



Criminal Identification System Using 3D Face Recognition

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Abstract: Finding relationships and patterns among varied data has become much simpler with the use of machine learning technology. The major task of this research is to determine the type of crime that might occur given the place where it has already happened. Using a training set of data that has undergone data cleansing and data transformation, we have developed a model using the machine learning idea. Criminal activity is expanding exponentially in modern society. The police's main obstacle is effectively identifying criminals to prevent crime; however, there are not enough police officers available. Although there are many technical ways to catch thieves, many methods fall short. In this project, a machine learning algorithm is used to create a face detection and recognition system for criminal identification. This system will be able to distinguish criminals' 3D faces in real-time and automatically detect their faces. The one shot learning technique used by this system would also just need a single photograph of the culprit to identify him. The goal is to recognise the criminal face, retrieve the data from the database for the recognised criminal, and send a notification to the police staff with all the details and the place where he was being watched by the camera.

Index Terms - Component, formatting, style, styling, insert.

I. INTRODUCTION

Personal information on a specific person is included in criminal records, along with a photograph. Any criminal must have identification in order for us to identify them. Based on statements made by an eyewitness. Fingerprints, eyes, DNA, and other features can be used for identification. One application is face identification. Our primary point of focus during social interactions is the face, which is crucial for expressing identity and emotion. Although it can be challenging to infer intelligence or character from a person's face, the human brain is remarkably adept at remembering and recognising faces. In a facial recognition system, an image is compared to a database of images to determine whether there is a match. Using the RGB values for the eye colour, face breadth and height, as well as various ratios, it is feasible to identify each facial image. The goal of this technology is to locate criminals in any investigating department. In this method, criminals' photos and identifying information are stored in a database, and the images are then divided into four slices: the forehead, eyes, nose, and lips. To facilitate identification, these photos are once more stored in another database entry. Witnesses will choose the slices that show up on the screen, and by doing so, we are able to access the database and retrieve the face's image. This method provides a very friendly environment for the operator and the witnesses to easily identify the perpetrator if the criminal's record is already in the database. The goal of this project is to recognise a person from the previously captured photographs. The created system also marks the beginning of face detection and recognition for surveillance using video.

i. Problem Statement

To create a programme that will enable remote registration and tracking of criminals using criminal data. There are two ways to identify criminals using this programme. One method involves manually giving the criminal's images, and the second involves employing live real-time capturing. Crime poses a serious threat to humanity. In the discipline of image processing, person recognition is a difficult problem to solve. Images that come from many sources could be sensitive to noise and lighting. It can be challenging to identify faces in low-resolution, noisy images. Additionally, the obtained image may have a very high dimensionality. Some preprocessing approaches must be used to address these issues. Preprocessed photos are useful for increasing accuracy and system performance.

ii. Project Objective

- Real-time criminal identification based on face recognition application's. The major objective is to help law enforcement locate perpetrators.
- The purpose of this application is to submit details about a specific criminal that we have located.
- Anytime, everywhere, police officers can utilise this application to track down a criminal.

• Any police officer can use the internet to use this programmer from anywhere at any time.

iii. Scope of Project

To create a programme that will enable remote registration and tracking of criminals using criminal data There are two ways to identify criminals using this programme. One method involves manually giving the criminal's images, and the second involves employing live real-time capturing.

II. RELATED WORK

1.K. Kranthi Kumar a , , Y. Kasiviswanadham a , D.V.S.N.V. Indira a , Pushpa Priyanka palesetti b , Ch.V. Bhargavi cEt.al In contemporary civilization, criminal activity is growing dramatically. Effective criminal identification is the police's main obstacle to preventing crime, but there are also too few officers on the street at any given time. There are numerous technical approaches to apprehend criminals, yet many of them are ineffective. In this study, a face detection and recognition system for criminal identification is built using a multi-task cascade neural network. This system will have the ability to recognise criminals' faces in real-time and do so automatically.

2. Ajay Gurav, Alireza Chevelwalla, Sachin Desai, Prof. Sumitra Sadhukhan et.al This research seeks to evaluate five face detection and recognition algorithms, better response rate, and a first step for video surveillance in order to give a full solution for image-based face identification and recognition with increased accuracy. On the basis of experiments conducted on numerous face-rich datasets in terms of subjects, stance, emotions, and light, a solution is suggested.

