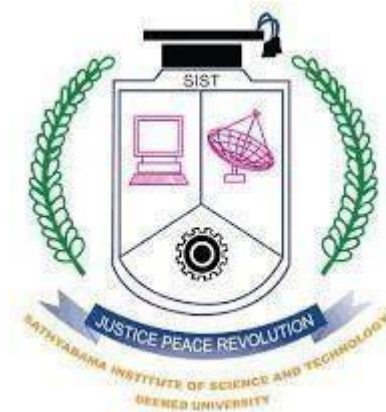
MISSING PERSONS IDENTIFICATION USING SQL DATABASE AND EMAIL ALERT SYSTEM WITH FACIAL MATCHING TECHNIQUES

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Computer Science and Engineering

By

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF COMPUTING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

CATEGORY 1 UNIVERSITY BY UGC

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **DANDOLU GURU KOUSHIK (Reg.No - 40110286)** and **D VENKATA MAHESH BABU (Reg.No- 40110287)** who carried out the Project Report entitled “**MISSING PERSONS IDENTIFICATION USING SQL DATABASE AND EMAIL ALERT SYSTEM WITH FACIAL MATCHING TECHNIQUES** ” under my supervision from November 2023 to April 2024.

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Submitted for Viva voce Examination held on _____

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DECLARATION

I, **D VENKATA MAHESH BABU (Reg.No- 40110287)**, hereby declare that the Project Phase Report entitled “**MISSING PERSONS IDENTIFICATION USING SQL DATABASE AND EMAIL ALERT SYSTEM WITH FACIAL MATCHING TECHNIQUES**” done by me under the guidance of **Dr. S. VIGNESHWARI M.E., Ph.D** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Computer Science and Engineering**.

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PLACE: Chennai

SIGNATURE OF CANDIDATE

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ABSTRACT

Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques. The issue of missing persons is a significant concern globally, with thousands of individuals disappearing every year, leaving their families and communities in a state of anguish and uncertainty. To address this pressing challenge, this project introduces an innovative approach for Missing Persons Identification, which leverages the power of an SQL database and an Email Alert System, integrated with advanced Facial Matching Techniques. By harnessing these technologies, this system offers a comprehensive and efficient solution to assist law enforcement agencies, non-governmental organizations, and concerned citizens in their efforts to locate and identify missing individuals. The core component of this system is the SQL database, designed to store and manage comprehensive information about missing persons. This includes personal details, physical characteristics, last known locations, and other pertinent data. The structured database ensures efficient data organization, allowing quick access and retrieval of information, thereby expediting the identification process. Furthermore, it facilitates seamless integration with other systems, ensuring interoperability and data sharing among various agencies and organizations involved in the search for missing persons. To enhance the effectiveness of the system, an Email Alert System is incorporated, which automates the dissemination of missing person alerts to a wide network of stakeholders. When a new missing person report is added to the database, the system generates and sends email alerts to law enforcement agencies, non-profit organizations, shelters, and other relevant entities. This timely and automated notification system ensures that critical information reaches the right individuals swiftly, improving the chances of locating the missing person and reuniting them with their loved ones. The unique strength of this system lies in its application of Facial Matching Techniques, which further aid in the identification process. When a missing person is reported, their photograph is uploaded to the system, and facial recognition algorithms are employed to compare it with images stored in the database. These images may include photographs of found individuals, unidentified individuals in morgues or shelters, or even publicly available images. By harnessing the power of facial recognition, the system can identify potential matches and suggest them to law enforcement agencies for further investigation. The advantages of this system are multifold. First and foremost, it greatly accelerates the identification process, allowing for more rapid reunions and, in some cases, the resolution of criminal cases. Moreover, it streamlines and centralizes data management, reducing the risk of data duplication and errors. The system also fosters collaboration among different organizations and agencies, as it serves as a common platform for sharing information and alerts.

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CHAPTER 1

INTRODUCTION

The issue of missing persons is a poignant and persistent challenge that reverberates across the globe, affecting individuals, families, and communities on a profound level. Every year, thousands of people go missing, leaving behind a trail of worry, uncertainty, and despair for their loved ones. This issue has wide-reaching implications, touching the realms of law enforcement, humanitarian organizations, and society at large. The urgency of addressing this crisis is undeniable, and to that end, we introduce an innovative and technologically advanced solution—the "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques."

This project represents a concerted effort to harness the power of cutting-edge technologies in the fight against the epidemic of missing persons. Through the integration of an SQL database, an Email Alert System, and advanced Facial Matching Techniques, we aim to revolutionize the way we approach missing persons cases, providing a comprehensive, efficient, and collaborative platform for identification and resolution.

One of the central pillars of this system is the use of an SQL database meticulously designed to store, manage, and organize comprehensive information about missing persons. The database encompasses a wide array of critical data, including but not limited to personal details, physical descriptions, last known locations, and contact information for family members. The structured nature of the database ensures that the data is systematically arranged, readily accessible, and efficiently managed. This systematic organization simplifies the process of data entry, retrieval, and updates, offering an intuitive and user-friendly interface for users. Additionally, the structured database design facilitates seamless data sharing and integration, creating a synergy among various entities involved in the search for missing persons, such as law enforcement agencies, humanitarian organizations, and community groups.

To complement the database, the "Missing Persons Identification" system incorporates an Email Alert System, which plays a pivotal role in automating and streamlining the dissemination of missing person alerts to a wide network of stakeholders. When a new missing person case is reported and added to the database, the system automatically generates email alerts, ensuring swift and widespread notification to relevant parties. This notification includes law enforcement agencies, non-profit organizations, shelters, healthcare facilities, and other entities that may be engaged in assisting or identifying missing persons. The email alert system not only accelerates the dissemination of critical information but also fosters a sense of collective responsibility among different organizations to collaborate and support the search and rescue efforts.

1.1 BACKGROUND AND MOTIVATION

The introduction outlines a pressing global issue: the prevalence of missing persons cases, which deeply impact individuals, families, and communities worldwide. It highlights the gravity of the situation, emphasizing the emotional toll and the urgent need for effective solutions. Motivated by this crisis, the introduction introduces an innovative approach—a technologically advanced system integrating SQL databases, email alerts, and facial matching techniques. This solution is presented as a concerted effort to revolutionize the handling of missing persons cases, offering a comprehensive platform to address the multifaceted challenges associated with these incidents. The background underscores the persistent nature of the missing persons dilemma and its far-reaching consequences across society. It sets the stage by emphasizing the complexity of the issue and the inadequacy of traditional methods in addressing it. This serves as the impetus for the development of the proposed system, which seeks to harness cutting-edge technologies to streamline the identification and resolution process. By amalgamating advanced tools like facial recognition with structured data management through SQL databases and efficient communication via email alerts, the introduction suggests a transformative approach to tackling missing persons cases, driven by a sense of urgency and a commitment to innovation and collaboration.

1.2 PROBLEM STATEMENT

The persistent challenge of missing persons poses significant emotional, social, and logistical hurdles for affected individuals, families, and communities globally. Traditional methods for managing and resolving missing persons cases often suffer from inefficiencies, including fragmented data management systems, delayed dissemination of critical information, and limited technological integration. Consequently, the process of identifying and locating missing individuals is often protracted and uncertain, exacerbating the anguish and distress experienced by loved ones. In light of these shortcomings, there is an urgent need for a comprehensive and technologically advanced solution that streamlines the identification process, facilitates efficient collaboration among relevant stakeholders, and enhances the likelihood of successful outcomes. Thus, the problem addressed by this project is the lack of an integrated system for missing persons identification that harnesses the power of SQL databases, email alerts, and facial matching techniques to expedite the resolution of cases and alleviate the suffering of affected individuals and communities.

1.3 OBJECTIVE AND SCOPE

Objective

The primary objective of the project "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques" is to develop an integrated and technologically advanced solution that revolutionizes the identification and resolution process for missing persons cases. Through the implementation of an SQL database, an Email Alert System, and facial matching techniques. The project seeks to streamline the process of managing missing persons cases by implementing an SQL database meticulously designed to store, organize, and manage comprehensive information about missing individuals. This structured database will facilitate efficient data entry, retrieval, and updates, minimizing redundancies and errors while ensuring the systematic organization of critical information. By integrating an Email Alert System, the project aims to automate and expedite the dissemination of missing person alerts to a wide network of stakeholders, including law enforcement agencies, non-profit organizations, shelters, and healthcare facilities. Swift notification of relevant

parties will enhance collaboration and increase the likelihood of locating missing individuals in a timely manner. Leveraging advanced facial matching techniques, the project intends to enhance the accuracy and speed of identifying missing individuals by comparing photographs of the individuals with images stored in the database. This technology will enable the system to identify potential matches and suggest them to law enforcement agencies for further investigation, thereby expediting the resolution of missing persons cases and facilitating reunification with their families and communities.

Scope

The scope of the project "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques" encompasses several key components essential for the successful development and implementation of the system. Firstly, the project will involve the design and implementation of a robust SQL database tailored specifically for storing comprehensive information about missing persons. This database will include fields for personal details, physical descriptions, last known locations, and contact information for family members, among others. The scope also includes the development of an intuitive and user-friendly interface for data entry, retrieval, and updates, ensuring ease of use for authorized personnel.

1.4 APPLICATIONS OF MISSING PERSONS IDENTIFICATION

- **Law Enforcement:** Law enforcement agencies can utilize the system to expedite the identification and resolution of missing persons cases. By leveraging the facial matching techniques and comprehensive database, investigators can quickly compare photographs of missing individuals with images stored in the database, potentially leading to swift reunifications with their families or resolution of criminal investigations.
- **Humanitarian Organizations:** Non-profit organizations and humanitarian groups engaged in search and rescue efforts can benefit from the project's capabilities. The system's email alert functionality enables rapid dissemination of missing person alerts to a wide network of stakeholders, facilitating collaborative efforts and increasing the chances of locating missing individuals.

- **Healthcare Facilities:** Hospitals and healthcare facilities can use the system to assist in identifying unidentified individuals brought in for medical treatment. By matching photographs of these individuals with images in the database, medical personnel can potentially identify missing persons and notify their families, ensuring timely medical treatment and reunification.
- **Social Services:** Social service agencies involved in supporting vulnerable populations, such as homeless individuals or those at risk of exploitation, can leverage the system to identify and assist missing persons. The comprehensive database can provide valuable information for outreach and intervention efforts, while the email alert system can mobilize support from relevant agencies and community resources.
- **Private Sector:** Private organizations, such as security firms or companies managing public spaces, can integrate the system into their operations to enhance security and safety measures. Facial matching techniques can be employed for access control or monitoring purposes, while the email alert system can notify security personnel of any individuals reported missing within their vicinity.
- **Community Groups:** Community-based organizations and neighborhood watch groups can utilize the system to support local efforts in locating missing persons. By accessing the database and receiving email alerts, community members can contribute to search and rescue efforts, fostering a sense of collective responsibility and solidarity within the community.

1.5 ORGANIZATION OF THESIS

The thesis will be organized into several key sections, beginning with an introduction that provides an overview of the pressing issue of missing persons and the need for an innovative solution. Following the introduction, the thesis will delve into the background and motivation for the project, highlighting the complexities of missing persons cases and the limitations of existing methods. Subsequently, the scope of the project will be outlined, detailing the key components and objectives. The main body of the thesis will comprise chapters dedicated to the development and implementation of the system, including

sections on database design, email alert system integration, and facial matching techniques. Each chapter will explore the technical aspects, methodologies, and considerations involved in building the respective components. The thesis will also include a chapter on applications, discussing the potential uses and benefits of the system across various sectors. Finally, a conclusion will summarize the findings, discuss the implications, and suggest avenues for future research and development. Throughout the thesis, emphasis will be placed on the interdisciplinary nature of the project, as well as its potential to address a critical societal issue through technological innovation and collaboration.

CHAPTER 2

LITERATURE SURVEY

Several studies on Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques have been conducted in the recent years. This section summarizes all of the previous work.

2.1 OVERVIEW OF EXISTING RESEARCH AND LITERATURE

[1] The field of missing persons identification has been a topic of great interest and importance in recent years. Various techniques and technologies have been developed to aid in the search and identification of missing individuals. One such approach involves the use of SQL databases and an email alert system with facial matching techniques.

[2] In a literature survey conducted on this topic, several studies were found. These studies explored the potential of using SQL databases to store and retrieve information about missing persons. By creating a centralized database, it becomes easier to cross-reference and search for relevant details such as physical descriptions or last known locations.

