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Finding Missing Person Using AI

Aditya[1], Ankesh raj[2], Affan J[3], Aniket Aman[4], Sreevidya B.S.[5]
[1]*Assistant Professor, Department Of Information Science and Engineering, Dayananda Sagar College of Engineering, Bangalore, India*
[2, 3, 4, 5] *Department Of Information Science and Engineering, Dayananda Sagar College of Engineering, Bangalore, India*

Abstract: ***The paper focuses on leveraging the power of Artificial Intelligence (AI) algorithms, specifically Convolutional Neural Networks (CNN) for image classification, along with the Python programming language and the Telegram messaging platform for real-time notifications. The objective is to enhance the efficiency and effectiveness of search and rescue operations by utilizing AI techniques to detect missing persons using surveillance cameras. This research aims to harness the potential of AI, particularly in facial recognition, to improve the accuracy and speed of identifying and locating missing individuals, thereby aiding in search and rescue efforts..***
Index Terms: Convolution neural network, facial recognition, Artificial Intelligence,

I. INTRODUCTION

This paper presents a detailed overview of a project focused on utilizing Artificial Intelligence (AI) techniques to locate missing persons. The paper aimed to address the pressing issue of missing persons by harnessing the power of AI algorithms and data analysis. By integrating AI, computer vision, and natural language processing. The paper aimed to enhance search and rescue operations, improve investigation efficiency, and increase the chances of locating missing individuals. Face recognition techniques have proven to be highly versatile and offer numerous advantages, with one of the most significant being their potential in finding missing persons. Recognizing this advantage, we have proposed and implemented an application that enables volunteers to contribute to the process of locating missing individuals, thereby significantly expediting the search efforts. By utilizing face recognition techniques in this manner, we can leverage the power of technology and community involvement to swiftly identify missing persons. This not only improves the chances of finding them but also contributes to the overall safety and well-being of society as a whole.

II. MOTIVATION

India faces a concerning reality as an average of 296 children go missing every day, with a distressing monthly figure of 9,019 children remaining untraceable, highlighting a grave issue. In 2020, amidst the challenges posed by the Covid-19 pandemic, the National Crime Records Bureau data revealed a staggering total of 108,234 missing children across India. Among them, 33,456 were girls, 15,410 were boys, and tragically, 43,661 children remained untraceable throughout the year, emphasizing the urgent need for effective measures to address this crisis.

III. EXISTING SYSTEM

There are few existing system which uses different algorithms like k-nearest neighbors and Haar cascade classifier. The proposed system can also be implemented using RFID(Radio Frequency Identification) tags, which are physical tags used in amusement parks for the same purpose. It is a wireless technology that enables the identification and tracking of objects or individuals using radio waves.

IV. LITERATURE SURVEY

1) The paper discusses the utilization of AWS facial recognition algorithm powered by AI to locate missing individuals with high accuracy. This technology, leveraging one-shot learning, has demonstrated significant potential and can be applied in various sectors such as hotels, hospitals, etc., enabling instant identification of criminals. The system aims to expedite the process of identifying missing persons by replacing time-consuming manual scanning with an efficient face recognition method.
2) In this paper, his paper presents a novel approach to identify authorized passport holders using the Passport database. The proposed method combines image processing techniques with the LBPH mathematical model to achieve accurate results. For enhanced airport security, the method consists of six essential steps:

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a) *Image Capture:* The traveler's image is captured using a webcam.
b) *Image Transmission:* The captured image is sent to the Django server for further processing.
c) *Feature Extraction:* The LBPH feature set is extracted from the captured image.
d) *Comparison with Database:* The extracted features are compared with the images in the database using a classifier.
e) *User Details Retrieval:* If a match is found, the user details are fetched from the database.
f) *Notification to Admin:* The predicted user details are sent to the admin via email for further action.

This approach utilizes webcam images for LBPH processing and subsequently applies classifiers to compare them with the images in the database. This not only helps identify unauthorized travelers but also aids in apprehending criminals who attempt to cross borders. Additionally, if a traveler is associated with a bank loan, their information can be verified with the police station for added security measures.

