

Criminal Detection Using Face Recognition

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Abstract- 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 eyewitness. In most cases the quality and resolution of the recorded image segments is poor and hard to identify a face. To overcome this sort of problem we are developing software. Identification can be done in many ways like finger print, eyes, DNA etc. One of the applications is face identification. The face is our primary focus of attention in social inters course playing a major role in conveying identify and emotion. Although the ability to infer intelligence or character from facial appearance is suspect, the human ability to recognize face is remarkable. In this paper, we represent a methodology for face detection robustly in real time environment. Here we use Haar like classifiers to track faces on OpenCV platform. This paper implements "Haar-Cascade algorithm" to identify human faces which is organized in Open CV by Python language and "Local binary pattern algorithm" to recognize faces.

Keywords- Image processing, Machine learning, Face detection, Face Recognition, Haar cascade, OpenCV.

I. INTRODUCTION

In the modern world, security is a one of the main concerns. There are significant rise of threats to the society with increasing rate of crimes and terrorist activities. Even have many ways of identifying a person, biometric identification approaches have had a huge attraction because of the accuracy and the uniqueness of the biometric factors of a person. Finger print recognition, voice recognition, palm recognition iris and voice recognition are the approaches of biometric identification.

The advantage of face recognition approach is people do not need to look into an iris scanner or to place their hands on a fingerprint reader, or to speak to close by microphone. And also face recognition techniques can be very useful in footages taken by surveillance and applications. This project is aimed to identify the criminal faces. In here the technique which going to use is, manually we already store some images of the criminals in our database along with his details. By surveillance camera system residing at some public place which automatically matches the input faces with criminal

database and gives alert if the results are matched. If any image is matched up to 95% or closer to that rate then we predict that he is only the criminal. Face recognition technology can be applied to a wide variety of application areas including access control for PCs, airport surveillance, private surveillance, criminal identification and for security in ATM transactions. In addition, face recognition system is moving towards the next-generation smart environment where computers are designed to interact more like humans.

II. PROJECT OBJECTIVE

Main objective of this project is to identify a person using the images previously taken. The identification will be done according the previous images of different persons. Even today we use different types of face recognition applications sometimes those applications also fail to identify faces because of different facial expressions and typical variations in hair style. When the criminal where specs or wig it might get too difficult to identify a face. Also the facial marks, like aging, sketches birthmarks or other adornments will be big challenge to identify a face. This face recognition system will identify individuals based on characteristics of separate face segmentations and the objectives of the project as follows.

- Identify unique face features of eye, nose, and mouth region that recognizes individual
- Improve capabilities of the detecting features of the local segmentations of face. So that it's necessary to find the efficient algorithms to extract features of the segmentations. Through researches being carried on face recognition technique and available algorithm on partial face recognition and choose an appropriate method and implement face recognition system based on it. Finally As there are many approaches to these contents, selection of the most suitable techniques has to be determined after evaluating available techniques under various factors.

III. LITERATURE SURVEY

P. Jaturawat and M. Phankokkrud [1] had a study post. "Knowing the face of the person in the video" by the organizers of the posture has learned that the system knows

the face. Using facial features available in the database. This research uses Eigenface by calculating Face Covariance matrix and Face Eigenvectors from the sample. The result is called Face prints. If using different weights, Face prints are different and used as a feature. To know the sergeant Face Detection is a skin-color detector that separates the human skin from the background. The facial recognition offered in this research consists of two steps: the first step, where the system is taught using a visual representation of the object. Individual and Face prints are stored in the database. In the second stage, the features of the party need to check and confirm to compare with features in the database. Then show results from the test found that the accuracy of the subjects in the still images and video was in the range of 80 to 100 %.

In the year 2018, Suma S L [2] implemented a real time face recognition algorithm using Linear Binary Pattern Histogram (LBPH) and Viola Jones algorithm. This method consists of com fusion and recognition. is done using Viola Jones algorithm is applied is for Face detection, feature extraction is done by LBPH technique and Euclidean Distance Classifier is used for face recognition. This work have recognition rate of about “85%-95%”. This work can be further amended to favor in all conditions such as brightness, in case of twins, beard and wearing goggles.

In the year 2017, Li Cuimei [3] implemented a human face detection algorithm using three weak classifiers including Haar cascade classifier. Skin hue histogram, Eye detection and Mouth detection are the three classifiers adopted by this method. This yields sufficiently high detection. The proposed method generates a position prediction value(PPV) to about 78.18% - 98.01%. This can be amended to detect human faces only of multiple races and reduce the delay for detecting and recognizing various faces among different images of people with variation in light and background conditions.

In the year 2017, Souhail Guennouni [4] implement a face detection system by collating with Haar cascade classifiers and edge orientation matching. Edge orientation matching algorithm and Haar-like feature selection combined cascade classifiers are the two techniques used in this system. This algorithm produces a better matching but the detection speed is comparatively less.

IV. PROPOSED SYSTEM

In Proposed system , CCTV system detects the faces of criminals using CCTV cameras. Image processing on a server for image analysis by retrieving data from a database containing criminal data. Analyze criminals and alert to the

authorities involved in pursuing the criminal to prosecute. User interface can use the program via a smart phone and website.

