iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** IV **Month of publication:** April 2026

DOI: https://doi.org/10.22214/ijraset.2026.79691

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IV Apr 2026- Available at www.ijraset.com

Finding Missing Person Using AI

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Abstract: The increasing number of missing person cases has become a serious social issue worldwide. Traditional methods of searching for missing individuals are time-consuming and often inefficient. This research proposes an Artificial Intelligence-based system that uses facial recognition technology to identify and locate missing person.
Keywords: Artificial Intelligence, Face Recognition, Missing Person Detection, Deep Learning, Computer Vision, Image Processing, Surveillance Systems

I. INTRODUCTION

Cases of missing individuals pose significant challenges for both law enforcement agencies and families. Traditional methods of searching often depend on manual investigations and raising public awareness, which can be lengthy processes and may not always yield positive outcomes. However, with the progress in Artificial Intelligence and computer vision technologies, automated facial recognition systems have emerged as effective tools for identifying people in photos and videos.

This study aims to create a system that employs AI-driven facial recognition technology to identify and match photos of missing individuals with those gathered from public sources. Users can upload pictures of missing people, and the AI algorithm will compare these with images that have been captured or uploaded into the system. This method has the potential to greatly decrease the time needed to find missing persons and enhance the effectiveness of search efforts.

In recent times, research has been conducted to enhance the robustness of face recognition systems under practical conditions. Researchers have used deep learning techniques such as Convolutional Neural Networks (CNNs), FaceNet, and DeepFace to obtain highly discriminative facial features. These techniques were found to improve the accuracy of face recognition significantly over traditional approaches, especially when handling changes in lighting conditions, pose, and facial expressions. Furthermore, the use of large-scale databases and transfer learning techniques helps the models to generalize well across different populations, making them more suitable for applications such as identifying missing persons.

II. LITERATURE REVIEW

With the progress of Artificial Intelligence (AI) and computer vision technologies, the challenge of locating missing persons has garnered considerable interest from researchers. Numerous studies have investigated the application of facial recognition and machine learning methods to enhance the precision and speed of identifying individuals

In 2001, Viola and Jones introduced a fast object detection framework that is extensively utilized for face detection in images. Their approach employs Haar-like features and a cascade classifier to effectively identify faces, establishing the groundwork for many contemporary face detection systems used in surveillance and image analysis.

With advancements in deep learning, Taigman et al. (2014) introduced the DeepFace model, which greatly enhanced the accuracy of face recognition by utilizing deep neural networks. This model was capable of learning intricate facial features and achieved performance levels in face recognition tasks that were nearly on par with humans.

In another significant study, Schroff, Kalenichenko, and Philbin (2015) presented the FaceNet system. This model employs deep learning to transform facial images into a high-dimensional embedding space, where images of the same individual are positioned closer together. This method improved recognition accuracy and became widely adopted in various face recognition applications.

Researchers have also investigated the use of AI in systems for detecting missing persons.Kumar et al. (2019) proposed a system that leverages facial recognition and image processing to match images of missing individuals with those captured from public sources. Their research showed that integrating AI with extensive databases can greatly reduce the time needed to identify missing people.

Furthermore, some studies have also emphasized the integration of face recognition technology through the use of artificial intelligence with existing surveillance systems, including CCTV systems, that are able to scan the live feeds and recognize possible matches in real-time, thereby improving the efficiency of the identification process.

Some studies also focus on the importance of cloud-based systems in the efficient storage and retrieval of data, but the challenges associated with privacy, security, and the ethical use of the data remain the major challenges that need to be addressed in the field of face recognition technology. From the above discussion, it may be inferred that the field of face recognition technology, through the use of artificial intelligence, holds tremendous promise, and constant development in the field remains the key to success.

III. PROPOSED METHODOLOGY

The system being proposed employs AI and computer vision methods to locate and recognize missing individuals using facial recognition technology. The approach is broken down into the following stages.