3) In this paper, the authors have introduced an automated face recognition system designed specifically for attendance monitoring purposes. The system utilizes a camera to capture facial images, which are then compared against a pre-existing database of images. To achieve accurate face detection, the authors have employed machine learning techniques, incorporating an SVM classifier for name detection and a gradient-oriented Histogram for face detection. The implementation of the system involves several key technologies. For image detection and recognition, the authors have utilized the open-source computer vision library, OpenCV. To create a user-friendly graphical interface, they have employed Tkinter, a Python library for GUI application development. Additionally, the authors have utilized Numpy, a Python library for efficient array manipulation, to facilitate working with arrays in their implementation. To develop and test the application, the authors have opted for the Xampp server, a free and open-source server solution. Its usage provides a convenient and reliable platform for application deployment and testing. The proposed model has demonstrated impressive accuracy, achieving a rate of 99.38% in the conducted experiments.
4) In this paper, the authors present a system that utilizes CCTV footage to compare images with a criminal database when fingerprint evidence is unavailable. The system follows a structured approach comprising four stages. The first stage involves planning, where the authors discuss the rationale and methodology behind the system's development. The second stage focuses on requirement analysis, where the necessary specifications for designing the system are identified and outlined.In the third stage, system design is defined, including workflow and architecture. The authors describe the integration of the Principal Component Analysis (PCA) technique, which is used to identify similar features between images extracted from the CCTV footage and those stored in the database. The fourth stage, implementation and testing, encompasses the actual development and evaluation of the system using the PCA technique. Extensive testing is conducted to assess its performance and accuracy.
5) In 2020, Sarthak Babbar, Navroz Dewan, Kartik Shangle, and their team from Jaypee Institute of Information Technology, Noida, India, published a paper that provides a comprehensive understanding of the functioning of Amazon Web Services (AWS) Recognition. The paper also compares AWS Recognition with other algorithms and systems like CDAC-VS and CNN, aiding in algorithm selection for their project. One aspect addressed in the paper is the challenge of facial changes over time as individuals age, while the dataset images remain the same. To tackle this, the authors aim to assess the accuracy of the Residual Network (ResNet) for cross-age face recognition. They compare the performance of ResNet with cross-age reference coding (CARC), Amazon Web Services (AWS) Recognition, and other techniques using datasets such as the cross-age celebrity dataset (CACD) and a verification subset CACD-VS. Remarkably, the results reveal that ResNet achieves an accuracy of 98.40% on the CACD-VS dataset, while AWS Recognition achieves an impressive accuracy of 99.45%. These findings demonstrate the high accuracy and efficacy of AWS Recognition in cross-age face recognition scenarios, providing valuable insights for future research and practical implementations.
6) In this paper, the authors present a system comprising four essential steps for real-time image training and comparison. The initial step involves training real-time images, followed by the utilization of Haar-classifier for face detection in the second step. The third step focuses on comparing surveillance camera captured images with real-time images, and the final step entails analyzing and presenting the results based on the comparison. To facilitate face detection, the authors employ the Haar-classifier algorithm implemented in OpenCV. The Haar-cascading technique is utilized for face detection, and Harr-like classifiers assist in tracking faces within the OpenCV platform. Notably, this system enables the identification of multiple individuals and can aid in locating suspects. The accuracy of the proposed system surpasses that of previous models. The authors also suggest that

integrating the system with Aadhaar, a government-issued identification database, could enable the identification of Indian citizens and foreigners. This information could be utilized to further investigate whether an individual has a criminal background. Leveraging an existing citizenship database would be an effective means of implementing this system..

7) The paper titled "Criminal Identification System using Facial Recognition" authored by Nagnath B. Aherwadi, Deep Chokshi, Sagar Pande, and Aditya Khamparia discusses the application of facial recognition in a criminal identification system. The authors delve into the utilization of image processing techniques employing OpenCV and highlight the difficulties associated with manual scanning. Moreover, they explore how an automated process can effectively address and overcome these challenges.

8) In August 2014, a paper was presented by Swarna Bai Arniker, K. Sita Rama Rao, and their team from Research Centre Imarat in Hyderabad. The paper highlights the utilization of an RFID-based Missing Person Identification System, providing valuable insights. The envisioned future involves the installation of RFID reading equipment at all police stations and public gatherings. This system holds great potential for various applications, such as locating and assisting lost children, physically challenged individuals, and elderly citizens. By wearing an RFID label, these individuals can be easily identified, enabling authorities to reunite them with their guardians or caretakers. It's important to note that the effectiveness of this system relies on the person physically wearing the RFID label. Consequently, one limitation is the necessity of carrying the RFID chip for tracking purposes. In summary, the paper presents a perceptible approach to the RFID-based Missing Person Identification System. With the potential implementation of this system at police stations and public gatherings, authorities can improve their ability to swiftly identify and assist individuals in need.

