

# Criminal Face Detection

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**Abstract - A surge of organised crime activity is likely to try to weaken our law enforcement and defence agencies. In this case, technology plays a critical role. Video analytics is one facet of law enforcement's use of technology, and video analytics contains several components. Identifying patterns in different videos is one of the components. The goal is to study a 30-minute movie and capture the faces of the individuals in it, then analyse another film to see how many of the people from the first video appear in the second video and at what times. Now, if the technique described above is applied to thousands of videos obtained from hundreds of intelligence sources, with cross-checks across all recordings, significant information on trends in any form of organised crime can be identified. The goal of this study is to develop a method for recognising previously convicted individuals' faces that is more accurate, has a higher response rate, and may be utilised as a first step in video monitoring. To propose a solution, the nature of criminal psychology of repeated crime or engagement in it is used. Before and after any mischief or criminal action, this technology is utilised to track and detect history shelters. The police's top priority are property and life protection, and crime prevention and criminal identification are their top concerns. However, the number of police officers available to fight crime is limited. To make it easier to find, we're preserving the photograph of the perpetrator in the database, along with other details. Data retrieval and quick deployment of results in the real world The project is written in Python 3.5 and uses OpenCV and algorithms like Haar cascade classifier, LBPH, and facial recognition Pymysql to keep the information about the individual we utilised. And this approach aids in the efficient detection of criminals. It can also recognise the criminal face using several face images or videos.**

**Keywords — Face Extraction, OpenCV, Detect, Haar Cascade, Dataset.**

## I. INTRODUCTION

Since property and life protection are the fundamental priorities of the police, crime prevention and criminal identification are the primary issues for them. However, the availability of police personnel to combat crime is restricted.

The purpose of this research is to recognise previously convicted people's faces and create a solution that is more accurate, has a higher response rate, and may be used as a first step in video surveillance.

The nature of criminal psychology of recurring crime or involvement in it is used to suggest a solution. This technology is used to track and identify history shelters before and after any mischief or illegal conduct. We are keeping the image of the culprit in the database, along with other details, to make it easier to find.

retrieval of data and rapid deployment of outcomes in the actual world To save the details of the person we have used, the project is based on Python 3.5 with the usage of

OpenCV and methods such as Haar cascade classifier, LBPH, and face recognition. Pymysql

## II. PROPOSED WORK AND MODEL DESIGN

### A. Existing System

Many of the In existing system, The Criminal Face Detection System will be built of an existing criminal database. Input would be provided in the form of sketch or an image and matched against the existing database and results would be provided. Criminal record generally contains personal information about particular person along with photograph. Sometimes loss of data occur while searching the criminal details. To overcome this problem. this project useful to detect the criminal face from video and picture which user given for input

### B. Proposed System

The purpose of this research is to recognise previously convicted people's faces and create a solution that is more accurate, has a higher response rate, and may be used as a first step in video surveillance. The nature of the criminal psychology of recurring crime or

involvement in it is used to suggest a solution. This technology is used to track and identify history sheeters before and after any mischief or illegal conduct. We are keeping the image of the culprit in the database, along with other details, to make data retrieval easier and to ensure that findings are deployed quickly in the real world.

C. Python Package

A collection of modules in Python is known as a package. Modules that are linked to one another are usually packaged together. When a programme requires a module from an external package, that package can be imported and its modules used.

A module is a Python file with the name of the module's name property without the .py extension.

A package is a directory of Python modules that includes an additional \_\_init .py file that distinguishes it from a directory containing several Python scripts. If each relevant directory has its own \_\_init .py file, packages can be nested to several levels.

III. METHODOLOGY

A. Import The Necessary Modules

The modules cv2, os, image module, and numpy are required for facial recognition. Face detection and identification are included in the OpenCV module cv2. To alter picture and directory names, the operating system will be used. This module retrieves image names from the database directory, and then generates an individual number from these names to serve as a label for the face in that image. The grayscale image is read using PIL's Image module.

B. Load The Face Detection Cascade

Detecting the face in each image is the first step in loading the face discovery waterfall. We train the recognizer using the region of interest in the image that contains the face. Face discovery will be fulfilled using OpenCV's Haar Cascade. OpenCV includes Haar falls, which may be plant in the OpenCV installation directory. To descry the face, Haar cascade frontalfacedefault.xml is utilised. Cascade is loaded using the cv2 Cascade Classifier function, which takes the path to the cascade.yml train.

C. Create The Face Detection Object

After that, you'll need to make the face recognizer object. FaceRecognizer is a function of the face recognizer object. To train the recognizer and FaceRecognizer, use train(). To recognise a face, use predict().

Eigenface Recognizer, Fisherface Recognizer, and Local Binary Patterns Histograms(LBPH) Face

Recognizer are presently available in OpenCV. Because real life isn't flawless, we employed the LBPH recognizer.

We simply cannot guarantee that your photographs will have excellent lighting or that you will receive 10 different images of the same subject.

The goal of LBPH is to extract local features from photos. The goal is to express only local aspects of an item rather than the entire image as a high-dimensional vector. The main concept behind Local Binary Patterns is to summarise an image's local structure by comparing each pixel to its neighbours.

D. Prepare And Performing Dataset

We'll define a function that accepts the absolute path to the picture database as an input parameter and returns a tuple of two lists, one holding the identified faces and the other providing the appropriate label for that face. For example, if the 4th individual in the database is represented by the ith index in the list of faces, the matching ith location in the list of labels has a value of 4. Now it's time to use the Face Recognizer to complete the training. Function should be practised. It takes two arguments: the features, which in this case are photos of faces, and the corresponding labels, which in this case are the individual numbers we collected from the image names.