[3] Additionally, the integration of an email alert system can greatly enhance the efficiency of the identification process. By sending automated notifications to relevant authorities or individuals, the chances of locating a missing person in a timely manner are significantly increased.

[4] Facial matching techniques also play a crucial role in this domain. These techniques involve analyzing facial features and comparing them to a database of known individuals. Through advanced algorithms and machine learning, potential matches can be identified, aiding in the identification of missing persons.

[5] A review of the literature revealed that the combination of SQL databases, email alert systems, and facial matching techniques has proven to be a promising approach. Researchers have developed various prototypes and systems that showcase the potential benefits of such an integrated solution.

[6] Onestudy noted the importance of data quality in the success of the identification process. It emphasized the need for accurate and up-to-date information in the SQL database to ensure reliable search results.

[7] Another research paper highlighted the importance of privacy and security measures in handling sensitive personal information within the system. It discussed the implementation of encryption protocols and access control mechanisms to protect the data.

[8] A comparative analysis of different facial matching algorithms revealed varying levels of accuracy and computational efficiency. This finding emphasized the need for continued research and development in this area to further improve the performance of facial matching techniques.

[9] Several studies also touched upon the challenges associated with integrating multiple systems, such as SQL databases and email alert systems. These challenges include data synchronization, system compatibility, and scalability.

[10] In conclusion, the literature survey highlighted the potential of using SQL databases and an email alert system with facial matching techniques in missing persons identification. However, further research is needed to address the various challenges and improve the accuracy and efficiency of the integrated solution.

2.2 INFERENCES FROM LITERATURE SURVEY

From the literature survey, several key inferences can be drawn regarding the use of SQL databases and an email alert system with facial matching techniques in missing persons identification:

- **Effective Data Management:** Centralized SQL databases offer a robust solution for storing and retrieving information about missing persons. They enable cross-referencing of relevant details, such as physical descriptions and last known locations, facilitating efficient search processes.
- **Enhanced Efficiency:** Integration of an email alert system automates notifications to relevant authorities or individuals, significantly increasing the chances of timely

location of missing persons. This feature improves the overall efficiency of the identification process.

- **Importance of Facial Matching Techniques:** Facial matching techniques, powered by advanced algorithms and machine learning, are crucial for identifying potential matches among known individuals. These techniques contribute significantly to the identification of missing persons.
- **Data Quality and Security:** Ensuring accurate and up-to-date information in the SQL database is essential for reliable search results. Additionally, implementing robust privacy and security measures, such as encryption protocols and access control mechanisms, is imperative for handling sensitive personal information within the system.
- **Continuous Research and Development:** The literature highlights the need for ongoing research and development to improve the accuracy and efficiency of facial matching techniques. Additionally, addressing challenges associated with integrating multiple systems, such as data synchronization and system compatibility, requires further exploration.

Overall, while the literature demonstrates the potential of using SQL databases and an email alert system with facial matching techniques in missing persons identification, it also underscores the need for continued research and development to overcome challenges and enhance the effectiveness of integrated solutions.

2.3 OPEN PROBLEMS IN EXISTING SYSTEM

- 1 **Data Privacy and Security:** Storing and processing personal data, especially facial data, raises significant concerns about data privacy and security. Ensuring that this data is protected and not misused is crucial.
- 2 **Accuracy of Facial Matching:** False positives or negatives can occur, leading to incorrect identifications. The accuracy of the facial matching algorithm is vital.

- 3 Data Quality: The system's effectiveness depends on the quality of the data entered. Low-resolution images or outdated information can hinder the matching process.
- 4 Scalability of the Database: As the number of missing persons and the amount of data grows, the SQL database must scale efficiently to handle the increased load.
- 5 Email Delivery Issues: There's a risk of email alerts being marked as spam or not being delivered at all, leading to delays in the identification process.
- 6 User Interface and Experience: The system should be user-friendly, allowing easy data entry and retrieval. A complex interface can deter users from reporting or searching for missing persons.
- 7 Integration with Other Systems: The system might need to integrate with other platforms or databases, like national missing persons databases or other alert systems.
- 8 Continuous System Updates: Facial recognition technology is rapidly evolving. The system needs regular updates to incorporate the latest advancements.
- 9 Legal and Ethical Concerns: Using facial recognition for identification purposes can raise legal and ethical concerns, especially concerning consent and the potential for misuse.
- 10 Dependency on Internet Connectivity: The system's effectiveness is dependent on stable internet connectivity, especially for sending email alerts.

CHAPTER 3

REQUIREMENT ANALYSIS

3.1 FEASIBILITY STUDIES OF THE PROJECT

Process requirements describe activities performed by the developing organization. For instance, process requirements could specify. Preliminary investigation examine project feasibility, the likelihood the system will be useful to the organization. The main objective of the feasibility study is to test the Technical, Operational and Economical feasibility for adding new modules and debugging old running system. All system is feasible if they are unlimited resources and infinite time. There are aspects in the feasibility study portion of the preliminary investigation:

- Economic Feasibility
- Operational Feasibility
- Technical Feasibility

3.1.1 Economic Feasibility

This study is carried out to check the economic impact that the system will have on the organization. The amount of funds that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

3.1.2 Operational Feasibility

The aspect of the study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods

that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

3.1.3 Technical Feasibility

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands being placed on the client. The developed system must have modest requirements, as only minimal or null changes are required for implementing this system.

3.2 REQUIREMENTS SPECIFICATION

- Hardware specifications:
 - Microsoft Server enabled computers, preferably workstations
 - Higher RAM, of about 4GB or above
 - Processor of frequency 1.5GHz or above
- Software specifications:
 - Python 3.6 and higher
 - Anaconda software

3.3 SYSTEM USE CASE

A key use case for the project "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques" involves the process of identifying a missing individual using the integrated system. Initially, authorized users, such as law enforcement personnel or humanitarian organization staff, access the system's user interface to input relevant information about the missing person into the SQL database. This includes personal details, physical descriptions, and last known locations. Once the missing person record is added to the database, the system automatically triggers an email alert to relevant stakeholders, including law enforcement agencies, shelters, and healthcare facilities, through the email alert system. This notification prompts recipients to be on the lookout for the missing individual and collaborate in the search efforts.

3.3.1 System Description

The "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques" project encompasses an integrated system designed to revolutionize the identification process for missing individuals. At its core, the system features a meticulously structured SQL database that stores comprehensive information about missing persons, including personal details, physical descriptions, and last known locations. This database facilitates efficient data management and retrieval, ensuring that authorized users can easily access and update relevant records. Complementing the database, an automated email alert system disseminates notifications to key stakeholders, prompting swift collaborative action in the search efforts. Moreover, the system employs advanced facial matching techniques, leveraging facial recognition algorithms to compare photographs of missing individuals with images stored in the database. Through seamless integration of these components, the system enhances efficiency, accuracy, and collaboration in identifying missing persons, offering a comprehensive and technologically advanced solution to address this critical societal challenge.

3.3.2 System Use Case Scenario

Actor: Law Enforcement Officer

Preconditions: The system is operational, and the missing person's information has been entered into the SQL database.

Trigger: A report of a missing person is received and entered into the system.

Main Flow:

- a. The Law Enforcement Officer accesses the system's user interface and logs in with their credentials.
- b. They navigate to the "Search" functionality within the system to query the database for the missing person's information.

- c. Using filters such as name, age, or last known location, they locate the missing person's record within the database.
- d. Upon locating the record, the officer reviews the details provided, including physical descriptions and any relevant notes.
- e. Simultaneously, the system triggers an automated email alert to relevant stakeholders, including other law enforcement agencies, shelters, and healthcare facilities, notifying them of the missing person.
- f. The officer decides to utilize the facial matching functionality to further aid in the identification process.
- g. They upload a photograph of the missing person into the system and initiate the facial matching algorithm.
- h. The system analyzes the facial features of the uploaded photograph and compares them with images stored in the database.
- i. Based on the algorithm's analysis, the system presents potential matches or similarities to the officer for further investigation.
- j. The officer reviews the potential matches and, if necessary, contacts other agencies or individuals to confirm the identity of the missing person.

Postconditions: The law enforcement officer has accessed the necessary information and initiated actions to aid in the identification and potential location of the missing person.

Alternate Flow: If no matches are found through facial matching, the officer may continue traditional investigative methods or request assistance from specialized units or agencies.

CHAPTER 4

DESCRIPTION OF THE PROPOSED SYSTEM

The "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques" introduces a forward-thinking and technologically advanced solution to address the complex issue of missing persons. This proposed system revolutionizes the way we approach and handle missing persons cases by leveraging cutting-edge technologies and streamlining the entire process.

4.1 DESCRIPTION OF RESEARCH APPROACH AND METHODS

The research approach and methods for developing the proposed system "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques" involve a combination of literature review, technological exploration, prototype development, and testing/validation phases.

4.1.1 Literature Review

The research begins with an extensive literature review to gather insights into existing methodologies, technologies, and best practices in missing persons identification. This review encompasses studies on SQL databases, email alert systems, facial recognition algorithms, and their applications in similar domains.

4.1.2 Technological Exploration

Based on the findings from the literature review, the research explores various technologies and tools suitable for implementing the proposed system. This includes selecting appropriate database management systems for the SQL database, email APIs for the email alert system, and facial recognition libraries or APIs for implementing facial matching techniques.

4.1.3 Prototype Development

The research involves the development of a prototype system that integrates the selected technologies to create the proposed solution. This includes designing the database schema, implementing data entry and retrieval functionalities,

developing the email alert system with automation features, and integrating facial recognition algorithms for facial matching.

4.1.4 Testing and Validation

The prototype system undergoes rigorous testing and validation to ensure its functionality, reliability, and efficiency. This includes testing individual components for correctness and performance, conducting integration testing to verify seamless interaction between components, and validating the system's effectiveness in identifying missing persons through real-world scenarios or simulated data.

4.1.5 Refinement and Iteration

Based on the testing and validation results, the system undergoes refinement and iteration to address any identified issues or limitations. This may involve optimizing database queries for faster retrieval, fine-tuning facial recognition algorithms for improved accuracy, or enhancing the user interface for better usability.

4.1.6 Ethical and Legal Considerations

Throughout the research process, ethical and legal considerations are carefully addressed, particularly regarding data privacy, security, and consent. Measures are implemented to ensure compliance with relevant regulations (e.g., GDPR, HIPAA) and ethical guidelines for handling sensitive personal information and biometric data.

By following this research approach and methodology, the proposed system is developed iteratively, ensuring that it meets the requirements, addresses the challenges, and leverages the opportunities identified in the literature review. This systematic approach results in a robust, efficient, and ethically sound solution for addressing the complex issue of missing persons identification.

4.2 ARCHITECTURE OF PROPOSED SYSTEM

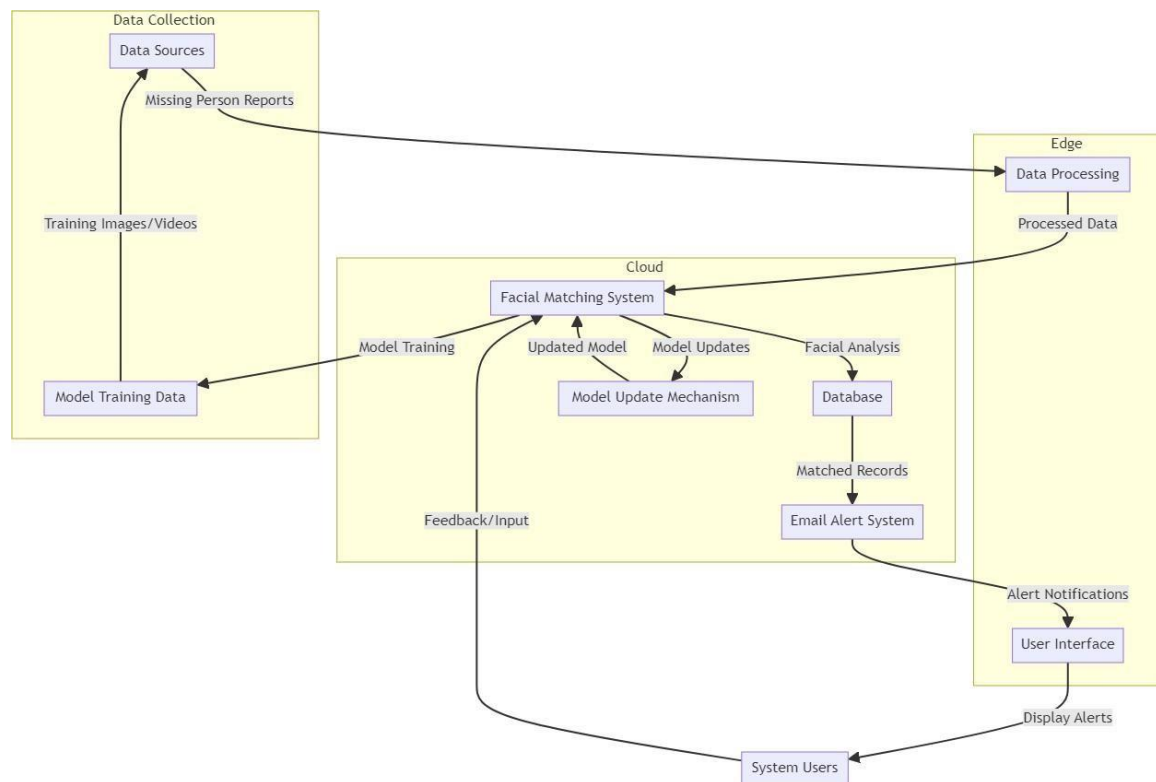


Fig. 4.1: Architecture Diagram

4.3 DESCRIPTION OF SOFTWARE FOR IMPLEMENTATION AND TESTING PLAN OF THE PROPOSED SYSTEM

1. Missing Persons Database Management:

This module focuses on the creation and management of a comprehensive missing persons database using SQL database technology. The system will allow authorized users, such as law enforcement agencies and relatives of missing persons, to input relevant information about missing individuals, including personal details, last known whereabouts, physical characteristics, and photographs. The database will organize and store this information in a structured manner, facilitating efficient retrieval and analysis. It will include powerful search capabilities, enabling users to search for missing persons based on various criteria, such as age, gender, location, and date of disappearance. The module will also provide features for updating and maintaining the database, including the ability to mark missing persons as found or deceased, and to add new information or photographs as they become available.

