

Criminal Identification by using Real Time Image Processing

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Abstract- This paper helps in real time face recognition using a automated face surveillance camera. The proposed system consists of 4 steps, it include training of real time images face detection using Haar based classifier comparison of trained real time images with images from the surveillance camera result based on the comparison between them. An most important application of interest is automated surveillance, the objective of automated surveillance to recognize people who around watch list. The ambition of this paper is to compare an image with several images which has been already trained. In this paper, we represent a methodology for face detection strongly in real time environment. Haar cascading is one of the algorithm for face detection. In that we use Haar like classifiers to track faces on OpenCV platform. The correctness of the face recognition is very high. The proposed system can successfully recognize more faces which is useful for quickly searching suspected persons as the computation time is very low. In India, we have a system to recognizing citizen called Aadhaar. If we use this as acitizenship database then we can differentiate between citizen and foreigner as well as we will be able to investigate whether the identified person is criminal or not.

Keywords: Automated surveillance camera, face detection, face recognition, Haar cascade, OpenCV.

1. INTRODUCTION

In this paper, an automated facial recognition system for criminal database was proposed using known Haar feature based cascade classifier. This system will be able to detect face & recognize face automatically in real time. We have taken a pre-captured image & performed processing techniques on it. We intend to take a real image & perform "real time image processing" on it. In the modern world, security is a one of the main concerns. There is a 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. In the modern world, security is a one of the main concerns. There is a significant rise of threats to the society with increasing rate of crimes and terrorist activities.

1.1 Motivation of Project

- In recent , crime increases rapidly.
- We used large face databases which already exists
- Accuracy of face recognition is very high.
- At a time, multiple images detects using video's or CCTV footage.

1.2 Problem Definition

It is very difficult to track the criminal person in local area, state level or district level in India. There is a no criminal tracking live system so criminal easily wanders anywhere in the country with the help of passport.

2. METHODOLOGY

The images in the databases are preprocessed to remove noise and redundancy. Then it undergoes feature extraction where Haar cascade is used. The database will have the images and details of all the citizens of the given country. The video obtained from the surveillance

camera will be converted into frames. When a face is detected in a frame, it is preprocessed where noise and redundancies are reduced. Then it undergoes feature extraction where Haar cascade comes into picture. The processed real time image is compared with the processed images already stored in the citizen database. If match is found, it is further compared with the images stored in local watch list database to identify if the person is criminal/suspect. If he is criminal/suspect the time for which he was under the surveillance of the camera is noted. If he is not a citizen, it is further compared with the images stored in international watch list database. If match found, the time for which he was under the surveillance of the camera is noted. If match is not found in both the watch lists, he is considered as an innocent.

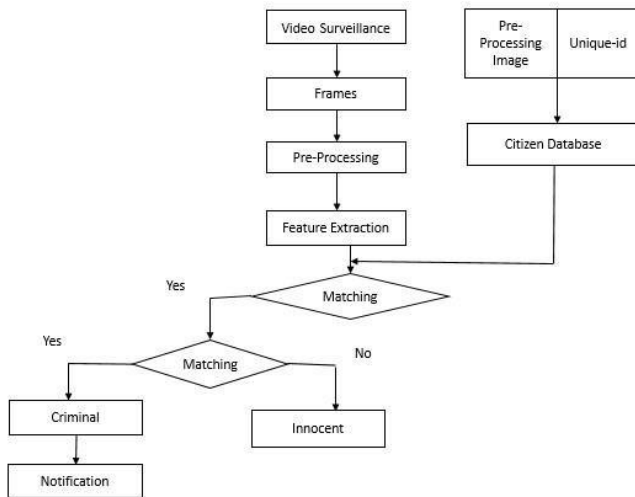


Fig . 1 Flowchart of Proposed Methodology

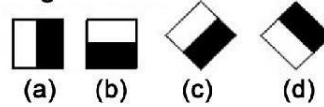
2.1 Haar Classifier

One of the most common tool for face identification is consider as Haar - Classifier. Here, the Open Computer Vision library provides the class for realize the HaarClassifier System. Though, the most prominent problem in the face recognition is the posture of the tilted-face. Here, this manuscript deals with two different resolutions to surpass the problem.

