

FACE DETECTION FOR CRIMINAL IDENTIFICATION SYSTEM

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ABSTRACT

Providing security to the citizens is one of the most important and complex task for the governments around the world which they have to deal with. Street crimes and theft are the biggest threats for the citizens and their belonging. In order to provide security, there is an urgent need of a system that is capable of identifying the criminal in the crowded area. This paper proposes a facial recognition system using Local Binary Patterns Histogram Face recognizer mounted on drone technology. The facial recognition capability is a key feature for a drone to have in order to find or identify the person within the crowd. With the inception of drone technology in the proposed system, we can use it as a surveillance drone as well through which it can cover more area as compared to the stationary system. As soon as the system identifies the desired person, it tags him and transmits the image along with the co-ordinates of the location to the concerned authorities using mounted global positioning system. Proposed system is capable of identifying the person with the accuracy of approximately 89.1%

Keywords: Face Detection, Face Recognition, Harr cascade, LBPH, Pre-processing, Criminal identification

1 INTRODUCTION

A key factor of improving the quality of education is having criminal attend classes regularly. Maintaining the criminal identification is very important in all the institutes for checking the performance of criminal. Traditionally criminal are stimulated to attend classes using criminal identification points which at the end of a semester constitute a part of a criminal's final grade. However, this presents additional effort from the teacher, who must make sure to correctly mark attending criminal, which at the same time wastes a considerable amount of time from the teaching process and there is a chance for proxy criminal identification. Furthermore it can get much more complicated if one has to deal with large groups of criminal

Maintaining an automated criminal identification management system ensures us with accurate criminal identification avoiding proxy criminal identifications. Every institute has its own method in this regard. Some are taking criminal identification manually using the old paper or file based approach and some have adopted methods of automatic criminal identification marking using some biometric techniques. There are many automatic methods which are available for this purpose like biometric criminal

identification. All these methods take a lot of time because criminal have to make a queue to touch their thumb on the scanning device.

This system uses the face recognition approach to mark criminal identification of criminal. This criminal identification is recorded by using a camera fixed in a classroom which captures images, detects criminal faces in the image and compares the detected faces with the images in the database and marks the criminal identification. We can view the criminal identification from dataset stored in database called as sql

2. LITERATURE SURVEY AND RELATED WORK

Nurul Azma Abdullah, REVIEW OF LITERATURE SURVEY Nurul Azma Abdullah, Md. Jamri Saidi, Nurul Hidayah Ab Rahman, Chuah Chai Wen, and Isredza, Rahmi A. Hamid's [1] Authors are taking help of the CCTV footage and comparing the images from the footage with a criminal database if they didn't find any biometric from the crime scene.

Design, the third stage where they defined system design and its workflow. The authors used Principal Component Analysis (PCA) to detect similar features between images stored in a database and the captured footage, in order to identify criminals. The facial recognition system is dependent on a database that contains personal information for individuals.

If the system detects a face, it can exhibit the corresponding person's information. The system's user interface was developed using Visual Studio Code, while MATLAB R2013b was used for coding and database management. The proposed model achieved an 80% accuracy rate. Shalinda Adikari, Kaumalee Bogahawatte [2] the researchers employed clustering techniques to group crime data into subsets based on available evidence, and then utilized Naive Bayesian classification to identify the most likely suspects for criminal incidents.

Technology used JSF (Java Server Faces) and Prime faces for the implementation of User Interfaces. All the widgets in user interfaces such as input fields, buttons and menus were developed using Prime faces 3.2. Prime faces built-in Ajax based on normal JSF 2.0 Ajax API is used to update the

components when they have finished processing the algorithms. To implement the database publisher used Oracle Database 10g Express Edition. Apoorva.P, Impana.H.C, Siri.S.L, Varshitha.M.R, and Ramesh.B [3]

3 EXISTING SYSTEM

4 There is no dedicated Criminal Face Detection System to assist in facial detection of criminals rather police technicians have to go through to different pictures of criminals and manually slice each picture to generate images, this will usually lead to the generation of low resolution and blurred images. Linking of each sliced image to the original image is also a herculean task. The Criminal Face Detection System is ineffective because a witness will not be able to continually peruse the different images rather they will receive a broken stream of images and randomness of the sliced image is not achievable. In the current System the complexity in the photo can't be removed and as we are not able to remove the complexity of any image, we can't clarify the criminal or any person with conviction. Face Detection and Recognition technique which is independent of variations in features like color, hairstyle, different facial expressions etc using Viola Jones algorithm.

