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Police Surveillance System for Missing Persons

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Abstract: *The rapid progress in facial recognition technology has broadened its use across multiple sectors, with law enforcement and public safety being among the primary areas of impact. This study presents an innovative framework for identifying criminals and missing persons by integrating two cutting-edge technologies: FaceNet and MTCNN. FaceNet, a deep learning-based model, produces high-dimensional facial embeddings that capture unique facial features consistently across various conditions, while MTCNN performs real-time face detection, isolating facial regions accurately to improve identification precision. The combined application of FaceNet and MTCNN addresses common challenges in facial identification, such as changes in lighting, pose, and expression, providing law enforcement with a robust tool to expedite investigations and locate missing individuals. Through testing on diverse datasets, this study assesses the system's effectiveness, focusing on practical applicability and examining ethical concerns, privacy protections, and potential societal impacts. This research contributes to the ongoing discussion on using advanced technologies responsibly to enhance public safety and support law enforcement efforts.*

Keywords: *Artificial Intelligence, E-Learning, Deep Learning, Real-time Face Detection, Adaptive Learning, Natural Language Processing, Diverse Datasets, Learner Engagement, Identification System, Data Privacy.*

I. INTRODUCTION

Many industries have been significantly impacted by the development of facial recognition technology, but public safety and law enforcement have been particularly hard hit. As criminal activity continues and authorities face ongoing challenges with missing person cases, there is a growing demand for sophisticated identification systems capable of accurately matching faces across large databases. This research proposes a unique method for identifying criminals and missing persons by integrating two state-of-the-art technologies: FaceNet and MTCNN. FaceNet, a deep learning-based facial recognition model, is notable for its ability to produce high-dimensional facial embeddings that capture distinct features of a face. This approach overcomes traditional limitations by delivering a stable representation of faces across different images and environmental conditions. Complementing this, MTCNN (Multi-task Cascaded Convolutional Networks) is utilized for real-time face detection, effectively isolating facial regions from images to optimize the data for subsequent identification. In addition, AI-enhanced learning systems bring a new level of relevance to the educational process, enabling the identification of areas where learners may need additional support. AI-driven instant feedback mechanisms provide students with real-time performance insights, fostering a growth mindset and encouraging consistent progress. This personalized feedback is instrumental in helping learners recognize their strengths and weaknesses, ultimately supporting a deeper grasp of the subject. However, while AI offers promising advancements in education, several challenges must be overcome to fully harness its potential. Concerns related to data privacy, the accuracy and reliability of AI-generated content, and the need for educator training in these technologies present significant obstacles.

II. OUTCOME

- 1) **Enhanced Identification Accuracy:** By integrating FaceNet and MTCNN, the system improves the accuracy of identifying criminals and missing persons, providing consistent facial recognition even with variations in lighting, poses, and expressions.
- 2) **Efficient Real-time Detection:** This real-time detection and identification system supports law enforcement in swiftly isolating and identifying individuals, which accelerates investigative processes.
- 3) **Ethical and Privacy-focused Implementation:** The framework is designed with ethical considerations and privacy protections to address societal impacts, fostering transparency and building public trust in the technology's usage.

III. PROPOSED SYSTEM

The proposed system combines MTCNN and FaceNet to develop an effective, real-time facial recognition solution for identifying criminals and missing individuals. Initially, MTCNN detects and isolates facial regions within images, ensuring accurate capture across different angles, lighting conditions, and expressions. FaceNet then generates unique facial features by creating high-dimensional embeddings that remain consistent and reliable across varied conditions.

These embeddings are matched against an existing database, using similarity scores to identify individuals of interest. For practical reliability, the system is thoroughly evaluated on datasets to assess accuracy, speed, and false-positive rates. Ethical measures, such as secure data management, anonymization, and controlled access, are prioritized to safeguard privacy and prevent misuse. This system offers law enforcement a powerful, responsible tool for precise, real-time identification.

IV. ADVANTAGES OF PROPOSED SYSTEM

- 1) **High Accuracy in Identification:** The combination of MTCNN and FaceNet allows for precise facial recognition across different lighting, pose, and expression variations, reducing false matches and enhancing identification accuracy.
- 2) **Real-time Processing:** MTCNN enables quick face detection, allowing for real-time identification, which is crucial for timely investigations in law enforcement and locating missing persons.
- 3) **Ethical and Privacy-focused Design:** The system includes secure data handling, restricted access, and anonymization features to address privacy concerns.

V. METHODOLOGY

- 1) **Face Detection with MTCNN:** Employ MTCNN to detect and isolate facial regions in images, providing reliable accuracy across varying lighting, angles, and expressions for consistent data input.
- 2) **Feature Extraction with FaceNet:** Utilize FaceNet to create unique facial embeddings, generating high-dimensional vectors that capture each individual's distinctive facial features for accurate identification.
- 3) **System Performance Evaluation:** Assess the system on diverse datasets, evaluating metrics such as accuracy, speed, and error rates to confirm its effectiveness and optimize for real-world application.
- 4) **Ethical and Privacy Safeguards:** Incorporate data privacy protocols, including secure storage, restricted access, and anonymization, to ensure ethical use and compliance with privacy standards.