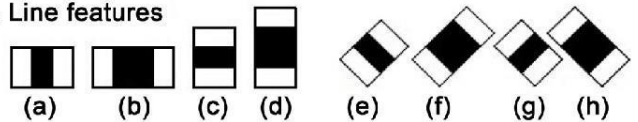
Here, the solutions are described the Python language which contains the syntax that shows ease and simple. The 1st solution is considered as using the more number of classifiers at the time. Everything should be trained for detecting and recognizing the face with various rotation angles. Next the 2nd solution uses the single classifier for recognizing many kinds of face images which has been rotated by various kinds of angles. Rather than using complex calculation, Haar-Classifier uses several weak classifiers combined to produce the decision. Haar Classifier is also implemented as a part of Open-CV library,

a popular open source computer-vision library written in C.

1. Edge features



2. Line features



3. Center-surround features

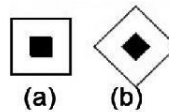


Fig.2 Haar like features

3. SYSTEM ARCHITECTURE

- Implementation Details (Modules):

3.1 Video Input:

Video forensic has become an important area of research in the last decade. System will accept video as an input. Justified format of video should be given as an input to get processed.

3.2 Feature Extraction:

Out of all the methods to analyze an image, extraction of GLCM features has proven to be efficient time and time again. The gray level co-variance matrix is atabulation that provides with statistical measures for texture analysis. This method takes into account the spatial relationship between the intensities of pixels in a gray-level image. In this paper, the GLCM features were calculated to study the differences in the original image and the digitally forged image. This gave 22 texture values (for each image) to work with, most of which were similar when it came to an image and its fraudulent counterpart. In practice, this would lead to redundancy and would also increase the time to run the algorithm. Also, the histogram of oriented gradient (HOG) features was calculated which gave another set of features for the original and the morphed image. The HOG values of the original and the morphed images were reasonably apart from each other, which meant that these values will be useful in differentiating the original document from the morphed one. However, the order of matrix generated by HOG algorithm is too large to be successfully fed into an SVM so it could also not be of practical use.

3.3 Online Database:

Also, the Features values were computed but since the order of the matrix produced were very large to be trained by using ANN machine learning algorithm so as to enhance accuracy.

3.4 Classification:

Initially, the classifier used for classification of dataset into two parts as original or morphed was linear kernel SVM. A linear kernel SVM is the most suitable classifier for two-class classification problems. It finds an equivalent hyperplane which separates the whole data by a specific criterion that depends on the algorithm applied. It tries to find out a hyper- plane which is far from the closest samples on the other side of the hyper plane while still classifying samples. It gives the best generalization techniques because of the larger margin.

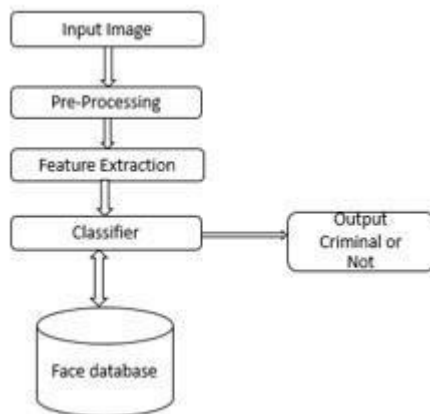


Fig.3 Architecture Diagram

4. ADVANTAGES

a) Easy Detection:

This system uses ANN for classification. ANN uses multiple hidden layer for processing and make detection easy.

b) To reduce the detection time:

Thus the system uses ANN. It is faster process to detect forged image or video using this system rather than human eyes.

c) Training will provide proper accuracy.

5. APPLICATION

- a) Forensic Department
- b) Police Department
- c) Investigation department
- d) Media Departments

6. CONCLUSION

The proposed face recognition system based on Haar cascade will be implemented. Even though the stored set of images of the person in the database differ from the real time image, the system serves as a fruitful method of identifying the faces. Thus, some changes in the new face image to be recognized can be allowed. The main advantage is that we use citizenship database which already exists.

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