Missing Person Identification Using Image Processing

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Abstract—
Missing person identification is a crucial task in law enforcement and humanitarian efforts. Traditional methods rely heavily on manual searching, which is time-consuming and often ineffective. This paper presents an automated system leveraging image processing & deep learning techniques to identify missing individuals efficiently. The proposed system enhances the accuracy and speed of identification by utilizing facial recognition, feature extraction, and database matching. The experimental results demonstrate promising performance, making the approach suitable for real-world applications.

Keywords: Missing person, Image processing, Facial recognition, Feature extraction.

I. INTRODUCTION

A Missing Person can be characterized as a child or an adult who is lost, voluntarily or involuntarily. There are various categories of missing cases of which only 43% of missing cases' reasons are known, 99% are juvenile runways, 2500 cases are due to family problems, and around 500 cases are kidnapped by strangers (which include both teens and adults). Women add about 52% of missing cases and males 48%."In India, there are no budgets allocated to finding missing people", claimed an official source. A missing person faces many obstacles, few are subjected to death (murder), rape, or abuse. People concerned with the missing person such as parents, friends, relatives, and guardians are exposed to stress and worries from not knowing whether the missing person is alive or dead. In our system, the image of the person given by the guardian at the time of missing is stored in the database by the police. Automatic detection of the match for this picture among the already existing images in the database will be done through our application..This helps the police department to spot the missing person in any place in India. When a suspicious person is found, the picture at that instance of time is compared with the images uploaded by the police department at the time of missing through the face recognition model. If a match is found, it will be notified to the police in the form of an email message along with the location of where the person is found. If not found, a new record will be created in the database with the uploaded picture. In this way, it decreases the time taken to search for a person's details after he is found. Sometimes, the person has been missing for a long period. The age gap is reflected in the image as aging affects the structure of the face, including shape, texture, etc. The appearance of the person can vary due to aging, filters, pose, lighting, etc. All these factors were considered before choosing the face recognition algorithm.

II. BLOCK DIAGRAM
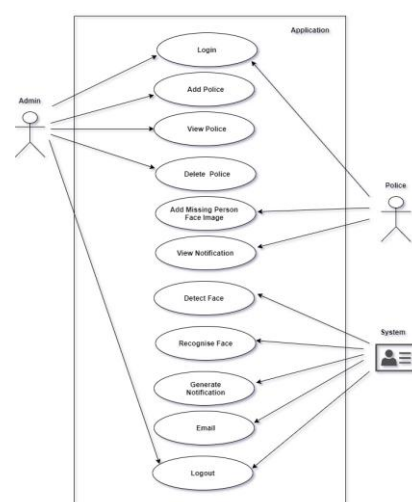
This is a Use Case Diagram representing a Missing Person Identification System involving three actors: Admin, Police, and System. Here's a simple breakdown:

1) Actors:

1. **Admin** – Manages users and uploads missing person images.
2. **Police** – Accesses notifications and relevant data.
3. **System** – Performs automated face detection and recognition.

2) Use Cases (Functions):

- **Login** – Admin logs into the system.
- **Add Police** – Admin adds police officers to the system.
- **View Police** – Admin can see the list of registered police officers.
- **Delete Police** – Admin removes police officers if needed.
- **Add Missing Person Face Image** – Admin uploads images of missing persons.
- **View Notification** – Admin and police can check notifications regarding identified persons.
- **Detect Face** – The system detects faces in images or real-time footage.
- **Recognize Face** – The system matches detected faces with the database.
- **Generate Notification** – The system sends alerts if a match is found.
- **Email** – The system sends email notifications to relevant authorities.
- **Logout** – Admin logs out of the system.

3) Flow Summary:

1. The **Admin** manages police users and uploads missing person images.
2. The **System** detects and recognizes faces, generating alerts if a match is found.
3. **Police** receive notifications and take action accordingly.

III.   PROBLEM STATEMENT

Identifying criminals and missing children is a major public safety challenge due to the inefficiency of traditional manual methods. Filing reports and searching records is time-consuming and often ineffective. To address this, the proposed system leverages image processing with Haar Cascade classifiers and the frontal face algorithm for automated face detection and recognition. This enhances identification speed and accuracy, aiding law enforcement and improving public safety.

IV.   PURPOSE

The Purpose of Missing Person Identification using Image Processing is to Save time and human efforts . The system's goal is to save time and human effort, Every bus stop, temple, mall, and railway station have the much more people crowd, if we think to find the someone in the crowd it's difficult observes to the human eye, but as we know the all above place have the CCTV coverage, this will help us to find the wanted person by using the technology which is faster and reliable as compare humans. This will directly help to save time and human effort.

