

Face Recognition System for Prisoners

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Abstract— Earlier, Police uses the thumbprint for the identification of prisoners. However, we can't use thumbprints more often because prisoners are getting cleverer and they do not leave any thumbprint on the scene. Nowadays, with the increase of security technology, there are multiple ways to identify prisoners. The identification can be done through face recognition, iris recognition, and by recognizing each part of the face. In this paper, we have proposed the solution for face recognition as CCTV cameras have been installed in many public as well as private areas, so we can identify the suspect through video surveillance or CCTV footage. So, in this paper, we are using local binary patterns histogram for face recognition as it gives more accuracy than previous algorithms. This system will be able to detect the prisoner through CCTV footage, it will detect the face and identify the prisoner and display the complete information of that prisoner. This will help the police to detect and recognize the prisoner if no thumbprints are present on the scene. This will give 89% correct matches of template data.

Keywords—Face Recognition, Open CV, LBPH.

1. INTRODUCTION

In this current world, security is our main concern. There is a significant rise in threats with an increasing rate of crimes and terrorist activities. There are many ways to identify a prisoner, biometric identification approaches give more accuracy because of their uniqueness. Iris recognition, fingerprint recognition, voice recognition, and face recognition are some examples of biometric identification approach. The Face recognition approach is very useful among all of the approaches because people do not need to place their fingers on a fingerprint scanner or use a microphone for voice recognition or look into an iris scanner for iris recognition. One more advantage of face recognition for police is that they can use CCTV footage of the place where the crime happened and recognize the suspects easily.

2. PROBLEM STATEMENT

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 and identify anemotion. Although the ability to infer intelligence or

character from facial appearance is suspect, the human ability to recognize face is remarkable.

MOTIVATION

Face recognition technology can be applied to a wide variety of application areas including access control for PC's, 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.

OBJECTIVE

This project is intended to identify a person using the images previously taken. The identification will be done according the previous images of different persons.

3. EXISINGSYSTEM

In [1] Nurul Azma Abdullaha, Md. Jamri Saidi, Nurul Hidayah Ab Rahman, Chuah Chai Wen, and Isredza Rahmi A. Hamid introduced face recognition for criminal identification. They have used principal component analysis for face recognition. Their function takes 4 parameters images, A, m, eigenface, where, A is the deviation of the images and m is the mean image in the database. In [2] Mustamin Anggo and La Arapu used face recognition using fisherface method. Face images of people of papua was used as data in this case study. The system using fisherface methods able to recognize the image of face testing correctly with 100% percentage for the test image the same as the training image and able to recognize the image of face testing correctly with 93% when the test image different from the training image.

DATASET

In this project, we use different datasets from the Kaggle website and created our customized Dataset. It's a public dataset. This dataset consists of about 54K RGB images of Criminals which are converted to gray images and mirror images.

DISADVANTAGE OVER EXISTINGSYSTEM

1. Existing system was using Eigenface algorithm of OpenCV library.
2. EigenFaces algorithm also considers illumination as an important feature.
3. In consequence, lights and shadows are picked up by EigenFaces, which classifies them as representing a 'face.'

4. REQUIREMENT ANALYSIS

1.1 FUNCTIONAL REQUIREMENT

1. User Interface Module:

Actually, every application has one user interface for accessing the entire application. In this application also we are providing one user interface for accessing this application.

2. Admin Module

The admin can create, update, delete, login, add details, update details, delete details of criminals.

3. Client Module

The client can register criminal images in the register module, then the client can detect the criminal through desktop images or through web camera.

4. Database Operations Module

Adding, deleting and updating of details of criminals can be done through this module.

5. Identify Module

Recognition of criminal through desktop images or through web camera can be done through this module.

2.2 NON-FUNCTIONAL REQUIREMENTS:

1. Accessibility:

Since this developed as PC client application, this will be able to access only single user at a time.

2. Security:

Login module will be implemented for user login.

5. TECHNOLOGIES

Python:

Python is a widely used general-purpose, high level programming language. It was created by Guido van Rossum in 1991 and further developed by the Python Software Foundation. It was designed with an emphasis on code readability, and its syntax allows programmers to express their concepts in fewer lines of code. It is used in many organizations as it supports multiple programming paradigms. It also performs automatic memory management.

Tkinter:

Tkinter is the inbuilt python module that is used to create GUI applications. It is one of the most commonly used modules for creating GUI applications in Python as it is simple and easy to work with. You don't need to worry about the installation of the Tkinter module separately as it comes with Python already. It gives an object-oriented interface to the Tk GUI toolkit.