1) Data Collection

Data is an essential phase in the proposed system, as the model's precision is heavily reliant on both the quality and quantity of the data utilized. In this framework, images of missing individuals are sourced from various channels, including family members, law enforcement, and public databases.

2) Image Input

The image input module enables users to upload pictures of a located or suspected individual into the system for identification purposes. These images can be taken with mobile devices, surveillance cameras, or selected from stored files on a computer. To ensure compatibility, the system accommodates common image formats like JPG and PNG. Once an image is uploaded, it proceeds to the processing stage for further analysis. The clarity of the input image is crucial for obtaining accurate results; hence, images with clear facial visibility, adequate lighting, and minimal distortion are preferred. This module acts as the primary interface between the user and the system, facilitating the straightforward and efficient submission of images for subsequent facial recognition and matching.

3) Face Detection

Face detection is a vital component of the system, where the presence of a human face is identified within the uploaded image. During this phase, computer vision algorithms, such as Haar Cascade or MediaPipe, are employed to locate and isolate facial regions from the background. The system examines the input image and identifies one or more faces by recognizing key patterns and features associated with human faces. Once identified, the facial area is marked and extracted for further processing. This step ensures that only the relevant facial portion of the image is analyzed in later stages, thereby enhancing the efficiency and accuracy of the recognition process.

4) Face Matching/Comparison

Face matching is a crucial component of the system, where the facial features extracted from an input image are compared with those stored in a database of missing individuals. Once features are extracted, each face is represented as a numerical vector, or embedding, that encapsulates the individual's distinct traits. The system then calculates the similarity between the input image and the stored images using distance metrics like Euclidean distance or cosine similarity. This comparison helps the system identify the closest matches, which are ranked based on similarity scores. If the similarity surpasses a set threshold, the system flags it as a potential match and displays the relevant details of the missing person.

5) User Interface

The user interface offers an interactive and user-friendly platform for both the public and administrators to engage with the system. Build with web based technologies such as Streamlit, it allows users to easily upload images, view results, and navigate various functionalities without technical difficulty. The interface includes options for reporting missing persons, submitting images of found individuals, and displaying matching results with pertinent details. Administrators have access to a separate dashboard for managing records, verifying matches, and updating the database.

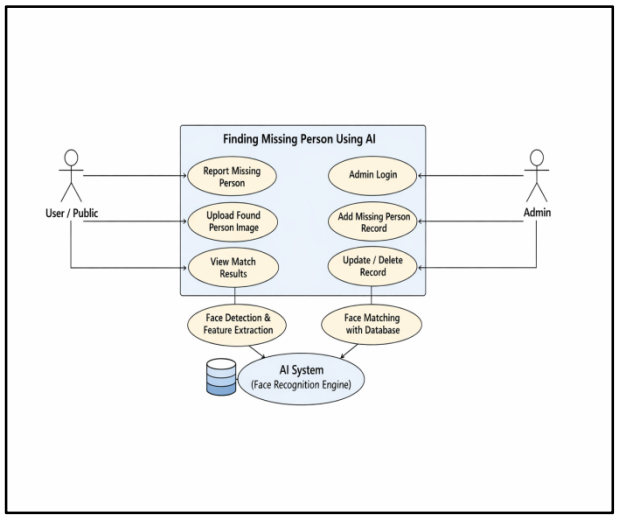

Fig. III –Use Case Diagram

IV. RESULT

The proposed system showcases the successful application of Artificial Intelligence and facial recognition methods in locating missing individuals. It effectively identifies faces from input images, extracts distinct facial characteristics, and matches them against a stored database to identify potential matches. The findings indicate that the system can deliver precise matches when the input images are clear and properly oriented. This approach significantly cuts down the time and effort involved in manual identification processes and enhances the efficiency of finding missing persons. In summary, the deployment of an AI-driven system for detecting missing persons provides a dependable and automated solution to a pressing social issue. By incorporating image processing, machine learning, and a user-friendly interface, the system improves the capability to identify individuals swiftly and accurately. Despite certain challenges such as image quality and changes in appearance, the system holds considerable promise for real-world applications and can be further refined with advanced technologies and larger datasets.