V.   PROPOSED SYSTEM

The proposed system makes use of Face Recognition for missing peoples and criminal identification.The architecture of our framework is presented in figure.The Architecture of the proposed Person Identification System. Here, the facial features of any reported missing person who is seen on a web cam will be matched to the database and sent to the police via email. Our algorithm extracts the face encodings of the image and compare with that of the face encodings of the previously existing images in the database. If a match is found, an alert message will be sent to the concerned police officer. The admin will login and can add, delete and view the police. The user police can login to the system. The image is detected and feature extraction is done, if match is found then, notification and email is generated and sent to police, if not then also notification is generated. When the match is found, the location is also sent along with the email.The system uses python, OpenCV library, haar cascade algorithm and frontal face algorithm, MySQL database. It requires the web camera to detect the face of lost person.

SYSTEM ARCHITECTURE :

The proposed system makes use of Face Recognition for missing people's identification. The architecture of our framework is presented in figure.The Architecture of the proposed Person Identification System.Here, the facial features of any reported missing person who is seen on a web cam will be matched to the database and sent to the

police via email. Our algorithm extracts the face encodings of the image and compare with that of the face encodings of the previously existing images in the database. If a match is found, an alert message will be sent to the concerned police officer.

VI.   OBJECTIVE OF SYSTEM

- **User Authentication**: Implement a secure login system for administrators to access the system.
- **Dashboard**: Provide a user-friendly dashboard.
- **Real-time Updates**: Ensure that records are updated in real-time.
- **Notifications**: Send automatic notifications to the admin and police station.
- **Data Security**: Prioritize data security and privacy, ensuring that sensitive information is encrypted and accessible only to authorized users.

VII.   LITERATURE REVIEW

- Nyoka et al. (2023) propose a face identification system using Haar cascade and frontal face algorithms for criminal investigations. Their system, tested on 1000 images and videos, achieves 95% accuracy and is evaluated using precision, recall, and F1-score. Future work includes multimodal biometrics and deep learning integration.
- Nyoka, Godfrey, and Mugendi (2023) develop a reliable face identification system for law enforcement, leveraging Haar cascade and frontal face algorithms. Their system demonstrates high accuracy and real-time effectiveness, contributing to digital forensics and public safety.
- Nyoka et al. (2023) present a facial recognition system for criminal investigations at ISDFS 2023. The system, validated through experiments, enhances digital forensics and security, aiding law enforcement in solving crimes and improving public safety.

VIII.   SYSTEM NECESSITY

1. **Operating System: Windows XP & Later**
   - Compatible with Windows XP and newer versions (7, 10, etc.), ensuring flexibility for law enforcement and surveillance.
   - Integrates well with cameras and peripheral devices for image-based identification.

2. **Frontend: HTML, CSS, JS**
   - Uses HTML for structure, CSS for design, and JavaScript for interactivity.
   - Enables responsive, user-friendly access on desktops, tablets, and mobile devices.
   - Web-based design allows easy navigation, image uploads, and database interactions.

3. **Backend: Java**
   - Java ensures stable and efficient backend processing with cross-platform support.
   - Offers robust libraries for networking, data handling, and seamless hardware-software integration.

4. **Programming Languages: Python & Java**
   - Python (with OpenCV libraries) enables efficient image processing and algorithm implementation.
   - Java ensures robust backend support, seamless Windows integration, and efficient data handling.
   - Together, they provide flexibility, scalability, and adaptability for law enforcement applications.

5. **Algorithm: Haar Cascade(Frontal-Face)**
   - Uses Haar-like features for fast and efficient face detection in images and videos.
   - Lightweight and suitable for real-time applications with limited processing power.
   - Ideal for quick, automated detection in surveillance and law enforcement.

6. **Library: OpenCV**
   - Optimized for real-time image processing, detection, and recognition.
   - Supports Python and C++ for seamless integration and high performance.
   - Cross-platform compatibility ensures smooth operation across different environments

7. **Database: MySQL**
   - Provides fast, secure, and scalable data storage for images, user profiles, and identification records.
   - Open-source with high-speed performance, ideal for handling large datasets.
   - Supports efficient querying and indexing for quick retrieval and comparison of records.

IX.   ACKNOWLEDGMENT

X. CONCLUSION

- We have developed a criminal identification system. It will save you time and effort, especially if you are going somewhere sociable. The goal of the Automated Criminal Identification Approach is to eliminate the flaws in the traditional (manual) system.
- This system exemplifies how image processing techniques can be used in public spaces. This technology has the potential to not only assist in criminal investigations but also to improve the government's reputation

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