E. Testing

When we bring the trained face in front of the camera to test the Face Recognizer, we see the anticipated label to see if the recognition was correct. The label is retrieved from the name of the example photos folder using the os module and string operations. The lower the confidence value, the more accurate the prediction.

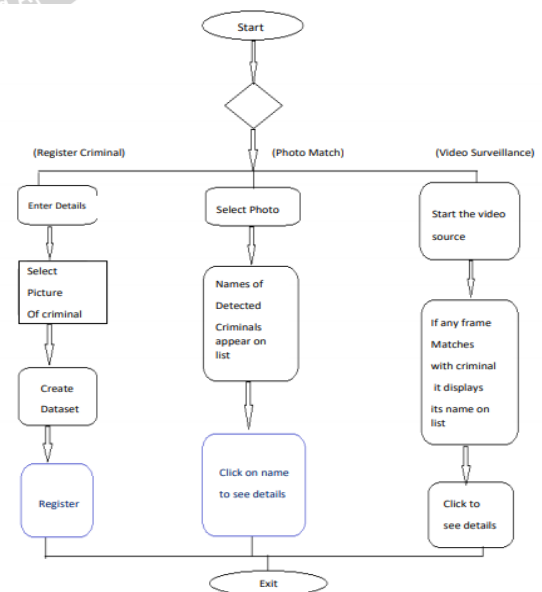


Fig. 1 Work Flow Of System

## IV. ALGORITHM

### A. ADABOOST ALGORITHM

Adaboost's core principle is to establish the weights of classifiers and train the data sample in each iteration so that reliable predictions of uncommon observations may be made. Any machine learning method that accepts weights on the training set can be used as a basic classifier.

### B. HAAR CASCADE ALGORITHM

Haar Cascade is a machine learning-based strategy that involves training the classifier using a large number of positive and negative images. Positive images - These photos contain the images that our classifier is supposed to recognise. Negative Images - Images of everything else that isn't the object we're looking for.

Sample code for this article

```
img_size = left_frame.winfo_height() - 200
current_slide += 1
showImage(img_list[current_slide], img_size)
slide_control_panel = tk.Frame(left_frame,
bg="#202d42", pady=20)
slide_control_panel.pack()
back_img = tk.PhotoImage(file="previous.png")
next_img = tk.PhotoImage(file="next.png")
prev_slide = tk.Button(slide_control_panel,
image=back_img, bg="#202d42", bd=0,
highlightthickness=0,
activebackground="#202d42",
command=lambda : getNewSlide("prev"))
prev_slide.image = back_img
prev_slide.grid(row=0, column=0, padx=60)
```

## V. RESULT ANALYSIS

### A. CRIMINAL REGISTRATION

(Figure 2)-Criminal Registration page will take atleast 5 images of the criminal while creating dataset of criminal that needs to be registered and also provides input form for providing various details of the criminal like his Name, DOB, Profile picture etc. After selecting images and filling details, user will click register. The criminal will be successfully registered if any error doesn't occur.



1. Fig.2 Registration Page

### B. DETECT CRIMINAL

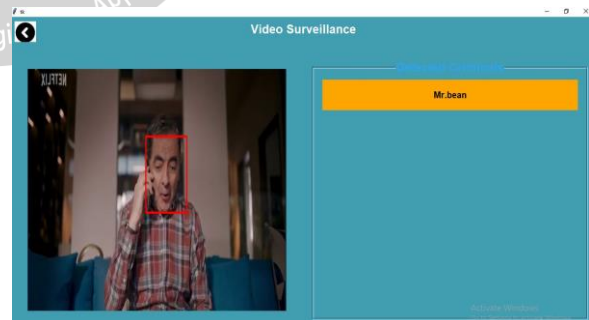
(Figure 3)-This page allows the user to browse an image from the system and helps in detecting one or more criminals in it. User can also see the profile of the criminal by clicking on detected criminal names.



2. Fig.3. Detection Page

### C. DETECTION USING VIDEO

(Figure 4)- This page will use the pc webcam to capture the video frames in real time. After this it will use face detection module on each frame to detect and recognize criminals in the video in real time. User can also see the profile of the criminal by clicking on detected criminal names.



3. Fig.4. Video Detection Page

### D. CRIMINAL PROFILE

(Figure 5)- This page will show criminal profile after clicking criminal name from detect criminal or video surveillance page.



4. Fig.5. Criminal Profile Page

## VI. CONCLUSION

We are able to discover and distinguish criminal faces in real time in an image and a video stream received from a camera in this research. For face detection, we employed Haar feature-based cascade classifiers in an OpenCV approach. It's a machine learning approach in which a cascade function is taught using a large number of positive and negative images. For face identification, we employed Local Binary Patterns Histograms (LBPH). The initiative will serve as a watershed moment for video-based facial recognition and surveillance systems. This method has several advantages: Advantageous characteristics To train a broad detection algorithm to recognise a variety of items, we scale the image's attributes rather than the image itself.

The LBPH recognizer can accurately recognise faces in a variety of lighting conditions. Even if only one training image is provided, LBPH can recognise humans. Our application contains a number of flaws, including: The detector works well on frontal images of faces on both the vertical and horizontal axes, but has difficulty with 45° face rotation.

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