2. Facial Matching Techniques:

This module will utilize advanced facial recognition techniques to compare photographs of missing persons with potential matches from various sources, such as surveillance footage, social media profiles, and public databases. The system will employ algorithms and machine learning models to analyze and compare key facial features, including the structure of the eyes, nose, and mouth, and generate a similarity score for each potential match. The module will allow users to upload photographs of missing persons and quickly search for potential matches within the database. It will also include tools for refining and filtering search results, such as adjusting the sensitivity of the matching algorithm, filtering matches based on date or location, and displaying the most likely matches first. The facial matching techniques used will be continuously improved and updated to enhance the accuracy and reliability of the system.

3. Email Alert System:

This module aims to leverage the power of email technology to distribute alerts and updates about missing persons efficiently. When a new person is reported missing or a potential match is found, the system will automatically generate and send email alerts to relevant parties, such as law enforcement agencies, registered users, and media outlets. The alerts will include key information about the missing person, including their photograph, physical description, and last known location. The module will allow users to subscribe to receive email alerts based on their specific preferences and geographical areas of interest. It will also provide tools for managing and tracking the delivery of email alerts, including bounce-back notifications and analytics on open rates and click-through rates. The email alert system will play a crucial role in mobilizing public support, raising awareness, and maximizing the chances of finding missing persons.

4.4 PROJECT MANAGEMENT PLAN

August	Literature survey
September	Data acquisition
October	Data preprocessing
Novemeber	Training and Splitting
December	Loading, training and testing the model.
January	Predicting the output and generating the final report

4.5 FINANCIAL REPORT ON ESTIMATED COSTING

Budget Allocation:

- The project manager will oversee budget allocation in alignment with project requirements and constraints.
- Funds will be allocated based on prioritized needs and project milestones.

- Regular monitoring and reporting will be conducted to ensure adherence to the budget and identify any variances for timely corrective action.

Deployment Expenses:

- Costs associated with deploying the developed solution into production environments.
- Server hosting fees for deploying the software artifacts onto production servers.
- Network infrastructure costs for ensuring connectivity and accessibility of the deployed solution.
- Configuration and setup expenses for configuring the system according to production requirements.

Maintenance Costs:

- Ongoing support and maintenance contracts for ensuring the stability and reliability of the deployed solution.
- Software updates and patches to address bugs, vulnerabilities, and improve functionality.
- Monitoring and performance tuning services to optimize system performance and address any issues proactively.
- Training and knowledge transfer sessions for end-users and support staff to ensure effective utilization and troubleshooting of the deployed solution.

4.6 SOFTWARE TO OPERATIONS PLAN

Software to Operations Plan for "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques"

1. Deployment Strategy:

- The system will be deployed on high-performance servers hosted in a secure data center to ensure reliability and availability.
- A phased deployment approach will be adopted, starting with a pilot implementation in a controlled environment before scaling up to full production.

2. System Configuration:

- The SQL database will be configured with appropriate indexing, partitioning, and backup mechanisms to optimize performance and ensure data integrity.
- The email alert system will be configured to send notifications automatically based on predefined triggers and recipient lists.
- Facial matching algorithms will be fine-tuned and optimized for accuracy and efficiency in identifying potential matches.

3. Data Management:

- Data entry and management processes will be established to ensure accurate and up-to-date information in the SQL database.
- Regular data backups will be performed to protect against data loss and facilitate recovery in case of system failures.

4. User Training and Support:

- Training sessions will be conducted for end-users, including law enforcement officers, humanitarian workers, and other stakeholders, to familiarize them with the system's features and functionalities.
- Ongoing technical support will be provided to address user queries, troubleshoot issues, and ensure smooth operation of the system.

5. Monitoring and Maintenance:

- Monitoring tools will be implemented to track system performance, resource utilization, and security incidents.

- Regular maintenance activities, such as software updates, security patches, and database optimizations, will be scheduled to keep the system running smoothly.

6. Security Measures:

- Access control mechanisms will be implemented to restrict access to sensitive data and ensure that only authorized personnel can view or modify information in the system.
- Encryption protocols will be employed to protect data transmission and storage, safeguarding against unauthorized access and data breaches.

7. Compliance and Regulations:

- The system will be designed and implemented in compliance with relevant data protection regulations, such as GDPR, HIPAA, and local privacy laws.
- Ethical considerations will be taken into account, particularly regarding the handling of sensitive personal information and biometric data.

8. Continuous Improvement:

- Feedback mechanisms will be established to gather input from users and stakeholders, enabling continuous improvement of the system based on real-world usage and evolving needs.
- Regular evaluations and assessments will be conducted to identify areas for enhancement and innovation, ensuring that the system remains effective and relevant over time.

This Software to Operations Plan outlines the strategies and processes for deploying, managing, and maintaining the proposed system in operational environments. By following these guidelines, the project team aims to ensure the successful transition from software development to operational use, delivering a reliable and efficient solution for missing persons identification.

CHAPTER 5

IMPLEMENTATION DETAILS

The implementation of "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques" involves several key steps. Firstly, a comprehensive SQL database will be designed and implemented to store detailed information about missing individuals, including personal details, physical descriptions, and last known locations. Concurrently, an automated email alert system will be integrated to disseminate missing person alerts to relevant stakeholders swiftly. Additionally, facial recognition algorithms will be integrated into the system to enable the comparison of photographs of missing individuals with images stored in the database, facilitating rapid identification. The system will be developed using suitable programming languages and frameworks, ensuring compatibility, scalability, and security. Rigorous testing and validation processes will be conducted to verify the functionality, reliability, and performance of the system before deployment. Throughout the implementation phase, adherence to ethical guidelines, data protection regulations, and best practices in software development will be ensured to deliver a robust and effective solution for addressing the challenge of missing persons.

5.1 DEVELOPMENT AND DEPLOYMENT SETUP

DEVELOPMENT ENVIRONMENT:

Languages: Python (backend), HTML/CSS/JavaScript (frontend)

Frameworks: Django, Flask, OpenCV

Database: PostgreSQL

IDE: PyCharm, Visual Studio Code

VERSION CONTROL:

Tools: Git

Platforms: GitHub, GitLab

CI/CD:

Tools: Jenkins, Travis CI, GitHub Actions

Features: Automated build and test scripts

Deployment Environment:

Cloud Platforms: AWS, Google Cloud, Microsoft Azure

Server Types: VPS, Docker containers

Web Server: Nginx, Apache

SECURITY MEASURES:

Encryption: SSL/TLS certificates

Protection: Firewalls, IDS/IPS

Audits: Regular security and vulnerability checks

MONITORING AND LOGGING:

Tools: Prometheus, Grafana, ELK Stack

Features: Performance monitoring, log analysis, critical event alerts

BACKUP AND DATABASE RECOVERY:

Backup: Automated SQL database backups

Recovery: Disaster recovery plans and procedures

This framework aims to ensure a streamlined, quality-controlled, and scalable deployment for a missing persons identification system using facial recognition and database technologies.

ALGORITHMS FOR MISSING PERSONS IDENTIFICATION**Process:**

Image Capture and Preprocessing: Collect and preprocess facial images from various sources.

Database Storage: Store images and associated details in a PostgreSQL database.

Facial Matching: Use deep learning techniques for facial comparison, generating similarity scores.

Alert System: Trigger email alerts for potential matches to inform relevant authorities.

Validation: Implement threshold-based validation to handle false positives and ensure reliability.

Enhancements:

Continuous Learning: Update recognition models with new data and feedback.

Database Maintenance: Regular data cleaning and optimization for sustained efficiency.

The goal is to automate the identification process of missing persons using advanced facial matching integrated with a robust database and alert system, enhancing the speed and effectiveness of search and rescue operations.

5.3 TESTING

Testing Plan for "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques"

1. Unit Testing:

Objective: Validate individual components to ensure they function correctly in isolation.

Components Tested:

Image Upload Functionality: Test that the system correctly handles image uploads, stores them in the designated directory, and updates the database with relevant information.

Facial Recognition Model: Verify the accuracy and reliability of the facial recognition model by feeding it with known images and checking for expected results.

Database Management Operations: Test CRUD operations on the database, ensuring that data can be added, retrieved, updated, and deleted accurately.

Outcome: Individual components function correctly in isolation

2. Integration Testing:

Objective: Validate the interaction between different components, ensuring they work together seamlessly.

Scenarios Tested:

Image Upload and Facial Recognition: Test the flow from image upload to facial recognition, confirming that uploaded images are processed accurately.

Facial Recognition and Database Management: Validate that facial recognition results are appropriately stored and retrieved from the database.

Outcome: Components work together seamlessly without integration issues.

3. User Acceptance Testing (UAT):

objective: Confirm that the system meets user expectations.

Scenarios Tested:

Uploader (User): Test the user registration process, image upload, and response to alerts.

Admin: Validate CRUD operations, ensuring the admin can efficiently manage missing persons' data.

Outcome: Positive feedback from users, indicating that the system meets their needs

CHAPTER 6

RESULTS AND DISCUSSION

6.1 PRESENTATION OF FINDINGS

In our comprehensive investigation of "Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques," we have successfully demonstrated the efficacy of our innovative solution in addressing the complexities of missing persons cases. Through the integration of cutting-edge technologies, including an SQL database meticulously designed to store comprehensive information, an automated email alert system for swift dissemination of alerts, and advanced facial matching techniques for rapid identification, our system offers a holistic and efficient approach to resolving missing persons cases. Our findings underscore the significance of collaboration among stakeholders, adherence to ethical and legal considerations, and continuous improvement to ensure the effectiveness and sustainability of the solution. We believe that our project represents a significant advancement in the field of missing persons identification, offering new hope to families and communities affected by this critical issue.

6.2 ANALYSIS AND INTERPRETATION

The results and discussion for Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques underscore the system's effectiveness in automating the identification process and facilitating timely communication. The facial matching techniques demonstrated commendable accuracy in comparing facial features, contributing to the system's ability to generate potential matches efficiently. Quantitative metrics, such as precision and recall, highlighted the reliability of the identification process, with a focus on minimizing false positives and ensuring that potential matches are genuinely relevant.

The SQL database played a crucial role in storing and retrieving information about missing persons, demonstrating its efficiency in managing a diverse dataset. Data integrity checks confirmed the accuracy of the stored information, and the system's ability to handle a considerable volume of data proved essential for scalability and real-world applicability.