Proposed system:

The proposed system introduces an automated criminal identification system based on face detection and recognition algorithms. The proposed system is basically done in two steps which includes Registration and training and the second one is taking criminal identification and recognition. The criminal needs to register using their unique ID and name. The system then captures around 60 images of the criminal and when they save the images, the captured images are stored in a folder with the label as their ID and serial number of the captured image. The system also stores the details of the criminal in a CSV file. While we take the criminal identification, the camera is started. It detects the faces and then compares it with the images stored to recognize them. It highlights the recognized criminal with their name and for the case of unrecognized persons they are highlighted as unknown. The criminal identification is updated accordingly and is saved in the CSV file. For the detection we used Haar Cascade algorithm. The advantage of Haar Cascade algorithm over other algorithms is that it is good in detecting edges and line features which makes it effective in face detection. Another advantage of this algorithm is its calculation speed. For the recognition we used LBPH algorithm. The advantage of LBPH algorithm over other algorithms is that it is robust against monochromatic grayscale transformations.

Algorithms were involved in this proposed system.

1. LBPH algorithm for Face Recognition

5 PROPOSED WORK AND ALGORITHM

- Pseudocode for the proposed system

Input: Live video with criminal face visible.

Output: Criminal identification in the form of the excel sheet.

1. Capture the image.
2. Convert the image into Grayscale.
3. Apply CascadeClassifier function for face detection to obtain Haar-features.
4. Apply LBPH algorithm for face recognition on Haar-features to obtain the histogram of the image.
5. If for Enrollment/Registration then Stored in the dataset.
Else if for Verification then Post Processing.

LBPH ALGORITHM FOR FACE RECOGNITION

LBPH is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. The steps involved in LBPH algorithm are:

1. Parameters:

The LBPH uses 4 parameters:

- i. Radius: the radius is used to build the circular local binary pattern and represents around the central pixel. It is usually set to 1.
- ii. Neighbors: the number of sample points to built the circular local binary pattern. It is usually set to 8.
- iii. Grid X: the number of cells in the horizontal direction. It is usually set to 8.
- iv. Grid Y: the number of cells in the vertical direction. It is usually set to 8.

2. Training the algorithm:

To do this we need to use a dataset with the facial images of the people we want to recognize. We need to also set an ID (it may be a number or the name of the person) for each image, so the algorithm will use this information to recognize an input image and give you an output. Images of the same person must have the same ID.

3. Applying the LBP operation:

The first computational step of the LBPH is to create an intermediate image that describes the original image in a better way, by highlighting the facial characteristics. The algorithm uses a concept of a sliding window based on the parameter's radius and neighbors.

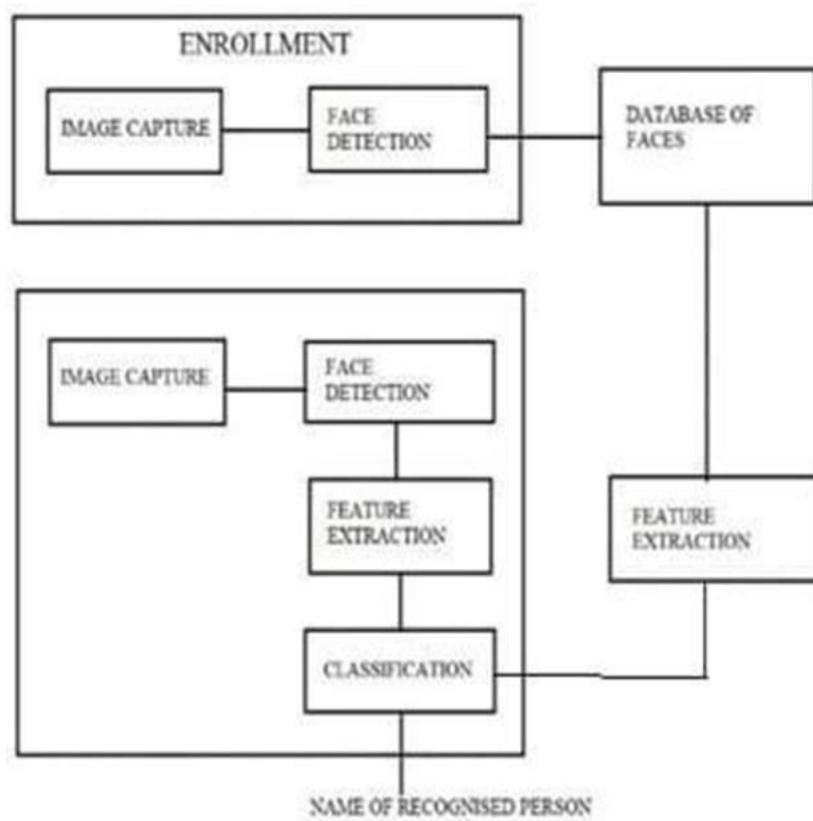


FIG 1: SYSTEM ARCHITECTURE

6 METHODOLOGIES

implementation

NumPy:

NumPy is an open-source library available in Python, which helps in mathematical, scientific, engineering, and data science programming. It is a very useful library to perform mathematical and statistical operations in Python. It works perfectly for multi-dimensional arrays and matrix multiplication. It is easy to integrate with C/C++ and Fortran. For any scientific project, NumPy is the tool to know. It has been built to work with the N-dimensional array, linear algebra, random number, Fourier transform, etc.