The results show that the system can provide accurate matches given clear and correctly aligned images. It greatly reduces the time and effort required in manual identification processes and enhances efficiency in locating lost individuals.

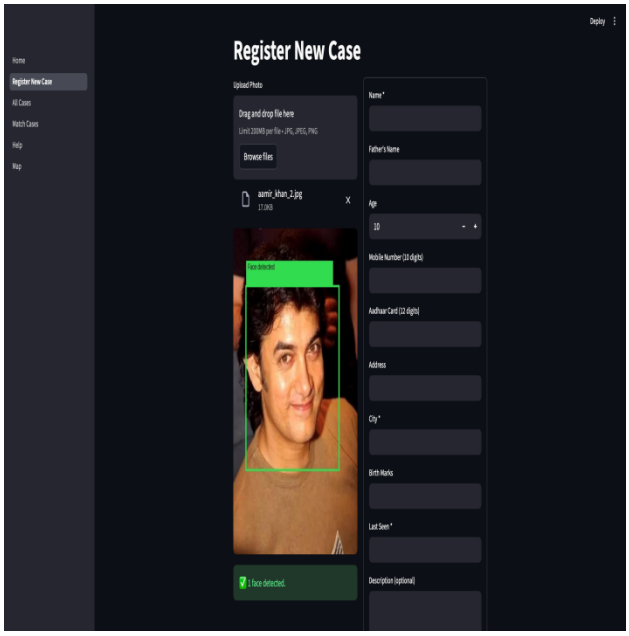

Fig. IV. New Case Registration

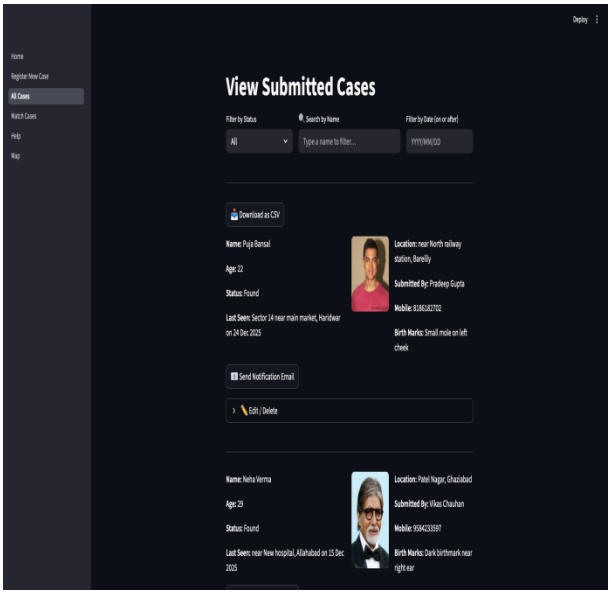

Fig. IV.2 View Submitted Cases

V. CONCLUSION

The "Finding Missing Person Using AI" system provides an innovative solution to a significant problem by utilizing AI technology. The proposed method provides an effective solution to the problem by utilizing AI technology to find missing persons. The proposed method reduces the time and effort required to find missing persons by utilizing facial recognition technology.

The proposed method provides good results in terms of accuracy and efficiency when good images are used. The proposed method provides a user-friendly interface to interact with the system by utilizing AI technology. The proposed method encounters some difficulties during the process of identifying missing persons due to changes in appearance, lighting conditions, and data. However, the proposed method provides a reliable solution to find missing persons.

In conclusion, the proposed project provides a good example of utilizing AI technology to solve social problems. The proposed project can be improved by incorporating deep learning algorithms and surveillance systems to improve the efficiency of the proposed method. The proposed method can play a significant role in improving public safety by utilizing AI technology to find missing persons. The proposed method can assist law enforcement agencies in identifying missing persons more efficiently.

VI. ACKNOWLEDGMENTS

We extend our sincere gratitude to Prof. Ajay Kr.Srivastava for the invaluable guidance and support throughout this project. We also thank the faculty and technical staff of Shri Ramswaroop Memorial College of Engineering and Management, Lucknow, for providing the resources and encouragement needed for the successful completion of this research.