3. Ruchi Jayaswal; Mansih Dixit et.al 3.In general, academics have shown a lot of interest in facial recognition. As crime rates climb daily, forensic surveillance is required to produce a facial characteristic, or a visual representation of a victim's face. Many researchers have made contributions to this field of study using a number of methods. Real-time facial recognition is still a laborious process, and the system only scores a good 1 for performance. We shall contrast two facial recognition models in this essay. The traditional method is the first, while the deep learning method using real-time data is the second. The accuracy of the models on the same dataset will be determined after comparing these approaches with various algorithms, and it will be determined whether or not they correctly predict a face.

4. Souhail Bakkali; Muhammad Muzzamil Luqman; Zuheng Ming; Jean Christophe Burie et. Thanks to the advancement of deep convolutional neural network approaches, numerous face identification algorithms have achieved state-of-the-art performance in terms of accuracy and exceptionally high speed in unrestricted applications (CNNs). However, due to a lack of publicly accessible datasets, the variety of face picture orientation, the complex background and lighting, defocus, and the fluctuating illumination of camera acquired photos, face detection on identity documents in unrestricted situations has not been thoroughly researched. In order to more efficiently

address this issue, we investigate three state-of-the-art face detection methods based on general images, namely Cascade CNN, MTCNN, and PCN, for face detection in camera-captured photos of identity documents, given varying image quality ratings.

5. Pallavi R. Wankhade and Mayuri S. Takore et.al. Personal information and an image of vulgar people are typically included in criminal records. In order to apprehend any criminals, we need some identity about the person, which is provided by the viewer. The standard and organisation of the captured image segments frequently make it challenging to identify faces. To fix this issue, we usually develop computer code. There are numerous ways to recognise someone, such as by looking at their eyes or finger prints. Face recognition is utilised in every application. The face is the primary topic of discussion in social interaction courses since it is crucial for establishing identity and communicating emotion. Although facial recognition by humans is remarkable, it is debatable if one can deduce traits like intelligence or character from a person's face.

6. Chuah Chai Wen, Isredza Rahmi A. Hamid, Md. Jamri Saidi, Nurul Azma Abdullah, and Nurul Hidayah Ab Rahman In this study, a renowned The well-known Principal Component Analysis methodology was used to construct an autonomous facial recognition system for criminal information. With the use of this technique, faces will be automatically located and recognized. This can assist law enforcement in identifying or locating the suspect in the case if there are no thumbprints at the crime scene. The results show that 80 percent of input images can be matched to template information.

7. Pournima Paman Patel, Chaudhari Vrushali Kishor, Snehal Prakash Sonar, Prarthana Sandip Patil, et al. The aim of this work is to analyse face discovery and recognition methods and to offer a comprehensive image-based method for face location and recognition that has a foundational advantage for video observation, enhanced accuracy, and a higher reaction rate. The set-up is designed using studies done on numerous face-made databases, together with people, position, sentiments, and light.

III. ALGORITHM

Harr Cascade Algorithm: use of Haar Cascade classifiers for object detection is efficient. Using a Boosted Cascade of Simple Features for Rapid Object Detection is the paper that Paul Viola and Michael Jones wrote that first described this technique. The classifier is trained using a large number of both positive and negative images in the Haar Cascade technique, which is based on machine learning.

Positive images - These images contain the images that we want classifier 1 to be able to identify.

Negative images: Negative images are pictures of everything else that don't include the thing we're trying to find.

Steps:

1. Haar Feature Selection
2. Integral Image Representation
3. Adaboost Training
4. Cascade Classifier Architecture

IV. BLOCK DIAGRAM

The system architecture consists of:

1. Database of images
2. Test photos taken with cameras

3. The test photos' feature extraction

4. Distributing a pre-written email notice.

The pictures come from the registration process where we will keep a person's real-time face images. Images are kept in a SQLite database. Along with the ID and photographs of the people, the criminal histories are kept on file. Utilizing the face-recognition library's function, the features are compared. We are creating a desktop application which will be usefriendly and Firstly, We need to register to the criminals and save there face images to the database. Then we perform realtime training using CNN and train images will get store

in a folder. Then, if the criminal comes front of camera his or her Face recognition has done using Harr Cascade Algorithm and records get fetched through database and output will get shown on screen.