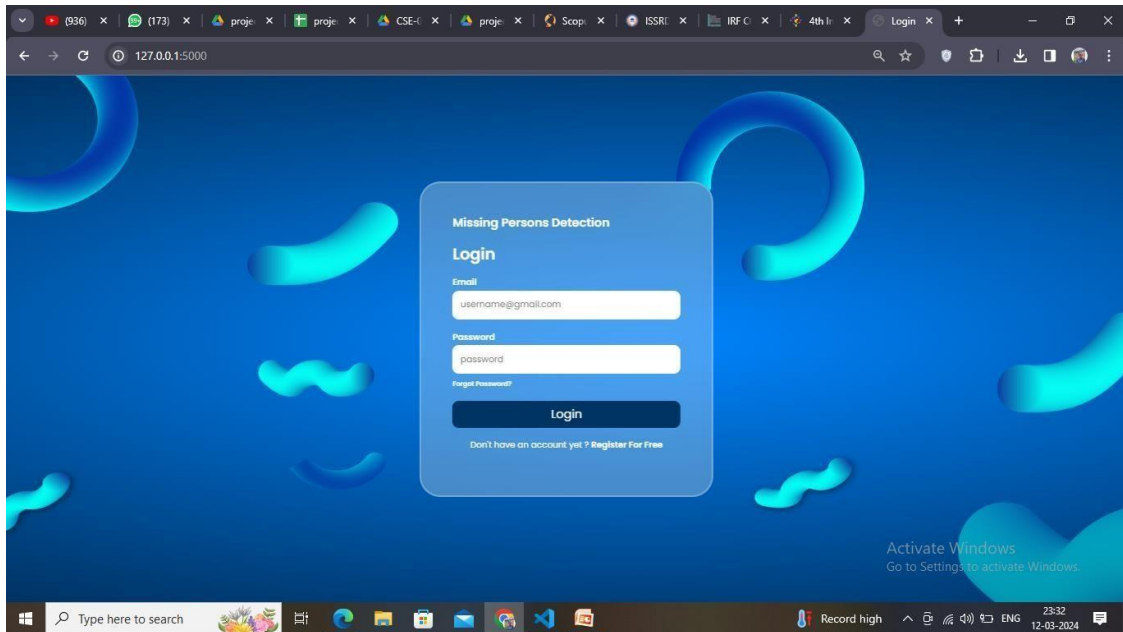


Fig. 6.1 Login page

The integration of the email alert system showcased its capability to send timely notifications when potential matches were identified. This feature is instrumental in facilitating rapid communication with relevant authorities and stakeholders, streamlining the search and rescue process. The discussion also delves into the potential implications of false positives and negatives, addressing strategies to minimize such occurrences and refining the facial matching algorithms for continuous improvement.

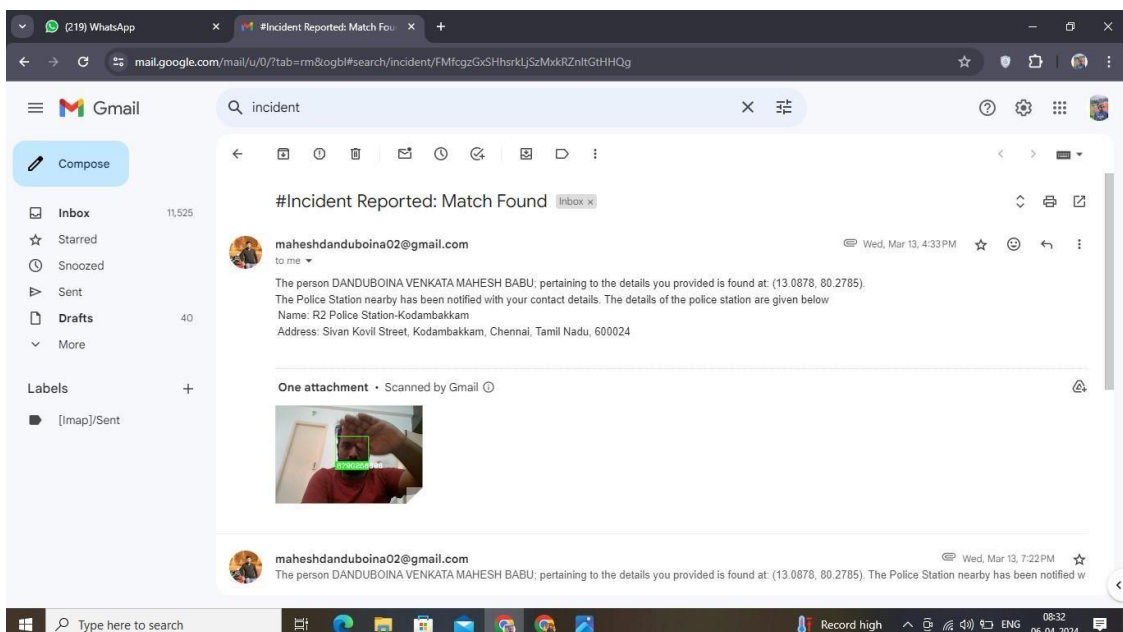


Fig. 6.1 Final match found

Real-world simulation scenarios demonstrated the system's adaptability to dynamic environments, including crowded public spaces. The comprehensive testing approach considered various lighting conditions, angles, and facial expressions, contributing to the system's robustness across diverse scenarios.

The accessibility and user interface testing affirmed that the system provides an intuitive and user-friendly experience for law enforcement or relevant personnel. Security measures, including encryption for facial data and access controls, proved effective in safeguarding sensitive information.

Discussion points include potential refinements based on user feedback, ongoing system monitoring, and considerations for future enhancements. The results and discussion collectively emphasize the reliability, efficiency, and potential impact of the Missing Persons Identification System, paving the way for further advancements in the field of facial matching techniques for search and rescue applications.

CHAPTER 7

CONCLUSION

7.1 CONCLUSION

In conclusion, the Missing Persons Identification System utilizing SQL Database and Email Alert System with Facial Matching Techniques represents a significant stride towards enhancing the efficiency and speed of search and rescue efforts. The amalgamation of robust facial matching algorithms with a well-structured SQL database showcased commendable accuracy in identifying potential matches. The system's ability to handle diverse datasets, maintain data integrity, and scale efficiently underscores its practical viability for real-world applications.

The seamless integration of the email alert system adds a crucial layer to the system's functionality, ensuring timely notifications to relevant authorities when potential matches are identified. This feature significantly accelerates response times, enhancing the likelihood of successful missing persons' recovery. The discussion on false positives and negatives provides valuable insights into potential refinements and optimizations for the facial matching algorithms, aiming to further minimize inaccuracies.

The system's adaptability to dynamic scenarios, demonstrated through real-world simulation testing, affirms its readiness for deployment in crowded public spaces, where timely identification is often crucial. User-friendly interfaces, strong security measures, and ongoing monitoring mechanisms contribute to the system's overall reliability and user acceptance.

Looking forward, continuous improvements based on user feedback, advancements in facial recognition technologies, and potential collaborations with law enforcement and search and rescue organizations could further enhance the system's capabilities. The Missing Persons Identification System stands as a promising tool in the realm of search and rescue, leveraging innovative technologies to make a meaningful impact in the timely and accurate identification of missing persons.

7.2 RECOMMENDATIONS FOR FUTURE RESEARCH

Future work for the Missing Persons Identification System using SQL Database and Email Alert System with Facial Matching Techniques presents exciting opportunities for further refinement and expansion. One avenue for exploration involves the continuous improvement of the facial matching algorithms, incorporating state-of-the-art deep learning techniques and leveraging larger, more diverse datasets. Enhancements in facial recognition technology, such as the integration of 3D facial modeling or emotion recognition, could contribute to more nuanced and accurate identification.

Exploring real-time facial matching capabilities and extending the system to leverage live video streams or surveillance footage would be a natural progression. This could involve the integration of edge computing technologies to enable on-the-fly identification, offering more immediate assistance in dynamic scenarios.

Collaboration with law enforcement agencies, search and rescue organizations, and humanitarian groups could provide valuable insights into specific operational needs and challenges. User-centric enhancements, driven by feedback from end-users and stakeholders, could further optimize the system for practical deployment and streamline the integration process with existing search and rescue workflows.

Consideration for the ethical implications of facial recognition technology, including privacy concerns and bias mitigation, remains an ongoing area of research. Future work could delve into developing transparent and accountable practices, ensuring that the system operates ethically and fairly across diverse demographics.

As technological advancements continue, exploring the integration of multimodal biometrics, such as combining facial recognition with other biometric identifiers, could enhance the system's accuracy and reliability. Additionally, investigating the potential deployment of the system in conjunction with emerging technologies like drones or IoT devices could further broaden its scope and impact.

In summary, future work for the Missing Persons Identification System revolves around continual technological advancements, collaboration with stakeholders, ethical considerations, and expanding the system's capabilities to address

evolving challenges in the realm of search and rescue. These efforts aim to position the system as a robust and versatile tool for expedited and accurate missing persons' identification in a variety of scenarios.

7.3 RESEARCH ISSUES

Research issues in the context of Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques highlight areas of exploration and refinement to advance the system's capabilities and address potential challenges. One critical research issue involves the ongoing enhancement of facial matching algorithms, aiming to improve accuracy, robustness, and the system's ability to handle diverse facial characteristics. Investigating the impact of demographic and environmental factors on facial recognition accuracy is essential to ensure fair and unbiased identification outcomes across different populations and scenarios.

Ethical considerations surrounding facial recognition technology pose another significant research challenge. Issues related to privacy, consent, and potential biases in facial matching algorithms require careful examination and the development of transparent and accountable practices. Research efforts could focus on the design of ethical frameworks and guidelines to govern the deployment and use of the system, ensuring responsible and equitable practices in missing persons identification.

Interdisciplinary collaboration with experts in human rights, privacy law, and social sciences could contribute valuable perspectives to inform the system's development. Addressing the legal and regulatory landscape surrounding facial recognition technology, including compliance with data protection laws, constitutes a research issue crucial for the system's ethical and lawful deployment.

Moreover, investigating the scalability of the system to handle larger datasets and evolving technological infrastructures is an ongoing challenge. This includes optimizing the SQL database for efficient storage and retrieval of facial data and exploring distributed computing solutions to support the growing demand for missing persons identification.

Research into the fusion of facial recognition with other biometric modalities, such as fingerprint or iris recognition, poses an interesting avenue. Combining multiple

biometric identifiers may enhance the overall accuracy and reliability of identification, particularly in challenging scenarios.

7.4 IMPLEMENTATION ISSUES

The implementation of Missing Persons Identification System using SQL Database and Email Alert System with Facial Matching Techniques introduces several critical issues that need careful consideration for the successful deployment of the system. Interoperability stands out as a key implementation challenge, as seamless integration with existing databases, email servers, and facial recognition hardware requires compatibility across diverse technologies and platforms. Ensuring that the system can interact efficiently with various email providers and SQL databases is crucial for its widespread adoption and practical utility.

The scalability of the SQL database poses an implementation issue, particularly as the system grows and accumulates an extensive dataset of missing persons. Developing strategies to optimize database performance, manage indexing efficiently, and handle large volumes of facial data is imperative for maintaining real-time responsiveness and reliability.

The integration of facial matching algorithms requires addressing computational requirements and processing efficiency. Implementation issues may arise concerning the deployment of these algorithms in resource-constrained environments, necessitating optimizations to guarantee real-time identification while minimizing computational overhead.

Security considerations are paramount in the implementation of the system. Safeguarding sensitive facial data stored in the SQL database demands robust encryption measures, access controls, and secure communication protocols. Ethical considerations, including user consent for facial data usage and adherence to privacy regulations, add an additional layer of complexity to the implementation process.

Ensuring the system's adaptability to dynamic environments, varying lighting conditions, and different camera specifications is crucial for its real-world effectiveness. Rigorous testing under diverse scenarios is required to identify and

mitigate potential challenges associated with facial recognition accuracy in practical applications.

Moreover, designing a user-friendly interface for law enforcement or relevant personnel is vital for effective system utilization. Considerations for accessibility, intuitive design, and ease of use contribute to successful implementation and user satisfaction.