V. IMPLEMENTATION

A. *Methodology*

1) *AI-Enabled Image Classification:* The proposed system system utilizes Convolutional Neural Networks (CNN) for accurate and efficient image classification. By training the CNN model on a labeled dataset of images, we can reliably identify and classify individuals captured in surveillance footage.

2) *Geolocation Analysis:* In the proposed system sophisticated algorithms is used to perform precise geolocation analysis. By leveraging the camera's location, our system calculates the precise longitude and latitude coordinates of **detected individuals,** providing crucial location information for search and rescue teams.

3) *Real-Time Notifications:* Integrated with the Telegram messaging platform, system generates real-time notifications. When a missing person is detected, immediate notifications are sent, containing essential details such as the person's identification, location coordinates, and the distance from the camera. This enables prompt communication and swift response by search and rescue teams.

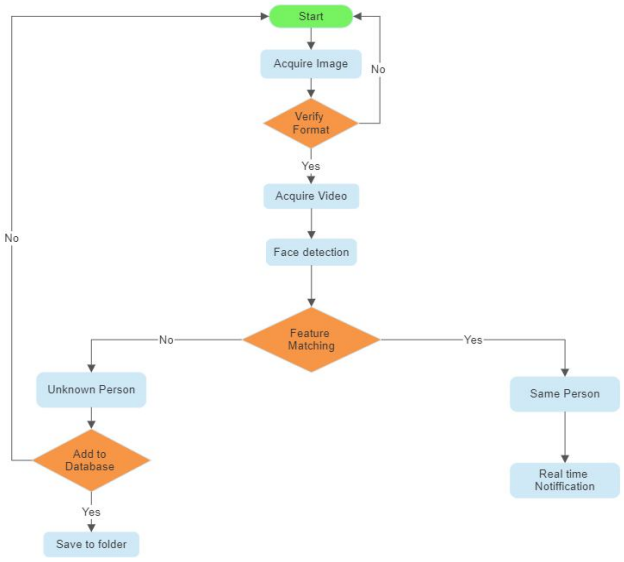


Fig. 1: Structure of the system

B. Main Components of CNN

1) *Convolutional Layers:* These layers perform the main computation in a CNN by applying convolutional filters to input data. Each filter scans the input and extracts relevant features by performing element-wise multiplications and additions.
2) *Pooling Layers:* Also known as subsampling or down sampling layers, pooling layers reduce the spatial dimensions of the feature maps generated by the convolutional layers. Common pooling operations include max pooling and average pooling, which help in reducing computational complexity and extracting the most important features.
3) *Activation Functions:* Activation functions introduce non-linearities into the network, allowing it to learn complex patterns and relationships. Common activation functions used in CNNs include ReLU (Rectified Linear Unit), sigmoid, and tanh.
4) *Fully Connected Layers:* These layers connect every neuron in one layer to every neuron in the next layer, similar to traditional artificial neural networks. Fully connected layers are typically placed at the end of the CNN and are responsible for making final predictions based on the extracted features. Loss function: The loss function measures the discrepancy between the predicted outputs of the CNN and the true labels. It quantifies the model's performance during training and guides the optimization process to minimize the error. Optimization algorithm: CNNs use optimization algorithms, such as stochastic gradient descent (SGD) or its variants (e.g., Adam, RMSprop), to update the network's weights and biases during training. These algorithms adjust the network parameters to minimize the loss function.
5) *Dropout:* Dropout is a regularization technique commonly applied to CNNs. It randomly sets a fraction of the neurons in a layer to zero during each training iteration, which helps in reducing overfitting and improving generalization.
6) *Batch Normalization:* Batch normalization is another technique used in CNNs to normalize the inputs to each layer, making the network more robust and accelerating training. It normalizes the activations by subtracting the batch mean and dividing by the batch standard deviation.

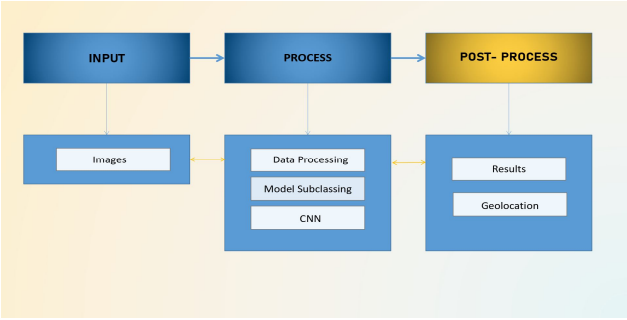


Fig 2: Architecture

VI. CONCLUSION

In conclusion, the proposed project has successfully developed an innovative system that utilizes Artificial Intelligence (AI) to enhance the process of locating missing persons. Through the integration of AI algorithms, image classification, geolocation analysis, and real-time notifications, we have achieved significant improvements in search and rescue operations. The implementation of Convolutional Neural Networks (CNN) has resulted in enhanced person detection accuracy, reducing false positives and providing reliable identification of individuals in surveillance footage

