# Criminal Identification System using Facial Recognition

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Abstract. We all know that our Face is a unique and crucial part of the human body structure that identifies a person. Therefore, we can use it to trace the identity of a criminal person. With the advancement in technology, we are placed CCTV at many public places to capture the criminal's crime. Using the previously captured faces and criminal's images that are available in the police station, the criminal face recognition system of can be implemented. In this paper, we propose an automatic criminal identification system for Police Department to enhance and upgrade the criminal distinguishing into a more effective and efficient approach. Using technology, this idea will add plus point in the current system while bringing criminals spotting to a whole new level by automating tasks. Technology working behind it will be face recognition, from the footage captured by the CCTV cameras; our system will detect the face and recognize the criminal who is coming to that public place. The captured images of the person coming to that public place get compared with the criminal data we have in our database. If any person's face from public place matches, thesystem will display their image on the system screen and will give the message with their name that the criminal is found and present in this public place. This system matching more than 80% of the captured images with database images.

Keywords: Face detection, Face recognition, Open-CV, Image Processing

1 Introduction

Criminal identification can be done in two ways, which is shown in figure 1. In Manual Identification System (MIS), identification is done by the Police officers searching them at public places. It takes a lot of time to give the proper attention and it also has the chances of skipping criminals as they will be alerted by seeing cops easily gets escape from there. Since the MIS is in the process of taking more time and we will not properly focus on everyone. But when it comes to an automated identification system (AIS) there is no need for observation going in a public place. Here all the process involved in this system is automated.
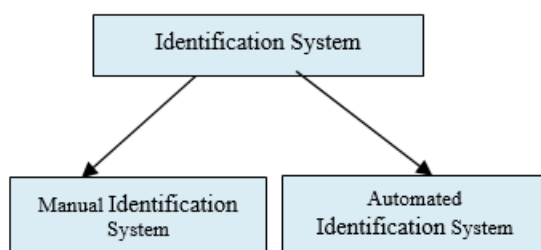
Automated Criminal identification monitoring system's some important things shown below:

1 Criminal Enrolment:
Criminal images with their name to photos are added to the criminal database so that we can compare thecaptured images with database one.

2 CCTV Connectivity:
CCTV Cameras should be connected tothe system on which we are having a criminal database and program where we are running.

3 Criminal Confirmation:
If a person is found from a public placeby using this system, then check who was the criminal using a special folderavailable on the desktop.

2 Components of AIS

2.1 Open-CV
Open-CV is Open-Source Computer Vision Library. The library contains 2500+ algorithms that are optimized which include a comprehensive set of both classic and state-of-the-art computer vision and machine learning techniques. Also, it has C++, PYTHON, JAVA, and MATLAB interfaces which support Windows, Linux, Android, and Mac-OS. For commercial and non-

commercial, Open-CV is free for use. Open-CV is used for capturing the images and videos in public-place.

2.2 Face Detection
The primary function of this step is to capture the faces of the people who are available in front of the camera. The outputs from this step are patches that contain each face in the input image. To design a perfect and preferable face recognition system. Face alignment is performed to rationalize the scales and orientation of these patches. Further Next step after the face detection step is human face patches are extracted.

2.3 Face Recognition
Face recognition is a method of identifying or verifying the identity of an individual using their face. The step after the representation of faces is to identify them. In this comparison of the detected face image with the images, we have in our database based on face encodings.
   A facial recognition system maps facial expressions from an image or video using biometrics. To find known faces match from the database, it compares the details to a database. Facial recognition may aid in the identification of personal identity, but it also introduces privacy concerns. Commercial applications use facial recognition as well as it is used for a variety of purposes ranging from security to promotions.

3   Existing System

Criminal record generally contains personal information about particular person along with photograph. To identify any criminal, we need some identification regarding person, which are given by eyewitnesses. Based on the details given by eyewitnesses, the criminal who did the crime will be identified manually. Problems in existing system:

a. In most cases the quality and resolution of the recorded image
segments are poor and hard to identify a face.
b. If an eyewitness observes a criminal only from single direction, it may not be possible to recognize him.
c. The photograph, which is a hard copy, cannot be able to divide or split into different modules. So, it is very difficult to find, unless we get full-

fledged details.
d. Sometimes the eyewitness may not be able to draw, the face of criminal.
e. Sometimes if we maintain the criminal details manually and physically. After a timespan, the photographs and other details may tend to tear out

