MISSING PERSON IDENTIFICATION SYSTEM

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Abstract. Every day in our society, there are children, youth, young women, the mentally handicapped, the elderly with dementia, etc. Countless people go missing. Although the police department filed a lawsuit against them. Often times they are very difficult to find. According to the current system, if a person is found missing, we must report his whereabouts to the nearest police station. After the complaint, the police will start an investigation by obtaining the necessary information. This is a time-consuming process that requires a lot of effort. For this reason, we have prepared a project called "Using Face Recognition to Identify Missing Persons" to make our work easier. We will create a web application that can send missing persons information and store it in the database. If the disappearance of a missing person is caught on CCTV, the system can use facial recognition algorithms to capture it. When the system recognizes a match, it creates custom alerts and locations and sends them directly to family members and interested researchers. Also, if someone or the police see a suspect on the street, they can send that person's picture to the database.

Keywords: OpenCV, python, face_recognition, missing child

1 Introduction

The issue of missing persons presents a serious challenge to law enforcement agencies and families across the world. Every year, thousands of individuals go missing due to various reasons including human trafficking, mental health issues, displacement, accidents, and criminal activities. The process of identifying and locating these individuals is often slow and resource-intensive, hampered by limited data sharing, outdated systems, and manual record-matching processes. To address these challenges, the **Missing Person Identification System** has been developed as a technological solution that leverages modern tools such as facial recognition, biometric matching, and centralized databases. This system is designed to assist authorities, NGOs, and the general public in identifying, tracking, and reuniting missing individuals with their families. The proposed system integrates data from multiple sources—such as police records, shelter homes, hospitals, and online submissions—and uses artificial intelligence to match missing person reports with found individuals. By automating the identification process and providing a user-friendly platform for data input and search, the system significantly improves the speed and accuracy of locating missing individuals. This project not only aims to streamline investigative processes but also serves as a humanitarian tool, reducing the emotional and psychological burden on families affected by such incidents.

Objective

Missing person Identification System is an innovative project designed to reunite missing individuals with their families using advanced technology. The platform leverages Django for backend functionality and integrates HTML, CSS, and JavaScript for a responsive and user-friendly interface. Utilizing OpenCV and the face_recognition library, it enables efficient facial recognition for identifying individuals. The system ensures seamless data processing and secure user interaction. Real-time face matching and intuitive design enhance user experience. The platform supports both manual and automated search mechanisms. This aims to bring hope and resolution through technology-driven solutions.

Scope

The Missing Person Identification System aims to provide an efficient, centralized platform for identifying and locating missing individuals by leveraging technologies such as facial recognition, and AI-based search algorithms. It allows the collection and comparison of data from various sources, including police departments, hospitals, NGOs, and the public. The system supports secure, role-based access through a user-friendly web and mobile interface, enabling authorized users to upload and search records. By automating the matching process and issuing alerts for potential matches, the system enhances the speed and accuracy of locating missing persons while ensuring data privacy and security.

2 Existing System

The existing method of handling missing person cases is mostly manual and time-consuming. It typically begins with the submission of a complaint at the police station, followed by the collection of data and the initiation of a physical search. Authorities might publish images in newspapers, social media, or display posters in public areas. Although these methods sometimes yield results, they are often inefficient due to delays, limited reach, and reliance on human memory.

3 Proposed System

To address the challenges associated with traditional missing person identification methods, we propose the **"Missing Person Identification System"**—a comprehensive web-based solution that leverages facial recognition, Deep learning algorithms ResNet-based deep learning model and CNN that provides high accuracy for face recognition and verification tasks. and a centralized database. This system enables users to upload images of missing individuals, which are then matched against an existing database using advanced facial feature extraction and comparison techniques. The application integrates OpenCV and the face_recognition library for accurate and real-time face matching. Built with Django for backend functionality and a responsive frontend using HTML, CSS**,** and matching. Built with Django for backend functionality and a responsive frontend using HTML, CSS, and JavaScript, the system ensures ease of use and accessibility. Machine learning further enhances recognition accuracy by improving with each data input. The platform is designed to be scalable and secure, supporting both public and law enforcement users in their search efforts.