OpenCV:

OpenCV (Open-source computer vision) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by willow garage then Itseez (which was later acquired by Intel). The library is cross platform and free for use under the open-source BSD license. OpenCV supports some models from deep learning frameworks like TensorFlow, Torch, PyTorch (after converting to an ONNX

model) and Caffe according to a defined list of supported layers. It promotes Open Vision Capsules, which is a portable format, compatible with all other formats.

Tkinter:

Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.

Creating a GUI application using Tkinter is an easy task. All you need to do is perform the following steps –

1. Import the *Tkinter* module.
2. Create the GUI application main window.
3. Add one or more of the above-mentioned widgets to the GUI application.
4. Enter the main event loop to take action against each event triggered by the user.

Pandas:

Pandas is an open-source Python Library providing high-performance data manipulation and analysis tool using its powerful data structures. The name Pandas is derived from the word Panel Data – an Econometrics from Multidimensional data. In 2008, developer Wes McKinney started developing pandas when in need of high performance, flexible tool for analysis of data. Prior to Pandas, Python was majorly used for data munging and preparation. It had very little contribution towards data analysis. Pandas solved this problem. Using Pandas, we can accomplish five typical steps in the processing and analysis of data, regardless of the origin of data – load, prepare, manipulate, model, and analyze. Python with Pandas is used in a wide range of fields including academic and commercial domains including finance, economics, Statistics, analytics, etc.

7 RESULTS AND DISCUSSION SCREENSHOTS



Fig 2:- home page



Fig 3: - registration page

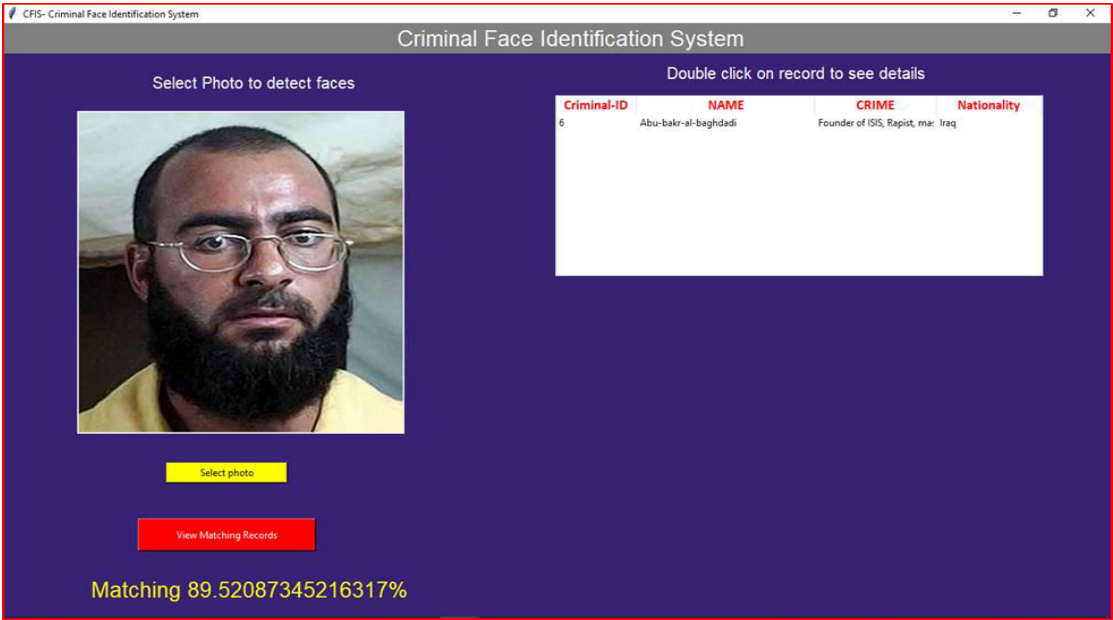


Fig 4: - detected face after input image



Name	Abu-bakr-al-baghdadi
FatherName	Awad ibrahim ali
MotherName	-
Gender	Male
Religion	Muslim
Blood Group	A+
BodyMark	-
Nationality	Iraq

Crime : Founder of ISIS, Rapist, mastermind of several attacks

Fig 4: - detail of the precited image of crime

6.CONCLUSION AND FUTURE SCOPE

CFD project aims to build a automated Criminal Face Detection system by leveraging the human ability to recall minute facial details. dedicated Criminal Face Detection System to assist in facial detection of criminals rather police technicians have to go through to different pictures of criminals and manually slice each picture to generate images, this will usually lead to the generation of low resolution and blurred images. This system is aimed to identify the criminals in any investigation department.

Future Scope

For the future work, efforts can be made to additional features like whenever an unknown person is recognized his images are stored in the dataset and system alert (voice alert) can be included if an intruder is detected

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