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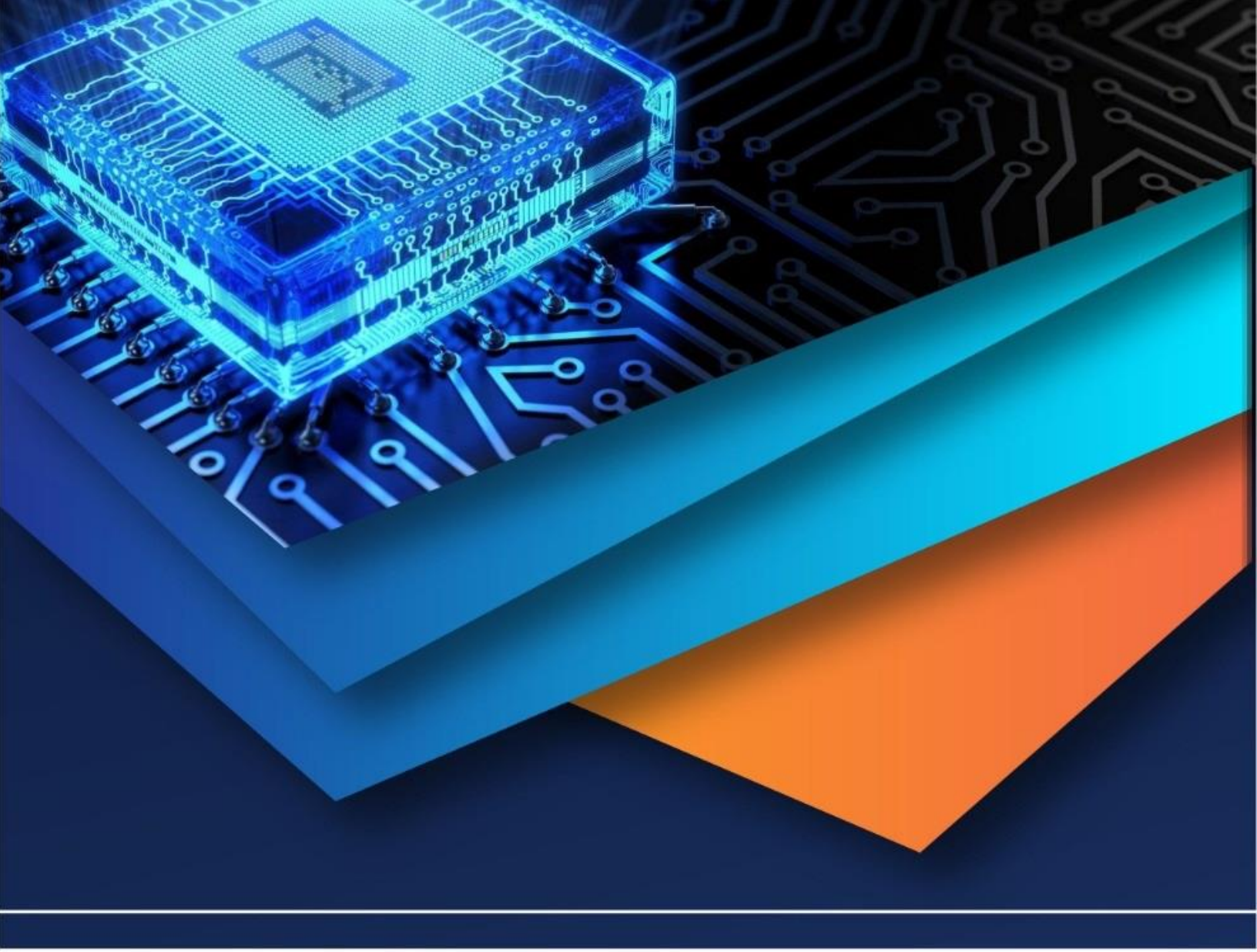

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