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Detection of Missing People using Aritificial Intelligence

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***Abstract*—The use of convolutional neural network (CNN) algorithms and artificial intelligence (AI) technology has shown great promise in helping to find missing people. This study describes a thorough method for looking through surveillance camera footage to find people who have missed. We suggest an AI- based framework that combines missing person detection, image and video analysis, and data preprocessing. The framework uses a deep CNN model to learn the characteristics of missing people, such as facial recognition and clothing identification, from a large dataset of images and videos. The suggested system has been tested and validated using real-time surveillance videos, and it successfully detects missing people with high accuracy.**

***Index Terms*—Keywords: CNN algorithms, AI, missing person.**

I. Introduction

A huge number of people around the world go missing every day, including children, teenagers, persons with mental disabilities, elderly people with Alzheimer's, etc. The majority of them are still unknown. This study presents a method that would expedite face recognition searches and be advantageous to both the general public and law enforcement personnel. Humans are capable of quickly identifying and locating objects in images. Humans have a rapid, accurate visual system that is capable of performing complex tasks like object recogni- tion and obstacle detection without much conscious effort. Thanks to the availability of enormous amounts of data, faster GPUs, and improved algorithms, we can now quickly train computers to detect and classify several elements inside a picture with high accuracy. Object detection can be used to count the objects in a scene, find and track them in real time, and precisely label them using this method of localization and identification. In the interim, automation is required to automate the procedure for locating a specific person by recognizing a particular image and contrasting it with another image to see if both images share the same characteristics. This will allow us to ascertain whether the missing person shown in a photo taken from a specific location is accurate or not, and if it is, police can start their search for the person from that location. Our programmed will be able to save all of the missing person's data, which will enable the system to identify that image data and locate the missing person. Deep learning employs a large number of trained neural networks for face recognition. The neural networks extract a number of features known as face encodings or numbers to describe a face. It checks the provided face encodings against each other to see if any of the face images match any of the face encodings

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II. Literature Survey

Various techniques have been rapidly advancing in recent years include the important feature for environment manage- ment.

We conducted extensive research and came to the follow- ing conclusions regarding the literature survey. To start, S. AYYAPPAN and his colleagues from the IFET College of Engineering have given a similar problem description and purpose as

another article. They use a layered convolution auto encoder and facial feature extraction and matching based on deep learning in their suggested solution (SCAE). The file contains pictures of missing persons. from those photographs, faces are recognized, and a convolution neural network picks up features. A multi-class SVM clas- sifier was trained using these newly acquired characteristics. They successfully labeled and identified the child using this technique. We conducted extensive research and came to the following conclusions regarding the literature survey. To start,

S. AYYAPPAN and his colleagues from the IFET College of Engineering have given a paper that addresses a comparable problem description and objective. Additionally, we won't share the lost person's information with the general public. Additionally, their system uses sophisticated algorithms that make the extraction and classification procedures take longer [1]

Shefali Patil and colleagues from SNDT Women's University, Juhu, Mumbai presented a study that addresses the meaning and purpose of the related question.. They use the KNN Algorithm, which requires 136 * 3 data points to detect faces, in their suggested system. The accuracy of the

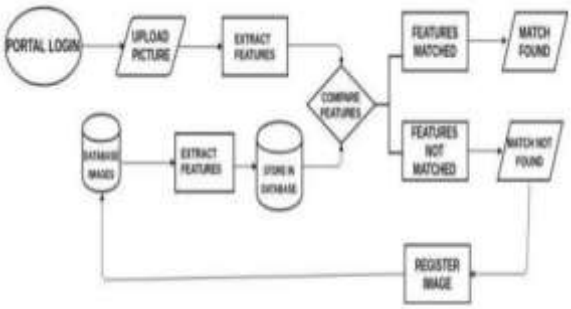

Fig. 1. Architecture of device

KNN approach, which is 71.28 percentage, and the fact that it ignores cross-age face recognition are its key drawbacks. The primary distinction between our work and theirs is that in this case, we'll use volunteer work from individuals to construct a dataset utilising a mobile application. We will make use of the cross-age face recognition feature of AWS facial reorganization. Additionally, a cloud database will be used to store our dataset. [2]