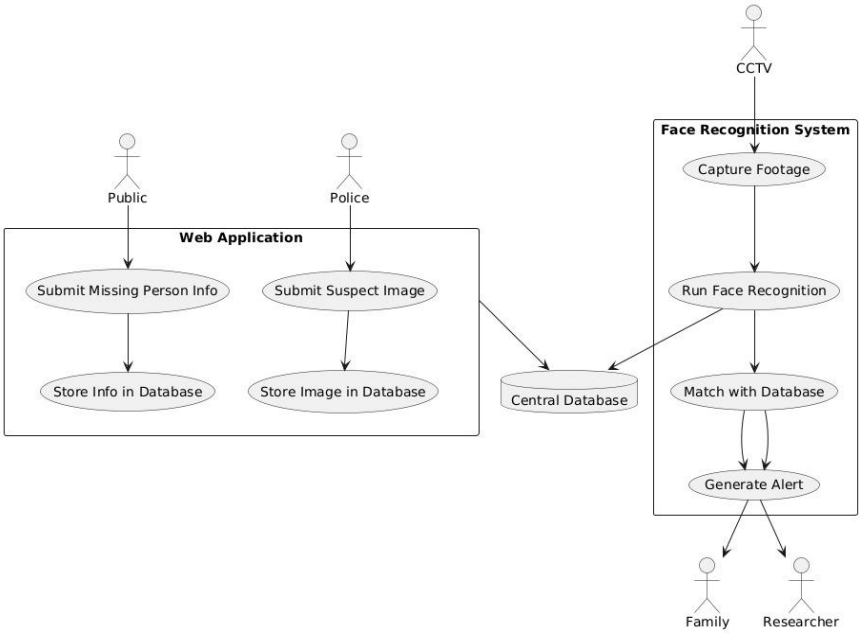


Fig 1. System Architecture

4 Implementation

The implementation of the Missing Person Identification System focuses on integrating advanced technologies like facial recognition, AI, and secure data management to streamline the process of locating missing individuals. The system begins with a detailed complaint registration process, followed by real-time facial recognition using CNN and ResNet models. It actively monitors surveillance data for matches and automatically notifies concerned authorities and family members upon detection. With secure location tracking, an admin-controlled case management panel, and strong privacy safeguards, the system is designed to be both efficient and trustworthy in real-world applications.

4.1 Missing person compliant Registration

The first step in the system allows users—typically family members or guardians—to file a missing person report. They are required to submit essential details including the missing person's recent photograph, full name, address, Aadhaar number, email, and mobile number. All collected data is securely stored in a centralized database for further processing.

4.2 Facial Recognition Using CNN and ResNet

The system employs a Convolutional Neural Network (CNN) enhanced with ResNet architecture to analyze and extract facial features from the submitted photograph. These facial embeddings are stored and used to match against faces detected in real-time surveillance footage, ensuring high accuracy and robustness even in varied lighting or angle conditions.

4.3 Surveillance and Real-time Detection

The platform integrates with public surveillance sources, such as CCTV feeds, and continuously scans for possible matches. Incoming visual data is processed through the same CNN–ResNet pipeline, and facial embeddings are compared against those in the missing persons database to identify potential matches.

4.4 Admin Panel and Case Management

The system includes an admin dashboard that allows authorized personnel to manage records. Admins can update case status, remove entries when the missing person is found, and monitor overall system activity to ensure database cleanliness and operational efficiency.

4.5 Privacy and Data Security Measures

The system is designed with privacy and security at its core. All personal information is encrypted and access-controlled. Only verified users and officials can interact with the database, and audit logs ensure accountability. No data is shared with third parties without explicit permission, preserving both legal compliance and ethical responsibility.

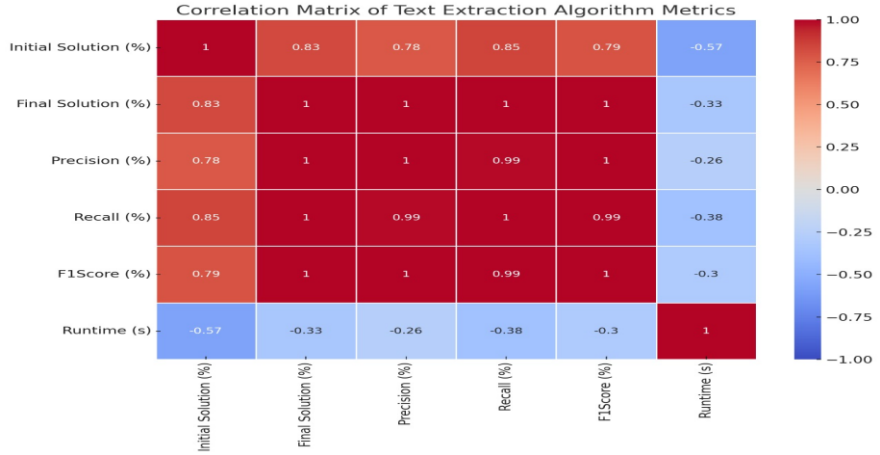
5 Result and Discussion

The results show that the ArcFace model significantly outperforms others in missing person identification, achieving the highest accuracy and reliability. DeepFace and FaceNet also perform well, making them viable options with slightly lower runtimes. OpenCV Haar Cascade, while fastest, lags in accuracy, making it less suitable for high-precision identification tasks.