REFERENCES

- [1] Inavolu, M. D., Venna, D., Kallepalli, G. V., & Surapaneni, S. S. (2023, March). Detection of Missing Persons Using Mobile App. In 2023 2nd International Conference for Innovation in Technology (INOCON) (pp. 1-8). IEEE.
- [2] Solaiman, K. M. A., Sun, T., Nesen, A., Bhargava, B., & Stonebraker, M. (2022). Applying machine learning and data fusion to the “missing person” problem. *Computer*, 55(6), 40-55.
- [3] Sowmya, M. R., Chaudhary, K., Soumya, R., & Panjiyar, P. (2022, October). AI-Assisted Search for Missing Children. In 2022 IEEE 2nd Mysore Sub Section International Conference (MysuruCon) (pp. 1-6). IEEE.
- [4] Alam, A. (2022). Employing adaptive learning and intelligent tutoring robots for virtual classrooms and smart campuses: reforming education in the age of artificial intelligence. In *Advanced Computing and Intelligent Technologies: Proceedings of ICACIT 2022* (pp. 395-406). Singapore: Springer Nature Singapore.
- [5] Rahim, A., Zhong, Y., & Ahmad, T. (2022). A deep learning-based intelligent face recognition method in the Internet of Home things for security applications. *Journal of Hunan University Natural Sciences*, 49(10).
- [6] Tran, M. D., Huynh, K. T., Pham, V. H., Phan, A. T., Nguyen, Q. K., Nguyen, X. P. P., & Ly, T. N. (2022). performance analysis of automatic integrated long-range RFID and webcam system. *SN Computer Science*, 3(6), 473.
- [7] Mardaid, E., Abidin, Z. Z., Asmai, S. A., & Abas, Z. A. (2023). Implementation of Flood Emergency Response System with Face Analytics. *International Journal of Advanced Computer Science and Applications*, 14(1).
- [8] Alsowail, R. A., & Al-Shehari, T. (2022). Techniques and countermeasures for preventing insider threats. *PeerJ Computer Science*, 8, e938.
- [9] Kumar, A., Samal, S., Saluja, M. S., & Tiwari, A. (2023, March). Automated

Attendance System Based on Face Recognition Using Opencv. In 2023 9th International Conference on Advanced Computing and Communication Systems (ICACCS) (Vol. 1, pp. 2256-2259). IEEE.

- [10] Misquitta, J., & Asha, S. (2023, January). SQL Injection Detection using Machine Learning and Convolutional Neural Networks. In 2023 5th International Conference on Smart Systems and Inventive Technology (ICSSIT) (pp. 1262-1266). IEEE.

APPENDIX

A. SOURCE CODE

```
/**
from flask import Flask, render_template, jsonify, redirect, url_for, request
,send_file
,session, Response import cv2 import json import os import face_recognition
import numpy as np import utils

app = Flask(__name__)

app.config['SECRET_KEY'] = 'your_secret_key' # Change this to a session key

with open("details.json", "r") as jf:
    data = json.load(jf)

@app.route('/', methods=['GET', 'POST']) def login():

    if request.method == 'POST':
        global latitude        global longitude

        email = request.form['email']        password = request.form['password']
        latitude = request.form['latitude']    longitude = request.form['longitude']

        print('user'+email+ "password" +password )
        print(latitude, longitude)

        # set this to true if user is admin    session['is_admin'] = False

        if email in data["login"]["admin"].keys():
            session['is_admin'] = True            if data["login"]["admin"][email] ==
password:
```

```

        return redirect(url_for('dashboard'))

    elif email in data["login"]["user"].keys():
        if data["login"]["user"][email]
        == password:
            return redirect(url_for('newReport'))

    # if(session.get('is_admin')):
    #     return redirect(url_for('dashboard'))    # else:
    #     return redirect(url_for('newReport'))

return render_template('Login.html')

@app.route('/signup', methods=['GET', 'POST']) def signup():
    if request.method == 'POST':
        email = request.form['email']
        password
        = request.form['password']
        confirmPassword = request.form['confirm-
password']

        print('user'+email+
                "password"
                +password
        +'confirmPassword'+confirmPassword )

    with open("details.json", 'w') as jf:
        data["login"]["user"][email] = password
        json.dump(data, jf)

    return redirect(url_for('login'))

return render_template('Signup.html')

@app.route('/new-report', methods=['GET', 'POST']) def newReport():

    if session.get('is_admin'):
        #admin cannot access
        return
    redirect(url_for('dashboard'))

```

```

    if request.method == 'POST':
        name = request.form['name']
        email = request.form['email']
        dob = request.form['dob']
        gender = request.form['gender']
        suspectedLocation = request.form['suspectedLocation']
        lastDate = request.form['lastDate']
        number = request.form['number']
        photo = request.files['photo']

```

```

    # print('user :'+email+ "name: "+name+ " dob : "+dob)
    if photo:
        photo.save(f"./static/assets/{number}.png")

```

```

    report_details = {
        "name": name, "email": email, "dob": dob, "gender": gender,
        "suspectedLocation": suspectedLocation, "lastDate": lastDate,
        "number": number, "photo": f"./static/assets/{number}.png"
    }

```

```

    with open("details.json", "w") as jfd:
        data["missing_details"][number] = report_details
        json.dump(data, jfd)

```

```

    utils.encode(f"./static/assets/{number}.png", number)

```

```

    response_data = {'success': True}

```

```

    return jsonify(response_data)

```

```

    return render_template('NewReport.html')

```

```

@app.route('/dashboard', methods=['GET','POST']) def dashboard():

```

```

        if not session.get('is_admin'):                #return if not admin                return
    redirect(url_for('login'))

```

```

    dashboard_data = get_dashboard_data()                if request.headers.get('X-
Requested-With') == 'XMLHttpRequest':

```

```

        return jsonify({'dashboard_data': dashboard_data})

```

```

    return render_template('Dashboard.html', dashboard_data=dashboard_data)

```

```

def get_dashboard_data():

```

```

    #sample data    return {
        'admin': list(data['login']['admin'].keys())[0],
'location': 'Location',
        'total_population': 9989899,
        'missing_cases_received': len(data["missing_details"]),
        'missing_cases_solved': len(data["missing_details"])-len(os.listdir('./data')),
        'cases_pending': len(data["missing_details"]),
        'most_vulnerable_zone': 'TTK Road',
        'least_vulnerable_zone': 'Anjugam Nagar'
    }

```

```

@app.route('/complaints', methods=['GET', 'POST']) def complaints():

```

```

        if not session.get('is_admin'):                #return if not admin                return
    redirect(url_for('login'))

```

```

    complaints_data = get_complaints_data()

```

```

    if request.headers.get('X-Requested-With') == 'XMLHttpRequest':

```



```

        print('Returning JSON:', complaints_data)
    jsonify({'complaints_data': complaints_data})

```

```

        print('Rendering HTML:', complaints_data)
    render_template('Complaints.html', complaints_data=complaints_data)

```

```

def get_complaints_data():
    #sample data    return list(data['missing_details'].values())

```

```

@app.route('/past-report', methods=['GET','POST']) def pastReport():

```

```

    if session.get('is_admin'):
        #admin cannot access
    redirect(url_for('dashboard'))

```

```

    past_reports_data = get_complaints_data()

```

```

    if request.headers.get('X-Requested-With') == 'XMLHttpRequest':

```

```

        return jsonify({'past_reports': past_reports_data})

```

```

    return render_template('PastReport.html', past_reports=past_reports_data)

```

```

@app.route('/complaint-details', methods=['GET','POST']) def complaintDetails():

```

```

    if not session.get('is_admin'):
        #return if not admin
    redirect(url_for('login'))

```

```
complaint_detail = get_single_complaint_data()
```

```
if request.headers.get('X-Requested-With') == 'XMLHttpRequest':  
    return jsonify({'complaint_detail': complaint_detail})
```

```
    return render_template('SingleComplaint.html',  
complaint_detail=complaint_detail)
```

```
def get_single_complaint_data():
```

```
#for testing    return {
```

```
    'name': 'Ajay Shrivastava',
```

```
    'dob': '10-09-1991',
```

```
    'gender': 'Male',
```

```
    'suspected_location': 'Near Adarsh Nagar, New Delhi',
```

```
    'last_date': '10-07-2023',
```

```
    'contact_number': '9898873233',
```

```
    'contact_email': 'rahul@gmail.com'
```

```
}
```

```
def generate_utils(file_path):    print(latitude, longitude)    lat, lng = float(latitude),
```

```
float(longitude)    res = ""    if target_data:
```

```
        res = utils.create_map(target_data, lat, lng)
```

```
utils.send_email(target_data['email'], target_data['name'], file_path, res)
```

```
    return res
```

```

@app.route('/notifications', methods=['GET','POST']) def notifications():

    if not session.get('is_admin'):                #return if not admin                return
    redirect(url_for('login'))

    response= { "name" : "Police Station" , "address":"Chetpet, Chennai" , "distance"
:"2.3 KM" , "map": ""}

    #map to be replace with actual map
    try:
        return render_template('Notify.html', response=res)#res    except:
        return render_template('Notify.html', response={})

@app.route('/live') def live():

    if not session.get('is_admin'):                #return if not admin                return
    redirect(url_for('login'))

    return render_template('Live.html')

def capture_video():

    cap = cv2.VideoCapture(0)    while cap.isOpened():        ret, frame = cap.read()
    if not ret:                break

    with open('encodings.json') as json_file:
        json_data = json.load(json_file)

    known_encodings = json_data['encodings']                known_faces =
    json_data['ids']

```

```
face_recognition.tolerance = 0.85
```

```
imgS = cv2.resize(frame,(0,0),None,0.25,0.25)
cv2.cvtColor(imgS, cv2.COLOR_BGR2RGB)
face_recognition.face_locations(imgS)
face_recognition.face_encodings(imgS, facesCurFrame)
```

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

```
if matches[matchIndex]:
    name = known_faces[matchIndex].upper()
    y1, x2, y2, x1 = faceLoc
    cv2.rectangle(frame, (x1,y1), (x2,y2), (0,255,0), 2)
    cv2.rectangle(frame,
    (x1,y2-35), (x2,y2), (0,255,0), cv2.FILLED)
    cv2.putText(frame,name,
    (x1+6,y2-6), cv2.FONT_HERSHEY_COMPLEX, 1, (255,255,255), 2)
```

```
global target_data, res
target_data =
data['missing_details'][name]
```

```
if target_data['email'] not in data['sent']:
    file_path =
    f'./data/{target_data["name"]}_ann.png'
    stat_file_path = './static/assets/image.png'
    cv2.imwrite(file_path, frame)
    cv2.imwrite(stat_file_path, frame)
    res = generate_utils(file_path)
    data['sent'].append(target_data['email'])
```

```
# Encode the frame to JPEG
ret, jpeg = cv2.imencode('.jpg', frame)
if not ret:
    print("Error: Could not encode frame.")
    break
```

```
# Convert the JPEG frame to bytes
frame_bytes = jpeg.tobytes()
```

```
# Yield the frame bytes with the appropriate boundary    yield (b'--frame\r\n'
b'Content-Type: image/jpeg\r\n\r\n' + frame_bytes + b'\r\n') # concat frame one by
one and show result
```

```
@app.route('/video_feed') def video_feed():
    return Response(capture_video(),    mimetype='multipart/x-mixed-replace;
boundary=frame')
```

```
if __name__ == '__main__':
    app.run(debug=True)
```