The Jaypee Institute of Information Technology, Noida, India team of Sarthak Babbar, Navroz Dewan, Kartik Shangle, and others published a paper in 2020 that gave us a very clear understanding of how Amazon Web Services (AWS) Recognition functions and contrasts AWS recognition with other algorithms and systems like CDAC-VS, CNN. There- fore, this paper assisted us in choosing the algorithm we would employ for our project, such as Amazon Web Services (AWS) Recognition. As we become older, our faces will alter while the images in our dataset don't change. For cross-age face recognition, we want to investigate Residual Network's (ResNet) precision.[3]

Rohit Satle and his team published a paper on facial recognition using principal component analysis (PCA) in August 2016.. The computational complexity of the PCA method and the fact that it can only analyse faces with comparable facial expressions are its two key limitations. Their project and ours are fundamentally different in that ours can recognise a certain person even though their facial expressions are different in both photographs. Our technology will also identify a certain person's two distinct photos, one with a moustache and the other without one. We'll employ AI to recognise photographs, which will undoubtedly improve our accuracy level. [4].

III. WORKING OF PROPOSED MODEL

The system plans to use facial recognition to identify missing persons.. The architecture of our frame- work is presented in figure 1.

Here, the public or the police find auspicious person (a child, a disabled person, etc.)on the Street and upload that person's photo to the portal. Our algorithm extracts face codes from the image as shown in 2 and compares them with the face codes of images previously in the database. If a match is found, an alert is sent to both the affected officer and the person's parent/guardian in the image. If no match is found, the person gets the option to register that face as a new face Login to our database with location and comments. Whenever the public or the police upload an i Image, the face code of the image is captured and then compared with the face codes of the images stored in the database. If the distance between the encoding of the uploaded image and the encoding of the image in the database is less than or equal to the minimum, then the face of both images is the same person. If so, the user will be notified that along with image from the database matching image has been found .If the distance between the codes is greater than the threshold, it means that the faces in the images are not from the same person. Thus, our proposed system will help to identify missing persons

IV. IMPLEMENTATION

This section focuses on the steps taken to develop, train, and deploy the AI model based on Convolutional Neural Network (CNN) algorithms for detecting missing individuals. It includes the following key aspects:

1) Dataset Collection:
   Explain the process of collecting a diverse and compre- hensive dataset of missing people's images or informa- tion, including data from law enforcement agencies, so- cial media platforms, and surveillance systems.Discuss any challenges or limitations encountered during the dataset collection process.
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4) Data Preprocessing:

Describe the preprocessing steps performed on the col- lected dataset, such as data cleaning, normalization, and augmentation. Explain any specific techniques or algorithms used for data preprocessing, including face detection, cropping, resizing, or noise removal.

5) CNN Model Architecture:

Present the architecture of the CNN model used for detecting missing people. Describe the layers, filters, activation functions, and other components of the CNN model. Explain the rationale behind selecting the specific CNN architecture and its suitability for the task of missing person detection.

6) Training Process:

Explain the process of training the CNN model on the prepared dataset. Discuss the optimization techniques used, such as stochastic gradient descent or adaptive learning rate algorithms. Describe the training param- eters, including batch size, learning rate, and number of epochs.

7) Model Evaluation:

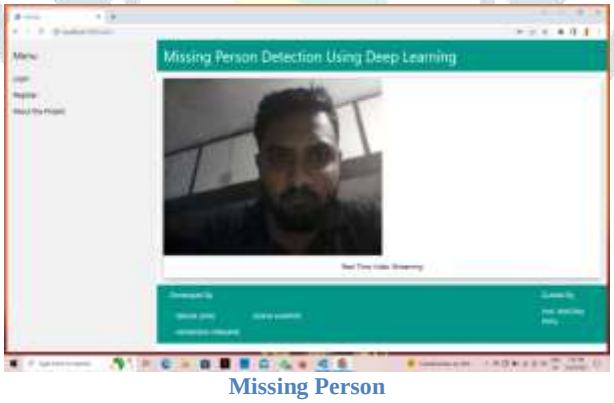
Present the evaluation metrics used to assess the perfor- mance of the trained CNN model. Discuss the metrics, such as accuracy, precision, recall, or F1 score, and their interpretation in the context of missing person detection. Provide the results of the model evaluation, including any insights or observations.