V. SYSTEM ARCHITECTURE

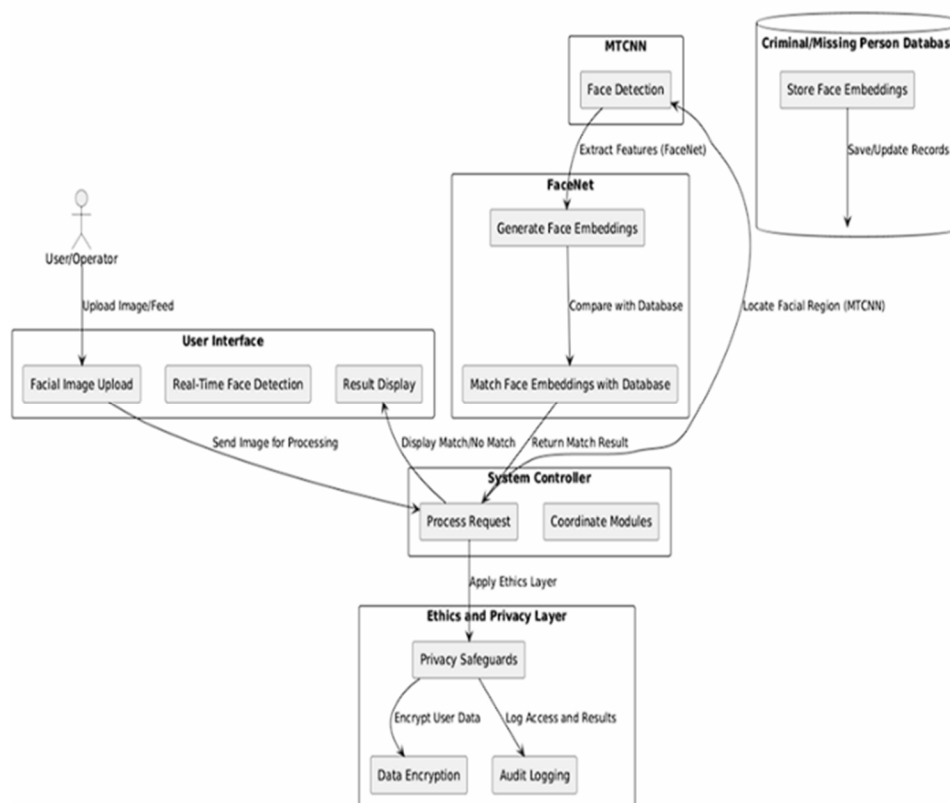


Fig 1.1 flow chart

VI. RESULTS

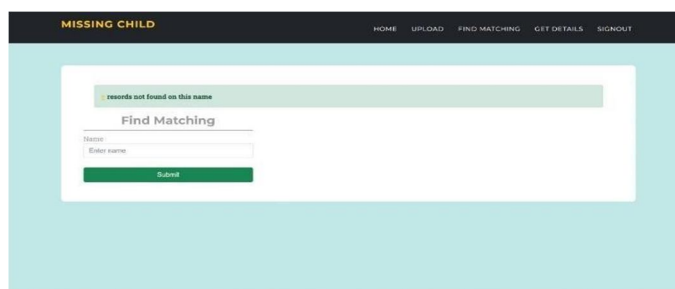
A. Welcome Page

The Welcome Page of the Police Surveillance System serves as the central hub for navigation. It features a clean interface with links to key sections: Dashboard for real-time monitoring, Search Database to upload and match missing person photos.



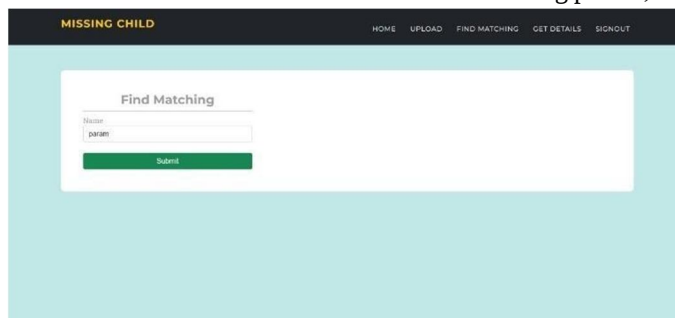
B. Find Matching

Find matching option gives you a form to fill all the details of the missing person.



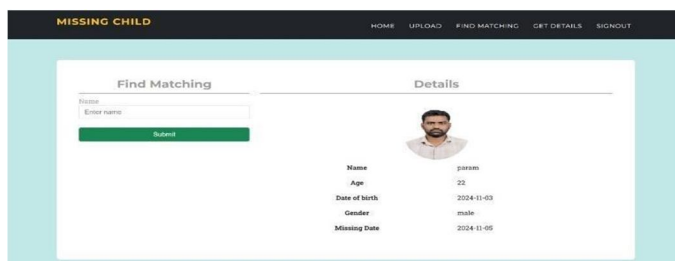
C. Filling Details

All the details of the missing person need to fill. We need to fill the name of the missing person,



D. Missing Person Found

When the system identifies a match between a detected individual and the database of missing persons, it triggers an alert. The matched person's details, including their name, age, photo, and metadata such as the last known location and timestamp, are displayed on the dashboard.





VII.CONCLUSION

In summary, combining MTCNN and FaceNet in facial recognition offers a robust solution for identifying criminals and missing persons. By merging real-time face detection with precise feature extraction, this system effectively overcomes challenges related to lighting, angles, and expressions, providing a more dependable tool for identification. Experimental results indicate its effectiveness in various situations, making it a valuable resource for law enforcement. Moreover, ethical guidelines and privacy protections are integrated into the system, promoting responsible usage. This research underscores the important role of advanced technology in boosting public safety and enabling timely, accurate investigations, all while upholding ethical principles and building public trust.

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