OpenCV:

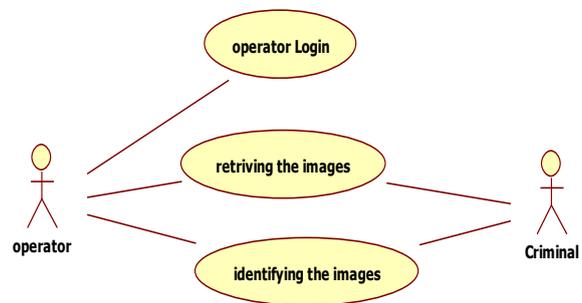
OpenCV is one of the most popular computer vision libraries. If you want to start your journey in the field of computer vision, then a thorough understanding of the concepts of OpenCV is of paramount importance. There are three easy steps to computer coding facial recognition, which are similar to the steps that our brains use for recognizing faces.

LBPH Algorithm

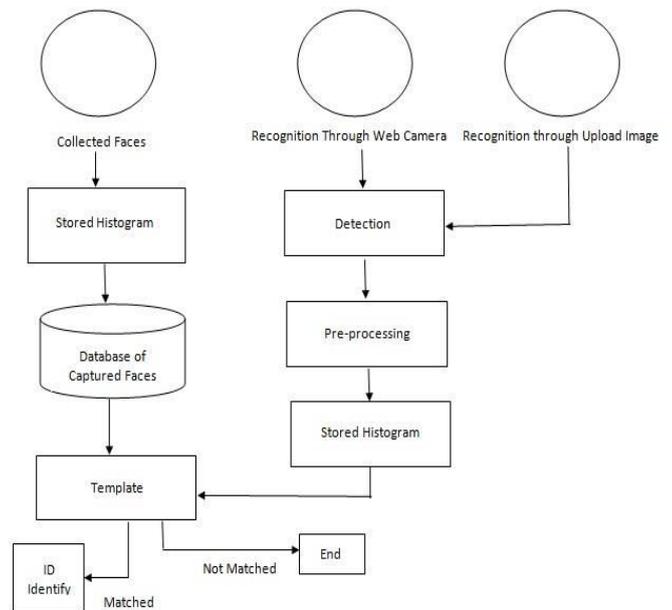
We know that Eigenfaces and Fisherfaces are both affected by light and, in real life, we can't guarantee perfect light conditions. LBPH face recognizer is an improvement to overcome this drawback.

6. DIAGRAM:

Use Case Diagram:



Data Flow Diagram:



7. PROPOSED SYSTEM

In this system we have used Local binary patterns histogram algorithm for Face recognition of criminals as it gives more accuracy than Eigen face algorithm. LBPH algorithm does not take light or shadows as feature of face like Eigen face algorithm. It recognizes face as a whole.

There are only three steps to perform face recognition through LBPH. Firstly, it gathers all the face data of the person, then train the recognizer by feeding face data and their names to the recognizer so that it can learn, then for recognition feed new faces of that people and see if it recognizes them.

The LBPH algorithm first takes 3X3 window. At each move the current pixel compares itself with neighboring pixel and creates a binary pattern like 111001100. Then after doing this for whole image, you will have list of binary patterns. Then LBPH will convert these binary patterns to decimal pattern using binary to decimal conversion and then again, the decimal pattern will be converted to histograms. So, for each image 1 histogram will be stored in the dataset. Suppose there are 50 images in our dataset, then there will be 50 histograms created. So now, given an input image, it creates histogram for this image and compare it with other histograms stored in dataset. For histogram comparison, we are using Euclidean distance. After comparing it returns the closest matched image with its information.

8. RESULTS

We got a training accuracy of 96.02% and a validation accuracy of 89.02%. For this, we stored the different images of the prisoner, and then for detection, we gave a different image of the same prisoner and we have got the correct result. After testing the model with different images, we found that, when we are recognizing a criminal through a web camera, If the criminal moves a lot, it can give a wrong prediction.

9. CONCLUSION

As for the future work, a lot more testing and debugging is needed as this system was developed in a very limited time and resources. Additionally, the system can feature an image processing where the input image can be made less blurry so the system can detect face on lower quality images. Other than that, the system can use a database which contain the personal info of the person in the database, so whenever face recognition system for prisoners recognizes a face, it will display the details about the person. in project. We describe the requirement specifications of the system and actions that can be done on these things. We designed user interface and security issues related to system. Finally, the system is implemented and tested according to the test cases.

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