8) Deployment and Integration:

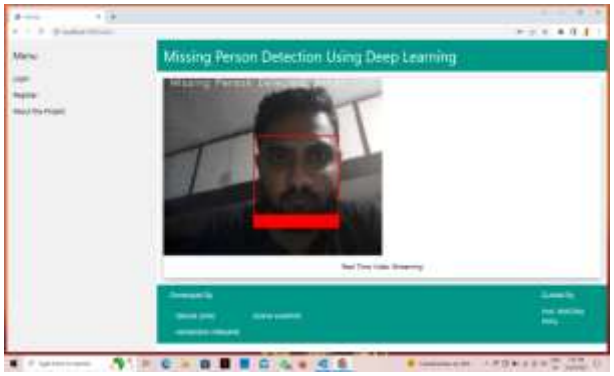
Describe the process of deploying the trained CNN model into a real-world system or application. Discuss any considerations or challenges related to integration with existing search and rescue operations or law en- forcement systems. Explain how the AI-based system can be used in practice to aid in the detection and location of missing individuals. ıPerformance Analysis: Conduct a performance analysis of the implemented system, including the speed, accuracy, and reliability of the missing person detection process. Compare the performance of the AI-based system with existing meth- ods or benchmarks. Discuss any limitations or potential areas for improvement identified during the performance analysis.

The implementation topic provides a detailed account of the practical steps taken to develop and deploy the AI and CNN-based system for detecting missing people. It highlights the data collection, preprocessing, model training, and per- formance evaluation processes, as well as the challenges and considerations involved in the implementation.

V. RESULTS



Missing Person



Missing Person Detected

VI. APPLICATIONS

It has various applications in real-world scenarios. Here are a few examples:

- **Law enforcement**: ML-based missing person detection can assist law enforcement agencies in identifying and locating missing individuals. By analyzing images or videos, the system can help prioritize investigations, narrow down search areas, and potentially lead to faster and more accurate identification of missing persons.
- **Social media monitoring**: Social media platforms can be leveraged to collect data on missing persons. ML algorithms can analyze the vast amount of user-generated content and identify relevant images or posts related to missing individuals. This can aid in spreading awareness, gathering leads, and facilitating communication between concerned parties.
- **Amber Alerts**: Amber Alerts are emergency notifications issued when a child is abducted. ML-based missing person detection systems can be integrated with Amber Alert systems to automatically analyze images or video footage, quickly identify the missing child, and disseminate crucial information to law enforcement and the public.
- **Public safety and surveillance**: ML algorithms can be applied to surveillance camera footage in public areas, transportation hubs, or airports to detect missing individuals. This can help security personnel in monitoring crowded spaces and identifying potential cases of missing persons in real-time.
- **Online platforms and databases**: ML-based missing person detection can be integrated into online databases and platforms dedicated to finding missing persons. This can enhance the search capabilities, enabling users to upload images or descriptions of missing individuals and receive potential matches from the database.
- **Personal safety apps**: ML models can be incorporated into personal safety applications to help individuals locate and identify missing persons. By using the camera on their mobile devices, users can capture and analyze images in real-time, alerting them if a missing person is detected in their vicinity.

VII. CONCLUSION

This will speed up the process of identifying missing persons. Our system replaces the manual method of scanning the database for each image to match with an efficient face recognition method that does the job in a short time. Although our system has a small limitation, e.g. For example, if he age of person is between 0 and 10 years, the accuracy of will decrease, as shown in Figure1.The reason forth is is the incomplete development of facial features at that age. We hope to lift this restriction in the future.. In the future, we plan to expand this system by connecting our system to public cameras and real-time facial recognition. Frames from public cameras are sent to our system where our system continuously checks the frames. If a missing person is identified in one of the frames, they will be reported to the relevant authorities.

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