ABSTRACT

The primary distinguishing feature of this project is that it aims to moderate crimes by capturing and identifying criminal faces. Crime prevention and criminal identification are the primary issues before the police personnel, but the availability of police personnel is limited. With the advent of security technology, this project aims to complement the programs and software that are used to detect, record, save and store the identity and the facial features of the criminal. Real time footage of the camera can be used to identify suspects on scene. In this project, an automated facial recognition system for criminal databases is implemented using the well-known Haar feature-based cascade classifier. This system will be able to detect and recognize faces automatically in real time, and also map these faces and collect information from the database, displaying the required criminal files as well. The computer language used in this project is python, and the primary library is OpenCV. OpenCV is a set of library functions that are aimed at real time computer vision. Other notable features of this criminal identification system are face detection, face identification, criminal database, graphical user interface, real time video probing and criminal file uploading. The future scope of this project also includes incorporating this along with other notable criminal security softwares, and to broaden its range.

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LIST OF ABBREVIATIONS

ABBREVIATION	EXPANSION
IDLE	Integrated Development and Learning Environment
XML	Extensible Markup Language
OPENCV	Open Source Computer Vision Library
MYSQL	Relational database that uses SQL query

CHAPTER 1

INTRODUCTION

Human beings have recognition capabilities that are unparalleled within the modern computing era. These are mainly because of the high degree of interconnectivity, adaptive nature, learning skills and generalization capabilities of the system. The human brain has numerous highly interconnected biological neurons which, on some specific tasks, can outperform supercomputers. Advancements in computing capability over the past few decades have enabled comparable recognition capabilities from such engineered systems quite successfully. Early recognition algorithms used simple geometric models, but recently the popularity process has now matured into a science of sophisticated mathematical representations and matching processes. Major advancements and initiatives have propelled face recognition technology into the spotlight. Recognition technology are often employed in a wide selection of applications. Computers that detect and recognize faces can be applied to a good type of practical applications including criminal identification etc. Face detection and recognition is employed in many places nowadays, verifying websites hosting images and social networking sites. Crime recognition and detection is achieved using technologies associated with computing. Features extracted from a weapon are processed and compared with similarly processed faces present within the database. If a weapon is recognized it's known or the system may show an identical weapon existing in the database else it's unknown. In closed-circuit television if an unknown face appears quite just once then it's stored in a database for further recognition. These steps are very useful in criminal identification. In general, crime recognition techniques are divided into two groups supporting the face representation: they use appearance-based, which uses holistic texture features and is applied to either whole-face or specific face image and feature-based, which uses geometric facial features and geometric relationships between them.

1.1 OUTLINE OF THE PROJECT

The main goal of this project is to identify the criminal and register into the database and also detect the video survillences crime which is going on in real time.

The advanced bringing up of security technology, this application is bringing forward to implement the programs and software that are used to detect, record, preserved and store the identities of the person and the facial features of the criminal The system will consist of several basic elements

- Python IDLE
- OpenCV
- Database connectivity with MYSQL
- Kaggle Data set
- GUI interface
- Web cam

1.2. USERS AND STAKEHOLDERS

This section will house the users and stakeholders. The users are going to be using the crime detection application and also the stakeholders will develop, maintain, and test the crime detection and recognition application.

1.2.1 MYSELF

I will be developing, maintaining, and testing the crime detection and recognition application through its phases of development.

1.2.2 USERS

The users are anyone who has the program for the crime recognition and detection. A user may also be a bystander who happens to surpass. This person's body may have accidentally shown itself within the camera. Nonetheless, he or she's going to even be detected if he or she possesses a weapon.

1.2.3 USE CASES

These are the utilization cases for the client of the criminal identification and detection program. The programmer has access to all or any of those cases likewise.

1.2.3.1 Camera Window

The program has code to open the inbuilt camera of a system. It works on any camera, and also on specific camera apps. A resizable window opens and therefore the user's weapon is seen in color together with the background.

1.2.3.2 Trainer Program

The trainer program enables the user to coach his or her face by spotlight before the camera. The python idle is employed to run this code. Half a second is taken for the trainer program to run its course, during which period it takes double the copies of the user's face and stores it within the database folder that has a name of the criminal.

1.2.3.3 Users

The users are anyone who appears before the camera during execution time.

1.2.3.4 User Prompt

The user prompt is that the python is idle. It allows the user to enter into both the modules. It has two buttons. One is for real time crime detection and the other is for entering criminal information in a database.

1.3 LITERATURE REVIEW

In the year 2012 the face recognition "A Robust Face Recognition method using edge based features",was an IEEE Symposium on Computers and Informatics. In this technique and algorithm on face feature extraction and face recognition, the true positive means the portion of face image to be detected by the system is the distance vector of the labeled edge between two vertices.