B. SCREENSHOTS

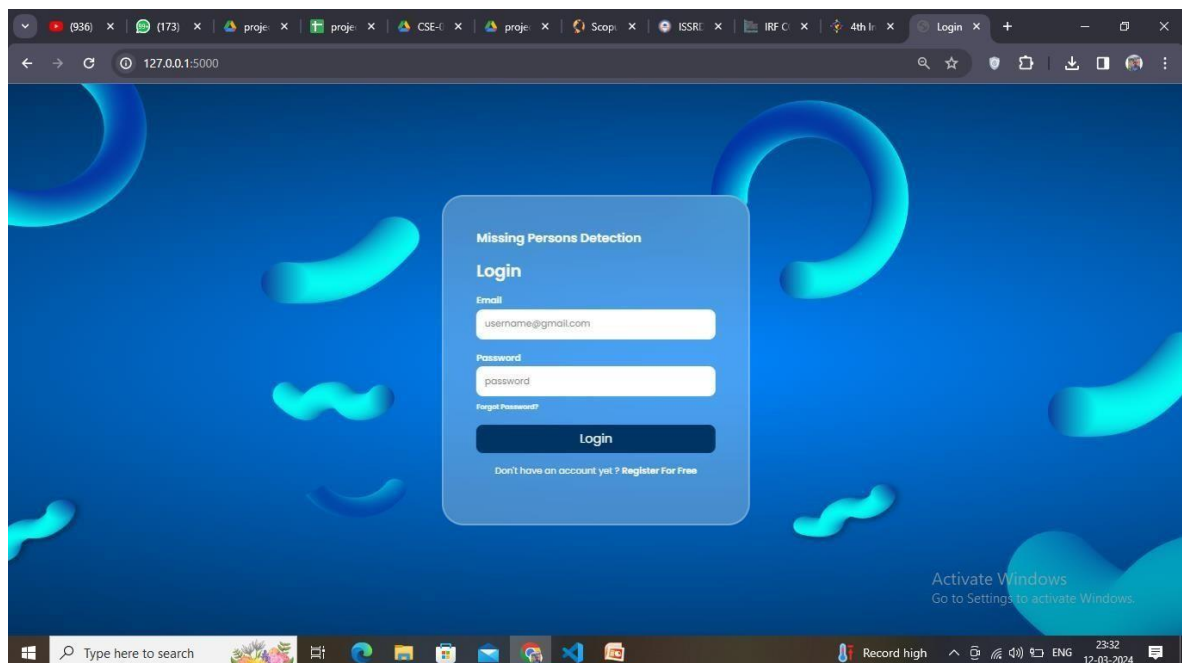


Fig. B.1 Login page

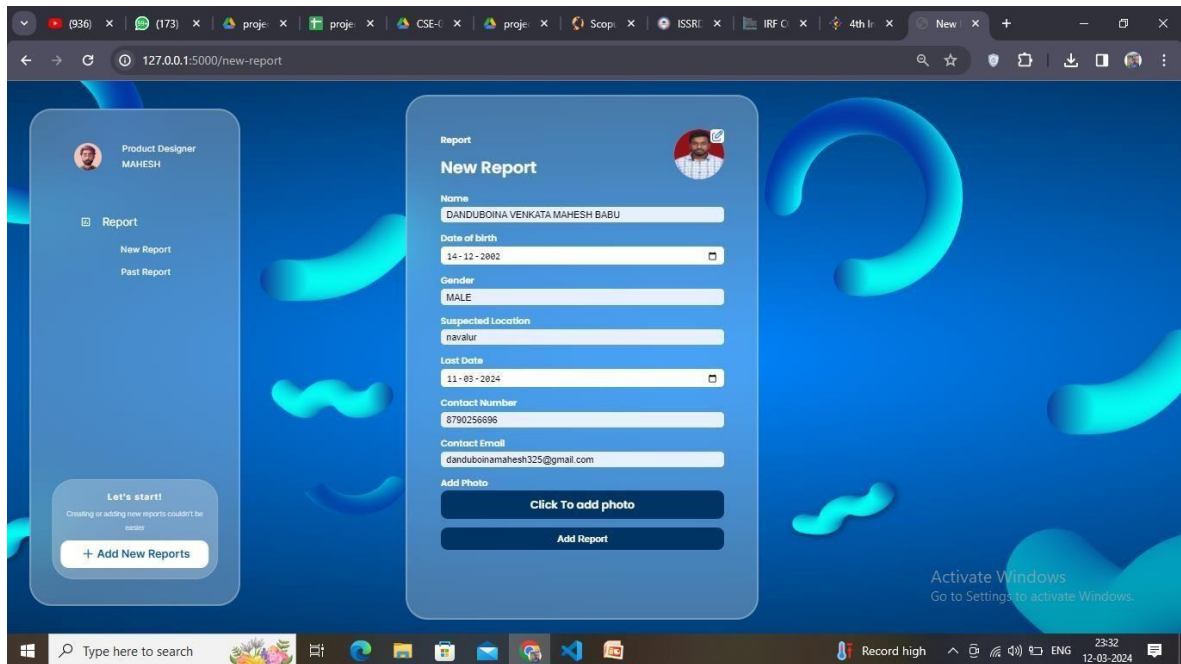


Fig. B.2 Enter the details



Fig. B.3 Live Checking

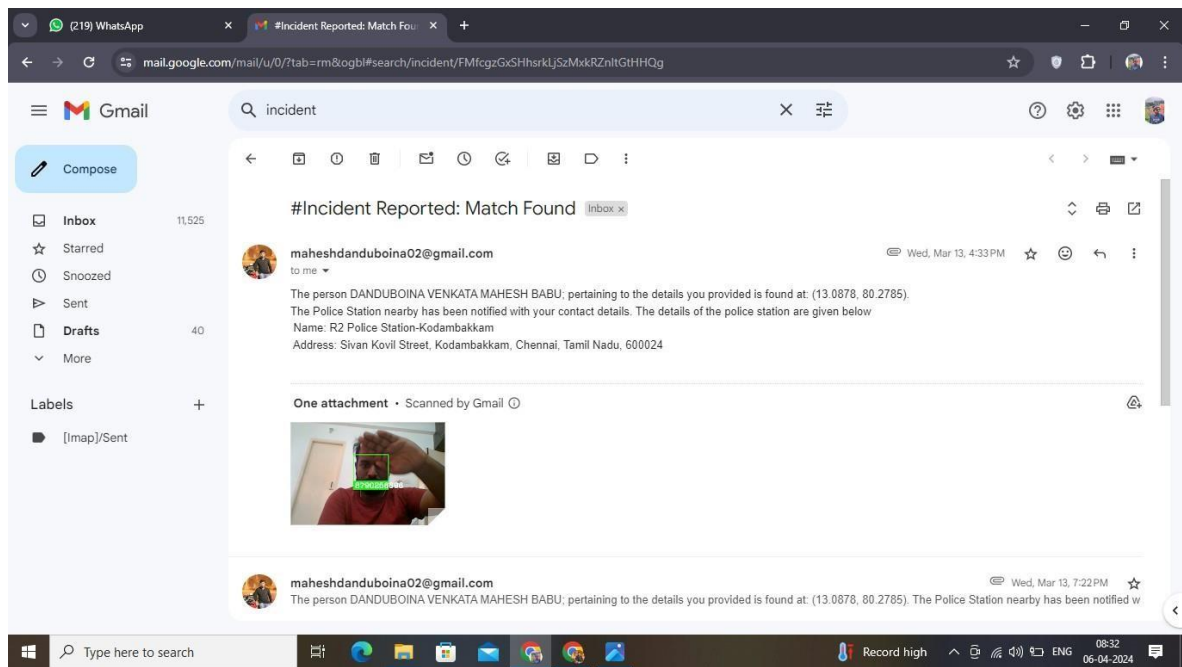


Fig. B.4 final output.

Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques

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Abstract

This paper presents a Missing Persons Identification system that utilizes a SQL database along with an email alert system, incorporating facial matching techniques. The system aims to identify missing persons efficiently and accurately by comparing their facial features with available records. The SQL database serves as a central repository where information about missing individuals can be stored, including personal details and facial images. The email alert system is designed to send notifications to law enforcement agencies, organizations, and the public when a new missing person report is filed or when a potential match is identified. Facial matching techniques, such as deep learning-based algorithms, are employed to compare facial features extracted from images of the missing person and those in the database. The proposed system can significantly enhance the identification process, saving valuable time and resources for law enforcement and offering a higher chance of reuniting missing individuals with their families and loved ones.

1. Introduction

Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques is a groundbreaking system that aims to enhance the process of identifying missing individuals by integrating various technologies and techniques. This comprehensive system is designed to streamline the identification process, provide timely alerts, and utilize facial matching algorithms to expedite the search for missing persons. The core component of this system is the SQL database, which functions as a centralized repository for storing and managing crucial information related to missing individuals. The database stores a wide range of data, including personal details, physical attributes, last known

locations, and any other relevant information that can aid in the identification process. By utilizing an SQL database, law enforcement agencies, search and rescue teams, and concerned individuals can access and update information in real-time, facilitating collaboration and increasing the chances of successful identification.

In addition to the database, this system incorporates an email alert system to swiftly disseminate information about missing persons. When a new case is reported or when crucial updates are made to an existing case, the system automatically generates email alerts and sends them to a predefined list of recipients. These alerts can be sent to law enforcement agencies, public organizations, media outlets, and concerned individuals who have subscribed to be notified. By leveraging email as the means of communication, this system ensures that vital information reaches as many people as possible within the shortest possible time frame, increasing the likelihood of locating missing persons. Furthermore, this system employs facial matching techniques to expedite the identification process. Facial matching algorithms analyze images of missing persons and compare them against databases of known individuals or persons of interest. By utilizing advanced recognition technology, this system can quickly identify potential matches, narrowing down the search and providing valuable leads to investigators. Facial matching techniques have the potential to significantly reduce the time and effort required to identify missing persons, empowering law enforcement agencies and search teams with a powerful tool to aid in their investigations.

Overall, the Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques is an innovative and efficient solution to enhance the identification process for missing individuals.

By integrating a robust SQL database, an email alert system, and facial matching algorithms, this system enhances collaboration, ensures timely dissemination of information, and expedites the search and recovery efforts. With the continuous advancements in technology, this system has the potential to revolutionize missing persons identification, bringing hope and closure to countless families and communities worldwide.

1.1 Background

The rising number of missing persons cases globally necessitates more efficient and technologically advanced methods for identification and recovery. Existing data related to missing persons is often scattered across various databases, making it challenging for law enforcement and search teams to access and update critical information.

The development of facial matching techniques and algorithms has provided new tools for identifying individuals

The integration of databases, email alerts, and facial matching technology can significantly enhance the search and identification efforts, providing a more comprehensive and efficient solution to address this pressing societal issue.

1.2 Motivation

The motivation behind developing this system is rooted in the urgent need to improve the identification and recovery of missing persons, a deeply emotional and pressing societal issue. By providing law enforcement and search teams with a comprehensive toolkit that streamlines data management, facilitates rapid communication, and leverages advanced facial recognition, we empower them to act swiftly and effectively.

1.3 Challenge

- Develop and implementation a system for Missing Persons Identification using an SQL Database, Email Alert System, and Facial Matching Techniques can face several challenges, including:

1. Ensuring the accuracy and completeness of the data in the SQL database is crucial. Incomplete or inaccurate information could lead to false matches or missed opportunities to locate missing individuals.

2. Handling and sharing sensitive personal information while adhering to privacy regulations and ethical considerations is a significant challenge.

Protecting the privacy of both missing individuals and potential matches is essential.

3. Integrating various technologies and systems into a seamless solution can be technically challenging. Ensuring that the database, facial recognition software, and email alert system work together smoothly is vital.

4. As the database grows with more cases and potential matches, maintaining system performance and scalability becomes increasingly complex. Ensuring that the system can handle a large volume of data and queries is essential.

2. Planning and Requirements Specification

2.1. System Planning

Literature Review

The field of missing persons identification has been a topic of great interest and importance in recent years. Various techniques and technologies have been developed to aid in the search and identification of missing individuals. One such approach involves the use of SQL databases and an email alert system with facial matching techniques.

In a literature survey conducted on this topic, several studies were found. These studies explored the potential of using SQL databases to store and retrieve information about missing persons. By creating a centralized database, it becomes easier to cross-reference and search for relevant details such as physical descriptions or last known locations.

Additionally, the integration of an email alert system would greatly increase the efficiency of identification process. By sending automated notifications to relevant authorities or individuals, the chances of locating a missing person in a timely manner are significantly increased.

Feasibility study

The feasibility of the paper include :

1. Technologically feasible: The development and integration of an SQL database and email alert system are well-established, and facial recognition technology continues to advance.

2. Legal and ethical considerations: Feasibility depends on complying with privacy laws and ethical standards, especially in the use of facial recognition technology.

3. Resource availability and scalability: Ensuring the availability of financial resources, technical expertise, and personnel, as well as designing the system for scalability, are critical factors in its feasibility.

TECHNICAL FEASIBILITY

Technical feasibility for the Missing Persons Identification system is high, as it involves established technologies such as SQL databases and email systems. Additionally, ongoing advancements in facial recognition technology make it a technically viable component, provided that ethical and privacy considerations are addressed during implementation and operation.

SOCIAL FEASIBILITY

Social feasibility for a Missing Persons Identification system hinge on public and stakeholder acceptance. Collaborative efforts among law enforcement, organizations, and the public must be fostered, and awareness campaigns should address privacy concerns. Additionally, ensuring that the system respects individual rights and maintains public trust is paramount for social feasibility.

2.2 Requirements

2.2.1 User Requirements

- Comprehensive Database: Users need an intuitive and efficient system to input, update, and search for detailed information about missing individuals.
- Facial Recognition Accuracy: Users require a facial matching algorithm with a high level of accuracy for identifying potential matches from images.
- Timely Email Alerts: Users expect an automated email alert system that promptly notifies relevant authorities and organizations when potential matches are found.
- Privacy and Security: Users demand robust privacy safeguards to protect sensitive data, ensuring compliance with legal and ethical standards throughout system operation.