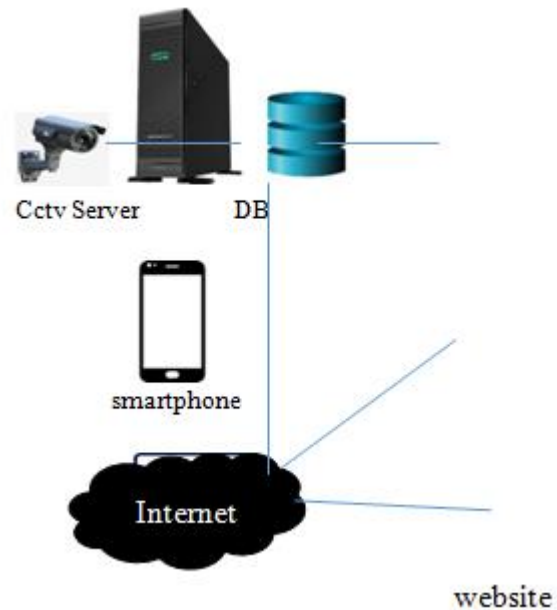


fig : proposed system

Following diagram illustrate relationship between components of the system. These relationship should be identify and understand properly before starting implementation of the system.

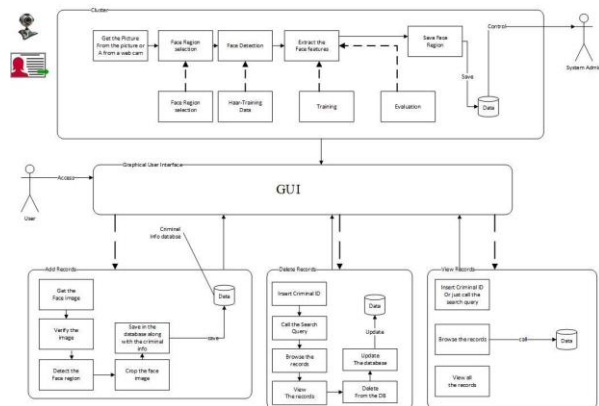


Fig: system architecture

V. METHODOLOGIES

A. System implementation

In Raspberry pi to stream a live stream video Web camera is connected. The captured image from the web camera will get detected first and then cropped to reach the computer. This detection is performed through Viola-Jones Haarcascade classifier. Using a python-based Open CV

software, face is saved in Raspberry Pi and forwarded to the available servers which are Linux-based. Whenever an image arrives, the server commences LBPH algorithm on this face, evens-up the image to minimize the variations and finally compares the emanated LBPH from detected image with the pre-saved LBPH in the database. The result of comparison is generated by sending a notification as authorized or unauthorized person via Internet of Things (IOT).

B. Phases of recognition

The three main process followed in face recognition system are Detection, Feature extraction and Comparison.

Face detection

For face detection, Viola Jones algorithm is a beneficial method. In general, this algorithm is not only limited for face detection but can also be utilized for many rigid structured object detection tasks. The Viola-Jones algorithm is composed of three main concepts that make it possible to develop a real time face detector: Haar-like features, Image integral, Adaboost training and Cascading classifier. By applying these features, the system can determine the presence or the absence of a human face

Haar-like features

Haar-like features is used by Haar cascade classifier for human face detection. There are three formations of Haar-like features. the first format is the edge feature, second type is the line feature and the last type is the four rectangle feature. Using the integral image, Haar like principle will provide fast computation. It's called Haar-like features.

Cascade Classifier:

Cascade classifier is a cascading of weak classifiers used to boost the face detection process and reduce the computational complexity. Each node in the series contains a weak classifier and filter for one Haar feature. Ada Boost provides weights to the nodes and the highest weighted node primarily arrives. When a filter ignores to permit image regions, that specific sub window of the image are eliminated for further processing. It is then considered as a non-face, which means that the image regions that are processed do not contain the face to be detected. This is very imperative to the performance of the classifier, since all or nearly all negative image sub-windows will be eliminated in the first stage. On the contrary, when image regions successfully passed the filter, they go to the following stage, which contains amore complex filter. Only regions that successfully pass all filters

are considered to contain a match of the face. This means that regions of the image contain the facial subject for detection. The reason behind the multi-stage classifier is to eliminate efficiently and rapidly the non-face sub-windows. The classifier is used to reject more false positives (non-face regions) of the sub-windows. The number of false positive rate is drastically reduced after several steps of processing

C. Feature extraction and Comparison

After the face is detected, next step is to extract features this is done using linear binary pattern algorithm. Initial step of this algorithm is to convert the test image into grey scale. This $L \times M$ pixel size image will get divided into regions. The same pixel size is used for the regions, producing $n \times n$ regions. Each region will go through linear binary pattern operator.

In this process, it will compare the centre pixel with its neighbour pixels. If the pixel size is greater to centre pixel it is '1' or it is '0'. Executing this process will result in 8binary values. By linking the binary values it results in binary number. The LBP value is obtained by translating 8binary number into a decimal number, it will be in the range of 0-255. There is an important concept called LBP uniformity. ALBP is uniform if it has at most two 1-0 or 0-1 transitions.

VI. CONCLUSION

This paper has an approach to detect criminal using face recognition. The scope of the project is to implement a criminal identification system which it can compare the witness images with the training images. It can be stated that the project is feasible since the requirements of the project has been successfully met.

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