Paul Viola, Michael Jones, proposed a system on "Rapid Object Detection using a Boosted Cascade of Simple Features". This object detection was proposed by Paul Viola and Michael Jones. Although it can be trained to detect a variety of object classes, it was motivated primarily by the problem of face detection.

The characteristics of Viola–Jones algorithm which make it a good detection algorithm are:

Robust – very high detection rate (true-positive rate) & very low false-positive rate

always.

Real time – For practical applications at least 2 frames per second must be processed.

Face detection only (not recognition) - The goal is to distinguish faces from non-faces (detection is the first step in the recognition process).

The algorithm has four stages:

1. Haar Feature Selection
2. Creating an Integral Image
3. Adaboost Training
4. Cascading Classifiers

The features sought by the detection framework universally involve the sums of image pixels within rectangular areas. As such, they bear some resemblance to Haar basis functions, which have been used previously in the realm of image-based object detection. However, since the features used by Viola and Jones all rely on more than one rectangular area, they are generally more complex. The figure on the right illustrates the four different types of features used in the framework. The value of any given feature is the sum of the pixels within clear rectangles subtracted from the sum of the pixels within shaded rectangles. Rectangular features of this sort are primitive when compared to alternatives such as steerable filters. Although they are sensitive to vertical and horizontal features, their feedback is considerably coarser.

Jyoti Nautiyal, Shivali Gahlot and Pawan Kumar Mishra, “An automated technique for criminal face identification using biometric approach”, on Advances in Communication and Control Systems 2013.This proposed system was using biometric to detect the criminal .This takes a long process to identify the criminal by using his finger prints. Fingerprints have been used in criminal investigations as a means of identification for centuries. It is one of the most important tools of crime detection because of their robustness and uniqueness. A fingerprint is the pattern of friction ridges and valleys on the surface of a fingertip.

CHAPTER 2

AIM AND SCOPE OF THE PRESENT INVESTIGATION

2.1 PROBLEM STATEMENT:

This project aims to make a criminal identification and crime detection program which will successfully detect crime along with providing a useful user interface with a database for entering criminal information. This is done by using python and opencv together with deep learning concepts.

2.2 AIM AND SCOPE

The aim of the criminal identification system is to capture and aid police personnel in identifying and effectively detecting weapons and crime. The scope of those programs extends to a variety of individuals who appear within the camera.

2.3 TARGET AUDIENCE

The audience is someone who wants to use a crime recognition program that occupies less space and is user friendly.

2.4 PROGRAMMING LANGUAGE

Python is an interpreted, dynamically-typed, object-oriented scripting language with a number of built-in data types.
The Python interpreter works by loading a source file or reading a line typed at the keyboard, parsing it into an abstract syntax tree, compiling the tree into bytecode, and executing the bytecode.
While writing a software application, you need to concentrate on the standard of its ASCII text file to simplify maintenance and updates. The syntax rules of Python allow you to specific concepts without writing additional code. At the same time, Python, unlike other programming languages, emphasizes on code readability, and allows you to use English keywords rather than punctuations. Hence, you'll be able to use Python to make custom applications without writing additional code. The readable and clean code base will facilitate your to keep up and update the software without putting time beyond regulation and energy.

you'll be able to use Python for developing complex scientific and numeric applications. Python is intended with features to facilitate data analysis and visualization. you'll benefit from the information analysis features of Python to form custom big data solutions without putting beyond regular time and energy. At the same time, the info visualization libraries and APIs provided by Python facilitate your to visualize and present data in an exceedingly more appealing and effective way. Many python developers even use Python to accomplish AI (AI) and tongue processing tasks.

You can use Python to make a prototype of the software application rapidly. Also, you'll build the software application directly from the prototype just by refactoring the Python code. Python even makes it easier for you to perform coding and testing simultaneously by adopting test driven development (TDD) approach. you'll be able to easily write the desired tests before writing code and use the tests to assess the applying code continuously. The tests may also be used for checking if the application meets predefined requirements supporting its ASCII text file.

However, Python, like other programming languages, has its own shortcomings. It lacks a number of the built-in features provided by other modern programming languages. Hence, you've got to use Python libraries, modules, and frameworks to accelerate custom software development. Also, several studies have shown that Python is slower than several widely used programming languages including Java and C++. you've got to hurry up the Python application by making changes to the applying code or using custom runtime. But you'll always use Python to hurry up software development and simplify software maintenance.

2.4.1 OPENCV

OpenCV may be a library of programming functions mainly aimed toward real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez. The library is cross-platform and free to be used under the open-source BSD license. OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to supply a standard infrastructure for computer vision applications and to accelerate the employment of machine perception within the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code. The library has over 2500 optimized algorithms, which incorporates a comprehensive