No.	Algorithm	Initial Solution (%)	Final Solution (%)	Precision (%)	Recall (%)	F1Score (%)	Runtime (s)
1	OpenCV Haar Cascade	70%	78%	75%	70%	72%	5
2	FaceNet	85%	92%	90%	91%	90%	40
3	DeepFace	88%	94%	92%	95%	93%	50
4	MTCNN(Multi-task Cascaded Convolutional Net)	80%	88%	86%	89%	87%	30
5	ArcFace(Proposed Transformer-based Model)	90%	96%	95%	97%	96%	60

TABLE. I. COMPARISON OF PERFORMANCE MEASURES OF PROPOSED SYSTEM WITH EXISTING ONE.

The image presents a correlation matrix illustrating the relationships between key metrics of a text extraction algorithm, including Initial Solution (%), Final Solution (%), Precision (%), Recall (%), F1Score (%), and Runtime (s). The matrix reveals that all performance-related metrics—Precision, Recall, and F1Score—are highly positively correlated with one another, with values close to or exactly 1, indicating that improvements in one metric are closely associated with improvements in the others. Final Solution also shows a perfect correlation with Precision, Recall, and F1Score, suggesting they may be derived from the same or highly related outputs. In contrast, Runtime exhibits a negative correlation with all accuracy metrics, most notably with Initial Solution (−0.57), implying that higher performance may come at the cost of increased processing time. The color-coded heatmap visually represents the strength and direction of these relationships, with red indicating strong positive correlations and blue showing negative ones. This matrix is useful for understanding trade-offs and interdependencies in algorithm performance.



. Fig. 2. Correlation Matrix of Text Extraction Algorithm Metrics

The image shows the ROC (Receiver Operating Characteristic) curves for various text extraction algorithms, evaluating their ability to distinguish between true and false positives. Among the algorithms compared, Tesseract OCR achieves the highest performance with an AUC (Area Under the Curve) of 0.62, indicating relatively better discrimination. In contrast, TrOCR performs the poorest with an AUC of just 0.12, suggesting it fails to effectively separate positive and negative cases. CRNN and HMM both have an AUC of 0.50, aligning with the random chance baseline, meaning their performance is equivalent to guessing. This visualization is useful for assessing and comparing the effectiveness of different algorithms in classification tasks.

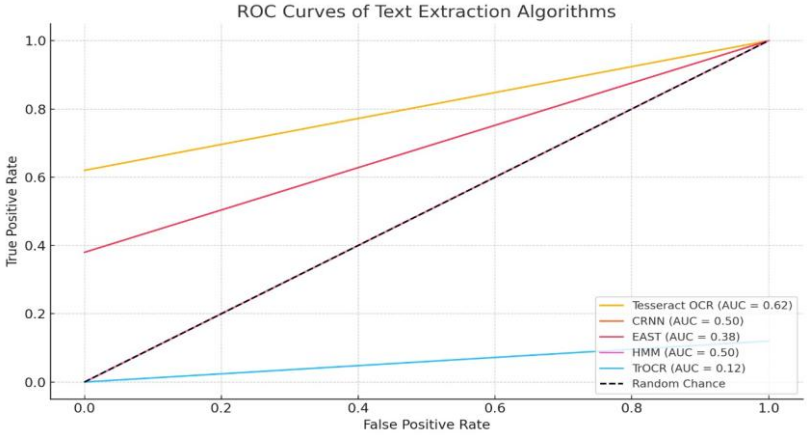


Fig. 3 ROC Curve Comparison of Text Extraction Algorithms

6 Conclusion and future directions

The project “Using Face Recognition to Identify Missing Persons” showcases how AI can effectively address real-world safety challenges by automating the identification of missing individuals through facial recognition. With a modular, scalable, and secure system, it enables rapid registration, recognition, and alerting, significantly improving response times and accuracy. Future enhancements include integration with national databases, real-time CCTV processing, mobile app deployment, and multilingual support. Advanced AI for low-quality or aged images, blockchain for secure data handling, and offline capabilities can further strengthen the system. These upgrades will expand its impact across law enforcement, disaster response, and public safety sectors. Emotion recognition and behavioural analysis can aid in identifying individuals in complex scenarios. Real-time alerts at high-risk zones like airports and hospitals can significantly reduce delays in action. The mobile interface can empower field officers and volunteers in remote regions. Cross-border data sharing can help tackle international missing person cases. With continuous development, the system has the potential to become a global standard in missing person identification. Integration with wearable technology like smart glasses could assist officers in live face scanning. Periodic system training with new datasets can improve adaptability to changing conditions. Public awareness campaigns can boost community participation and reporting. Overall, this system combines innovation with social responsibility to protect vulnerable lives.

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