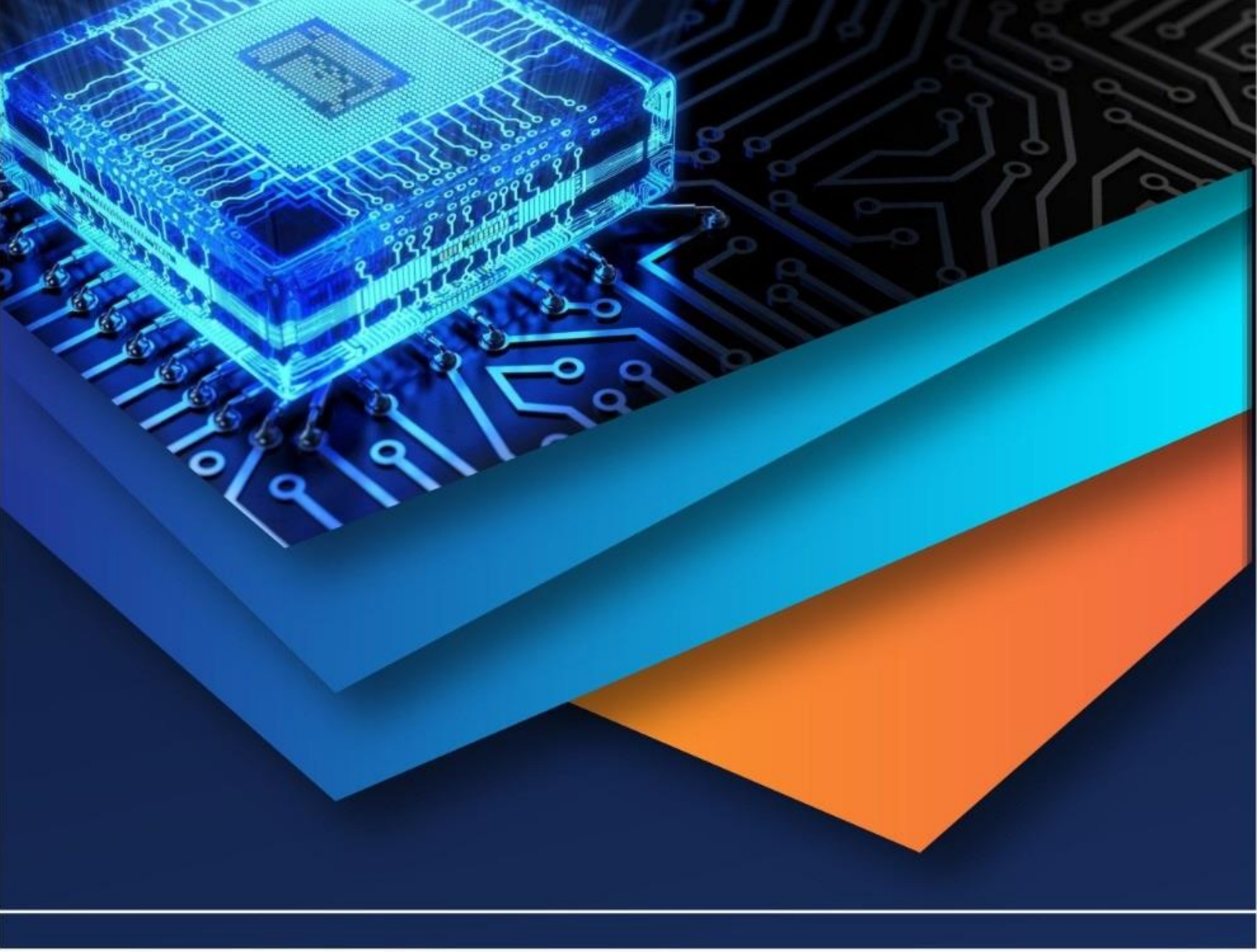
VII. FUTURE SCOPE

1) *Drone Integration:* Integrate the developed system with drones equipped with cameras and AI capabilities.
2) *Object Tracking and Behaviour Analysis:* Enhance the system to include object tracking and behaviour analysis capabilities

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