4   Proposed Work

So, to overcome drawbacks of existing system we have developed an automatic identification system that works on computer vision, that include face and behavioral biomatrix
Feature extraction domain has plenty of collection of generalized face features from several images of the same subject. Then, each face image is processed, features are extracted and the collection of features are analyzed and combined into a single generalized features collection, which is written to the database. The face is us primary focus of attention in social inter course playing a major role in conveying identification and emotion. Although the ability to infer intelligence or character from facial appearance is a guess but still the human ability to recognize faces is remarkable. This analogy would give us enough scope to envisage a new algorithm. There are mainly three important ways in construction of the face i.e., by using the eyewitness function, adding details and clipping image. This offers us a face as finally identification parameter to know who has committed the crime

Behavioral biometrics is a recognition system that identifies a person based on dynamic or behavioral characteristics. These characteristics may include voice and gesture recognition, electronic device usage characteristics through typing speed, the way a person holds a smartphone or tablet, and even the way they walk. This type is also known as passive biometrics, as it doesn't require a user's active participation to proceed with the authentication process.

These dynamic authentication methods are based on the characteristics of a person's behavior. They evaluate a person's unique behavior and subconscious movements in the process of reproducing any action.
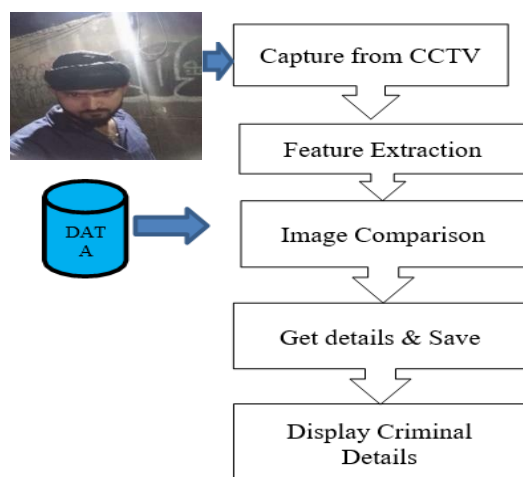
5   Experimental Results

We have proposed a promising Criminal Detection system for Face Videos. CCTV Cameras are used for continuous capturing of the video and images; we will get the information on our main screen that which image from the database is matching.

When the database image matches with CCTV captured image then on the main screen the name of the criminal with the criminal found message will be displayed as shown below in figure 5;
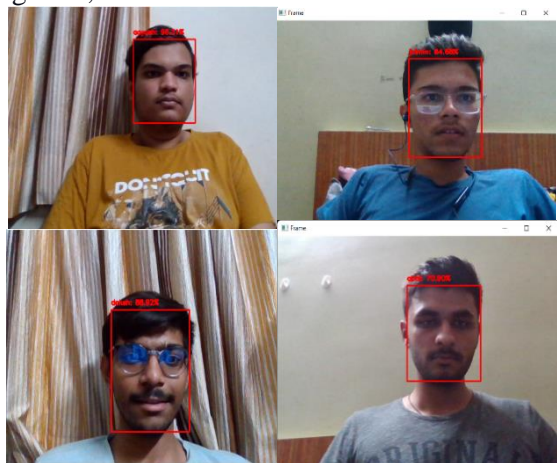

fig.5. Camera images with name and Criminal found Message

When a criminal is identified using a CCTV image, then which criminal found from the database that criminal image will be saved in Special folder on desktop as shown in figure 6. Police will come to know that who is found in a public place because he will not be there in front of a CCTV camera for a long time. So, this approach more helpful when criminals come for few minutes in front of a CCTV camera that one will be identified.
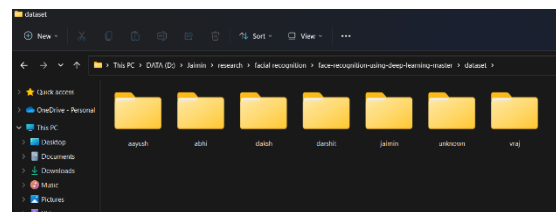
6   Conclusion and Future Work

This upgraded version of the criminal detecting system not only provides a huge convenience to the Police in the identification of criminals but also saves timefor them as processes are automated in the system. The novelty of this project isface detection done by using Face Encodings.

For future work, we can add the Alarms to the criminal detection system. It will ring place only when matches are found so that if anyone is not there to keep watch in the CCTV room, they will come to know that someone is found from the database or behavioral characteristics like the way a person holds a smartphone or tablet, and even the way they walk. This report presents a surveillance system that will give us alerts when any controversy, fight, or intruder is detected by using CCTV footage.