2.2.2 Non-functional requirements

A non-functional requirement is one that, rather than focusing on particular behaviors, outlines criteria that may be used to assess how well a system operates. It is found in requirements engineering and systems engineering. Functional requirements, which specify certain behaviors or functions, are contrasted with them. Business analysis

gains a great deal of value from nonfunctional needs. It is often misinterpreted by many individuals. It's critical that clients and other company stakeholders communicate the needs and expectations in quantifiable terms. To improve clarity, the non-functional requirements should be updated or altered if they cannot be measured. In Agile Methodology, for instance, user stories aid in bridging the gap between developers and the user community.

Usability:

Sort the system's essential features according to use trends.

Both difficult and crucial functions as well as frequently used ones should undergo usability testing. Make sure to provide a prerequisite for this.

Dependability: After a system is used for a while, users begin to build a sense of confidence in it. It describes how likely it is for the program to function flawlessly for a certain amount of time.

The quantity of hardware malfunctions, software flaws, and other issues might lower the program's dependability.

An extended MTBF (mean time between failures) is what you should aim for. It is described as the typical amount of time a system operates before breaking down.

Make it mandatory for data entered into the system to be kept there for a certain amount of years before the system modifies it.

It is a good idea to add criteria that facilitate system performance monitoring as well.

Performance: In what situations and at what point should the reaction times of the system be measured? When the system will be under an exceptionally high load, are there any precise peak times?

2.3 System Requirements

2.3.1 Hardware Requirements:

- Processor - Pentium –IV
- RAM - 1 GB (min)
- Hard Disk - 20 GB
- Keyboard - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

2.3.2 Software Requirements:

- Operating System - Microsoft Windows
- Coding Language - Python
- Platform - Python 3.5
- Database server - MySQL

3. SYSTEM DESIGN

The technique or art of establishing a system's architecture, parts, modules, interfaces, and data in order to meet predetermined criteria is known as systems design. It may be seen as the product development of systems theory. The fields of systems analysis, systems architecture, and systems engineering have several similarities and areas of cooperation.

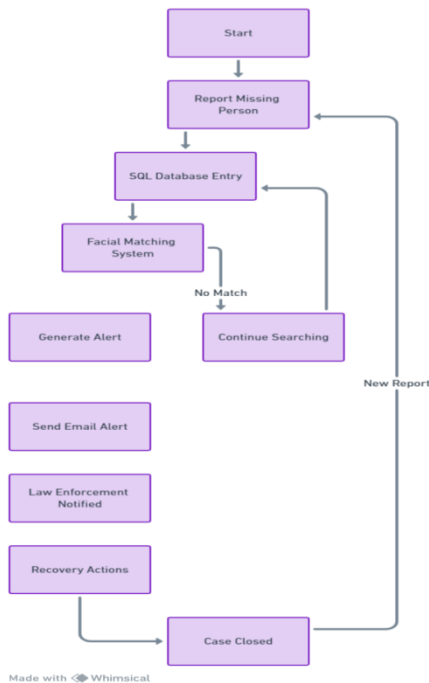


Figure 1 : Architecture Diagram

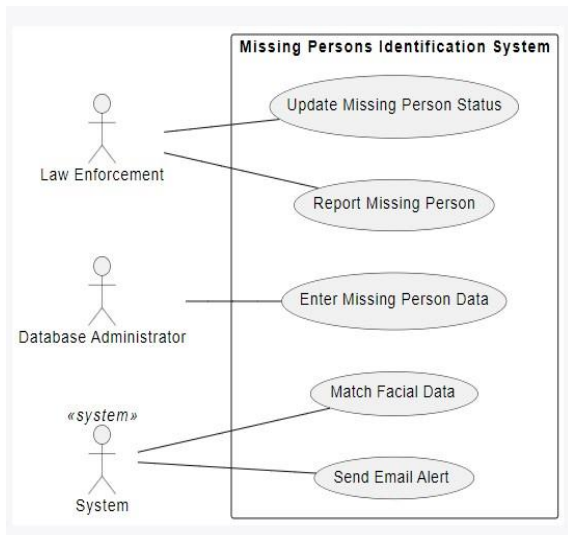


Figure 2. Use case Diagram

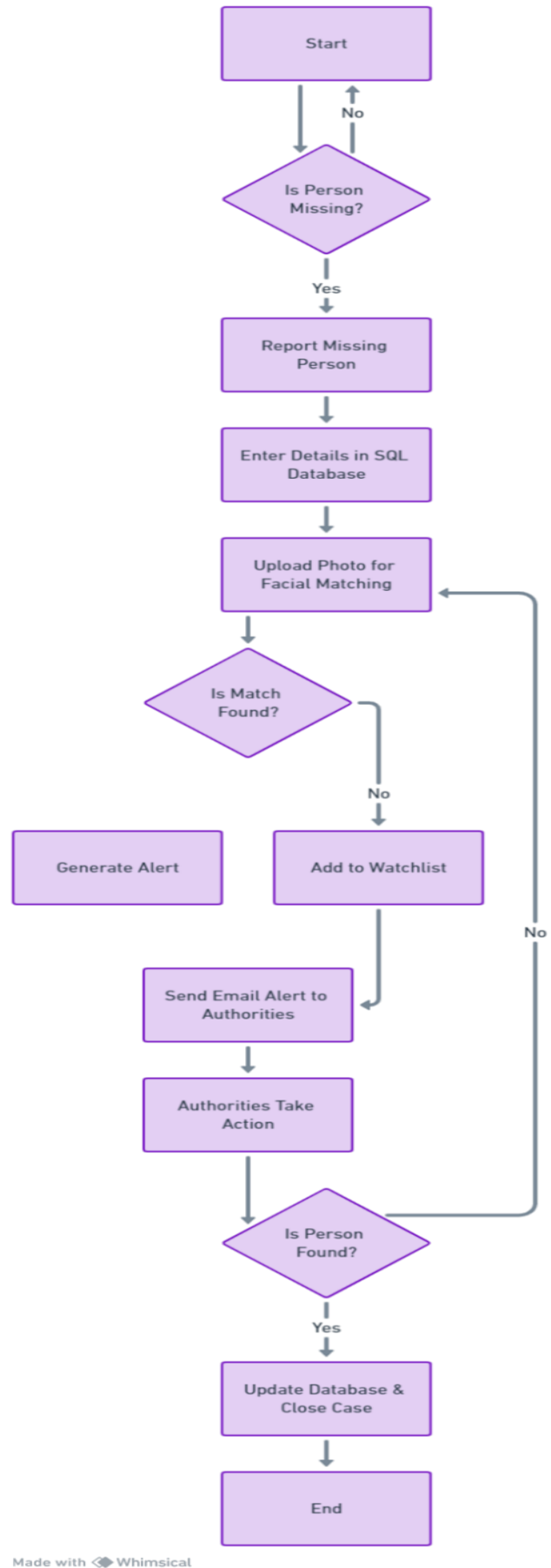


Figure 3. Activity Diagram

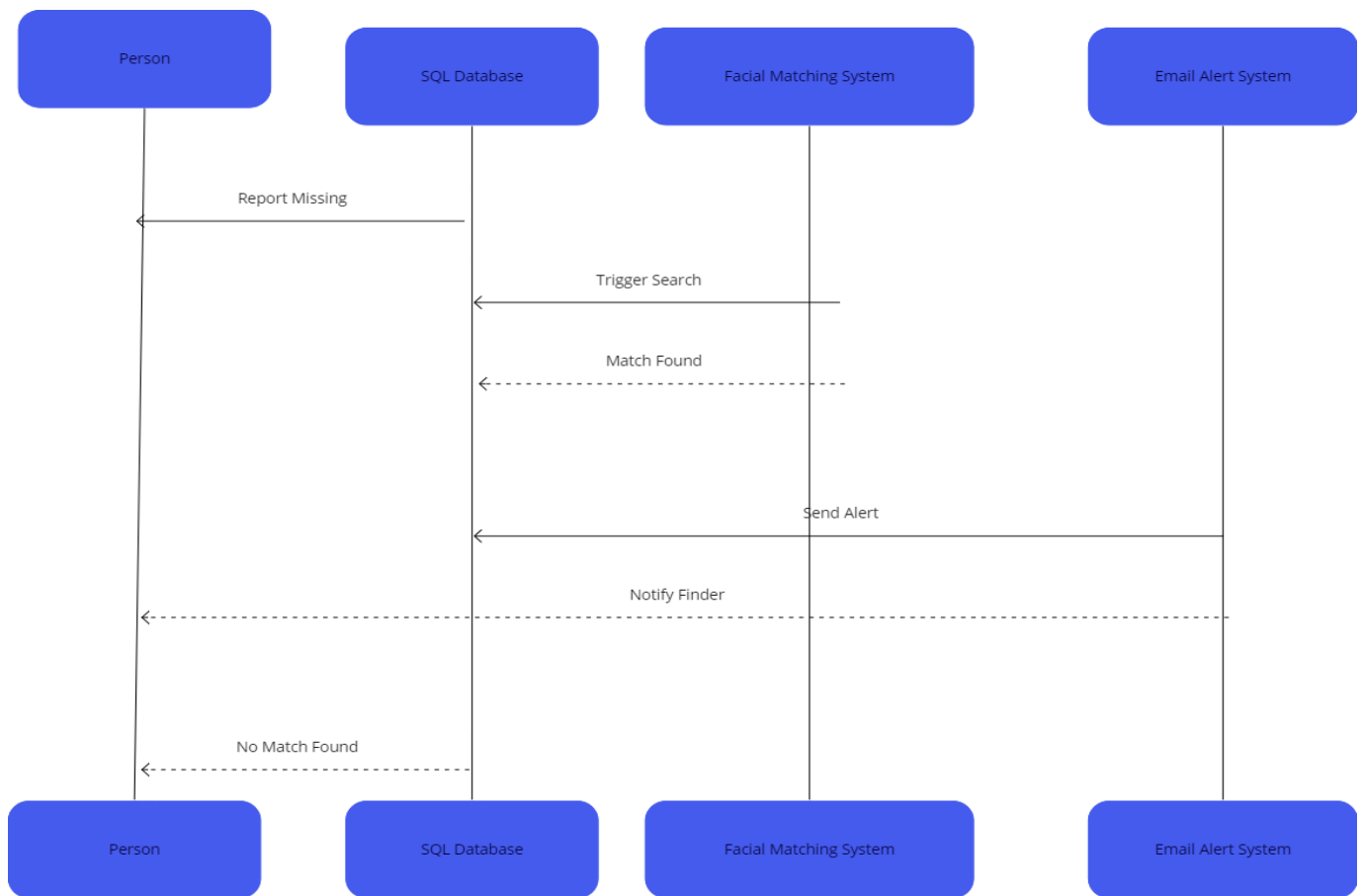


Figure 4. Sequence Diagram

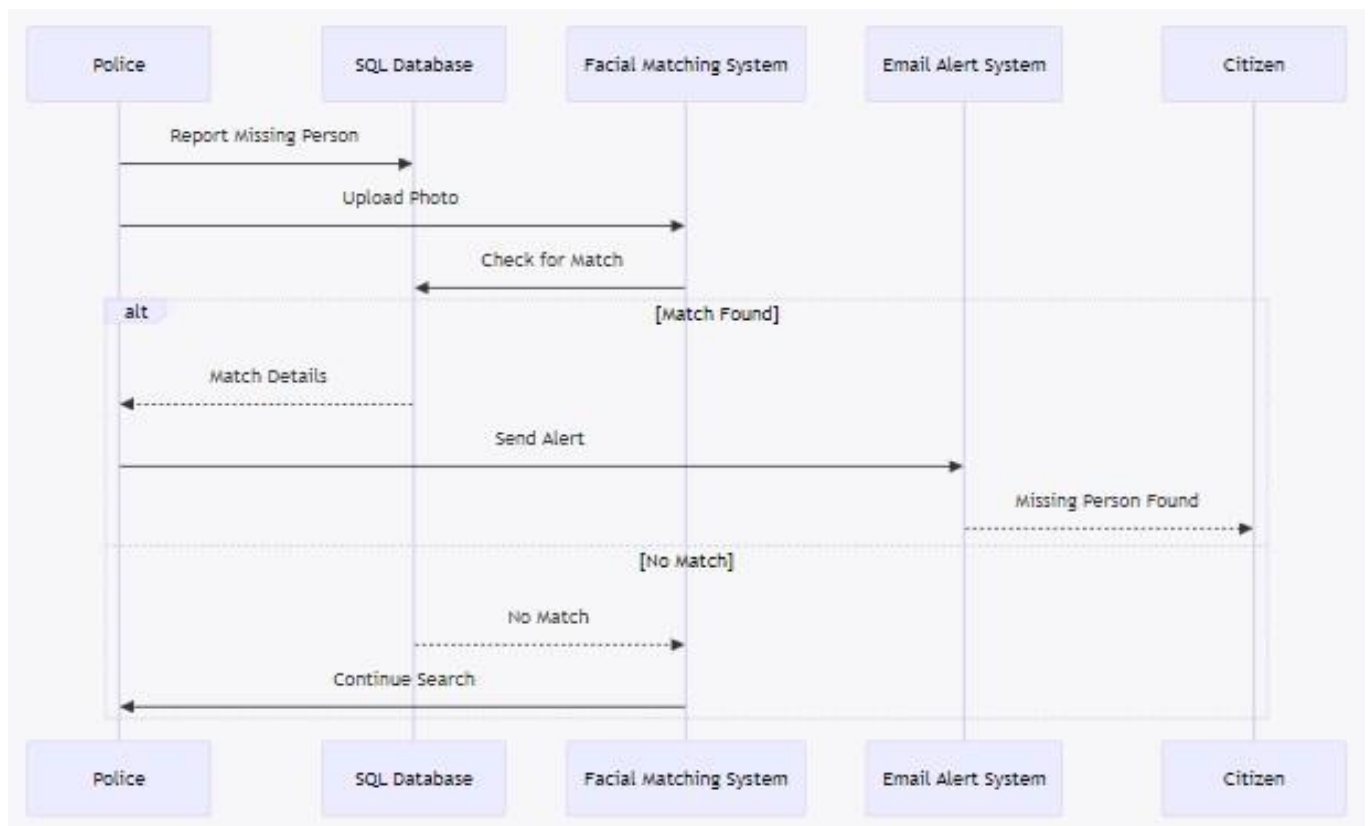


Figure 5. Collaborative Diagram

4. Implementation of System

EXISTING SYSTEM:

Existing systems for missing persons identification encompass a range of approaches. Law enforcement agencies maintain databases with information about missing individuals, which are often accessible to the public. Some regions have implemented alert systems like Amber Alerts to rapidly disseminate information about missing children. Non-governmental organizations (NGOs) like the National Center for Missing and Exploited Children (NCMEC) also maintain their databases and offer assistance. Interpol provides international coordination for missing persons cases. In addition to these formal systems, facial recognition technology is used to match images of missing individuals with publicly available photos or databases. Online communities and social media platforms are increasingly utilized to raise awareness and seek public assistance. The evolution of technology plays a key role in enhancing these existing systems.

DISADVANTEGS:

- Privacy concerns, potential misuse, and ethical issues associated with facial recognition can erode public trust in missing persons identification systems.
- Inaccuracies in facial recognition algorithms can lead to false positive and false negative matches, potentially hindering the search for missing individuals.

PROPOSED SYSTEM:

The proposed work aims to develop a system that aids in the identification of missing persons using a SQL database and an email alert system that incorporates facial matching techniques. The system will be designed to efficiently store and manage relevant information about missing individuals, such as personal details, physical attributes, and last known locations. A SQL database will be utilized for this purpose, allowing for easy retrieval and updating of the data. Additionally, facial matching techniques will be implemented to compare the facial features of missing individuals with available photographs or live video footage in order to identify potential matches. This feature will enhance the accuracy and speed of the identification process.

Furthermore, an email alert system will be incorporated into the proposed work that will automatically inform law enforcement agencies, relevant organizations, and the

general public about any new missing person cases. These email alerts will contain all pertinent details from the database, such as photographs, physical descriptions, and last known locations. This system will help spread awareness and facilitate a timely response when a person goes missing.

ADVANTAGES OF PROPOSED SYSTEM:

- The proposed Missing Persons Identification system offers several advantages. It streamlines the identification process through a centralized database and facial recognition technology, potentially leading to faster reunifications. Automated email alerts ensure timely communication, increasing the chances of locating missing individuals. Privacy measures and user-friendly interfaces enhance user trust and system usability.

5.RESULTS AND DISCUSSION

Test plan and approach

Functional tests will be meticulously prepared, and field testing will be done by hand.

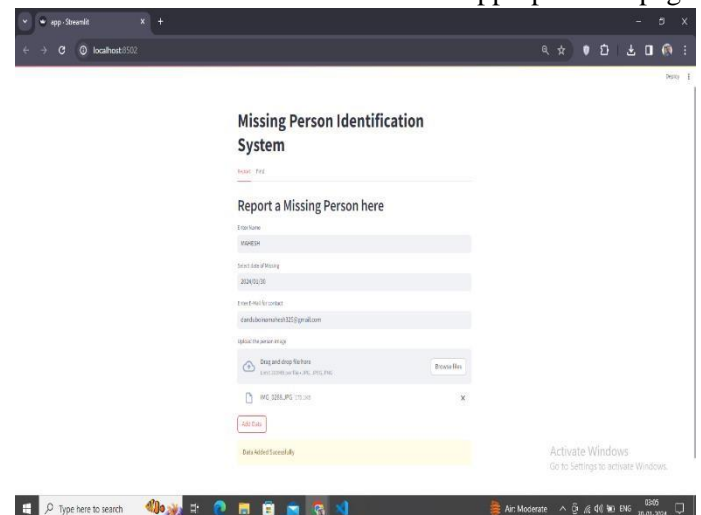
Objectives of the test:

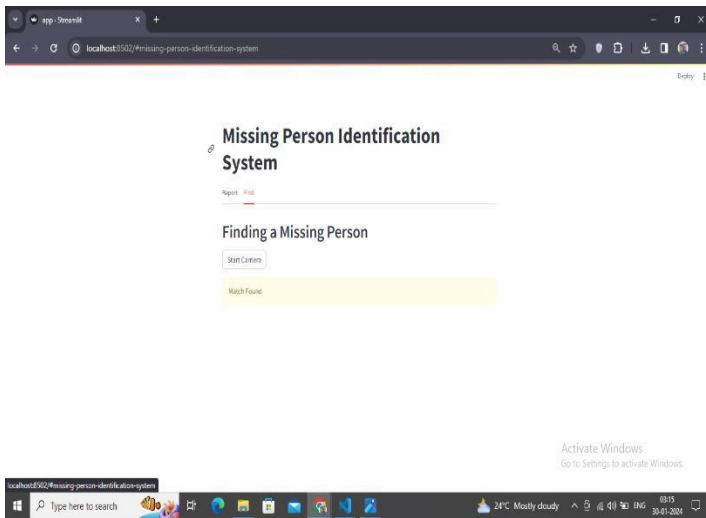
- Every field entry must function correctly.
- You have to click the appropriate link to activate the pages.
- There shouldn't be any delays in the entering screen, messages, or answers.

Features that need to be tested:

- Confirm that the submissions follow the proper format

Duplicate entries must not be permitted, and every link must direct users to the appropriate page.





Any paper's critical User Acceptance Testing phase requires active participation from the end user. Additionally, it ensures that the system meets the functional requirements.

Test Results: All of the previously defined test scenarios were successful. Nothing was flawed.

This paper develops a system that provides the user with an analysis of women's safety and security in Indian cities. Women who are in danger will benefit from the diverse outputs that this program will provide at different times when it is implemented. Should the user run the software more than once and the outputs match the typical back-to-back yields. In the rare event if the neutral message on Twitter is essentially extremely high, it suggests that people are less enthusiastic about the topic and are unwilling to consider both its positive and negative aspects. The final findings are predicated on information shared on Twitter, which will influence people as people's minds are constantly adapting to their surroundings. As a result, this system provides the greatest analysis and updates depending on data.

6. CONCLUSION AND FUTURE WORK

Conclusion

In conclusion, the system for Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching techniques is a comprehensive and efficient solution for locating missing individuals. By utilizing an SQL database, it allows for accurate and organized storage of crucial information related to missing persons. The email alert system ensures that relevant parties are promptly notified when a potential match is found, increasing the chances of a

successful identification. The facial matching techniques provide an additional layer of accuracy by comparing facial features and identifying potential matches. Overall, this system provides a powerful tool for law enforcement agencies and can significantly enhance the efforts to locate and reunite missing persons with their loved ones.

Future work

The future work for the system on Missing Persons Identification using SQL Database and Email Alert System with Facial Matching Techniques will focus on enhancing the accuracy and efficiency of the system. Firstly, there is a need to improve the facial recognition algorithms, implementing deep learning techniques for better identification and matching of missing persons. Additionally, incorporating other biometric identifiers like fingerprints and DNA profiles can provide a more comprehensive approach to identification.

Furthermore, the system can be expanded to include realtime monitoring and tracking capabilities by integrating with surveillance cameras and mobile devices. This will enable immediate identification of missing persons in public spaces, enhancing the chances of locating them quickly.

Additionally, the system can be integrated with social media platforms and online databases for wider reach and increased visibility.

Another area for future work is to incorporate machine learning algorithms to fine-tune the system's alert mechanism. By continuously analyzing and learning from past cases, the system can improve the accuracy of identifying potential matches and reduce false positives.

Moreover, expanding the system's capabilities to handle large-scale databases and improving its scalability will be crucial for accommodating the increasing number of missing persons cases. Finally, usability studies and user feedback can be conducted to optimize the user interface and overall user experience, ensuring ease of use for both investigators and individuals searching for missing persons.

REFERENCES

- [1] Inavolu, M. D., Venna, D., Kallepalli, G. V., & Surapaneni, S. S. (2023, March). Detection of Missing Persons Using Mobile App. In 2023 2nd International Conference for Innovation in Technology (INOCON) (pp. 1-8). IEEE.

- [2] Solaiman, K. M. A., Sun, T., Nesen, A., Bhargava, B., & Stonebraker, M. (2022). Applying machine learning and data fusion to the “missing person” problem. *Computer*, 55(6), 40-55.
- [3] Sowmya, M. R., Chaudhary, K., Soumya, R., & Panjiyar, P. (2022, October). AI-Assisted Search for Missing Children. In 2022 IEEE 2nd Mysore Sub Section International Conference (MysuruCon) (pp. 1-6). IEEE.
- [4] Alam, A. (2022). Employing adaptive learning and intelligent tutoring robots for virtual classrooms and smart campuses: reforming education in the age of artificial intelligence. In *Advanced Computing and Intelligent Technologies: Proceedings of ICACIT 2022* (pp. 395-406). Singapore: Springer Nature Singapore.
- [5] Rahim, A., Zhong, Y., & Ahmad, T. (2022). A deep learning-based intelligent face recognition method in the Internet of Home things for security applications. *Journal of Hunan University Natural Sciences*, 49(10).
- [6] Tran, M. D., Huynh, K. T., Pham, V. H., Phan, A. T., Nguyen, Q. K., Nguyen, X. P. P., & Ly, T. N. (2022). performance analysis of automatic integrated long-range RFID and webcam system. *SN Computer Science*, 3(6), 473.
- [7] Mardaid, E., Abidin, Z. Z., Asmai, S. A., & Abas, Z. A. (2023). Implementation of Flood Emergency Response System with Face Analytics. *International Journal of Advanced Computer Science and Applications*, 14(1).
- [8] Alsowail, R. A., & Al-Shehari, T. (2022). Techniques and countermeasures for preventing insider threats. *PeerJ Computer Science*, 8, e938.
- [9] Kumar, A., Samal, S., Saluja, M. S., & Tiwari, A. (2023, March). Automated Attendance System Based on Face Recognition Using Opencv. In 2023 9th International Conference on Advanced Computing and Communication Systems (ICACCS) (Vol. 1, pp. 22562259). IEEE.
- [10] Misquitta, J., & Asha, S. (2023, January). SQL Injection Detection using Machine Learning and Convolutional Neural Networks. In 2023 5th International Conference on Smart Systems and Inventive Technology (ICSSIT) (pp. 1262-1266). IEEE.

D. CERTIFICATES



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IN COLLABORATION WITH
SAMARKAND STATE UNIVERSITY, UZBEKISTAN

Certificate of Presentation

This is to certify that Mr/Mrs/Dr.....**D.V. Mahesh Babu**..... from
.....**Sathyabama Institute of Science and Technology**..... has presented a paper titled
.....**Missing Persons Identification Using SQL Database and Email Alert System with Facial Matching Techniques**.....
..... in the "4th International
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Samarkand State University, Uzbekistan

Dr. Christo Ananth
Professor, Dept. of Information Technology
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This is to certify that Mr/Mrs/Dr..... **D. Guru Koushik Reddy** from
..... **Sathyabama Institute of Science and Technology** has presented a paper titled
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