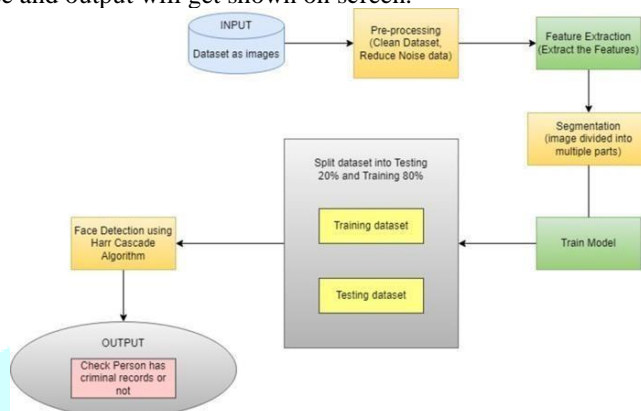


Fig. Block Diagram

3.1 Advantages

- It requires very little manpower and the cost of the operation is quite low, which makes it helpful to police officers in their efforts to trace and catch criminals.
- This technology can be used by police or investigation departments to identify criminals from their faces because the information cannot be altered or deleted in this application.

3.2 Disadvantages

- Criminal details were stored manually in a record and it requires lot of work
- Information can be lost or manipulated in records easily.

3.3 Application

- The facial recognition system application helps police officers identify offenders.
- It provides details about a specific criminal that we are looking for.
- Anytime, everywhere, police officers can utilise this application to track down a criminal.
- Any police officer can use the internet to use this programmer from anywhere at any time.

V. RESULTS

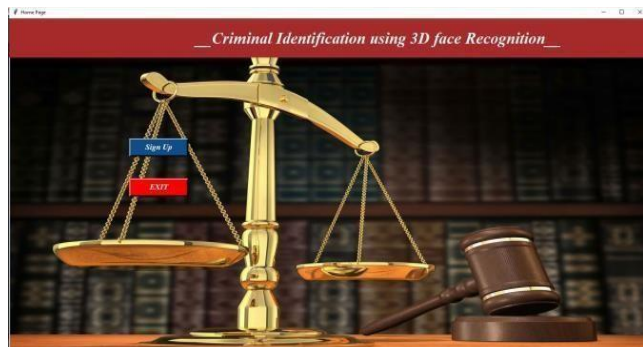


Fig.1 GUI Main Page



Fig.2 Home Page

Fig.3 Registration Page

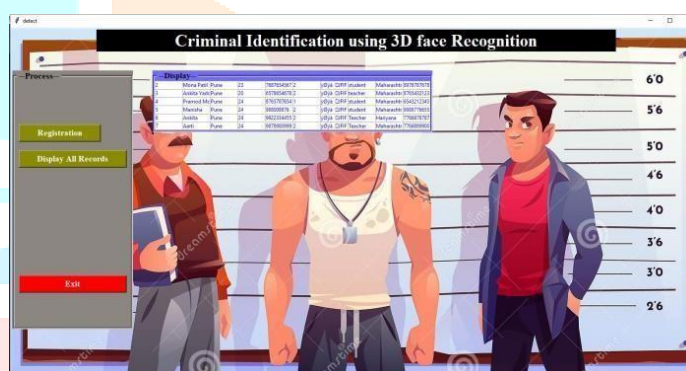


Fig.4 Display Records from database

IV. CONCLUSION

The proposed system, which we are going to design, will be able to perform as expected and meet the requirements, making it a most-wanted system for criminal detection and identification. This technique offers a more effective way to identify criminals. Advanced face recognition algorithms can be used to improve future results, and a login page must be created so that any police personnel can use this application remotely. Additionally, alarm messages should be sent to adjacent police stations if a criminal is discovered in a specific area. The created application is straightforward and user-friendly. With the advent of machine learning technologies, discovering links and patterns among various pieces of data has gotten considerably easier. The major task of this research is to determine the type of crime that might occur given the place where it has already happened.

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