SMART SURVEILLANCE CAM USING FACE RECONGITION ALOGRITHM

P. Ram Kumar[1], M. Surendar[2], T. Udhaya Kumar[3], Mr. D. Murugesan[4]

[1,2,3]Student, Department of ECE, Valliammai Engineering College, Tamilnadu India.
[4]ASST Professor, Department of ECE, Valliammai Engineering College, Tamilnadu, India.

Abstract - *Face recognition has been a major milestone in image processing applications. CCTV is now a days present in every households, streets and industries, still it is a tedious process to detect a person from the footage, thus it limits the efficiency of the security, in Order to overcome these limitations, here we use this face recognition algorithm to compare a live video stream with the uploaded photo from the database continuously , therefore when the particular object, i.e, when the person is found, instantly alert is sent, when this is done on a CCTV. Surveillance camera, especially those at airports and other public places can really be the best tool to find lost people, and other wanted personalities. The major problem in current systems is detection of more than one face, which we overcome to an extent in this project.*

Key Words: feature extraction**,** face recognition, face detection, live stream.

1. INTRODUCTION:

Identifying someone with their presence in front of a surveillance camera Though this marks a milestone in itself as far as facial recognition technology is concerned; what caught my eye was the use of face id in the sniper software -termed killer bots as presented at the United Nations body on autonomous weapons. It uses face identification technology to select and kill human targets. Face recognition deals with Computer Vision a discipline of Artificial Intelligence and uses techniques of image processing and deep learning. Face recognition algorithms can be further classified based on whether they are used on 2D or 3D images or on finding faces in motion, like in a video. A facial recognition system is a technology capable of identifying or verifying a person from a digital image or a video frame from a video source. There are multiple methods in which facial recognition systems work, but in general, they work by comparing selected facial features from given image with faces within a database. It is also described as a Biometric Artificial Intelligence based application that can uniquely identify a person by analysing patterns based on the person's facial textures and shape. Here the human faces are detected and recognized using human faces by a webcam. Which is then compared with the prestored images in the databases which eventually can identify people. This can be efficiently used in searching and identifying missing persons as well as criminals or so searched by the government.

2. LITERATURE REVIEW:

[1] “Face detection and tracking using live video acquisition in cctv and webcam”by Dhanar intan and Kamal amin at ICITISEE 2016.

Live video acquisition to detect human presence through cctv and webcam by comparing facial features. System fails when more than one faces are found within 300 cm zone.Existing system fails when used in public places as it misses when more than one face is detected. Need for large database storage. Access to database is not in a proper design. Not so simple to be used at residences

[2] Vahid Kazemi and Josephine Sullivan KTH, Royal Institute of Technology Computer Vision and Active Perception Lab Teknikringen 14, Stockholm, Sweden: “One Millisecond Face Alignment with an Ensemble of Regression Trees “, 2014 IEEE Conference on Computer

This paper addresses the problem of Face Alignment for a single image. We show how an ensemble of regression trees can be used to estimate the face’s landmark positions directly from a sparse subset of pixel intensities, achieving super-real-time performance with high quality predictions. We present a general frame work based on gradient boosting for learning an ensemble of regression trees that optimizes the sum of square error loss and naturally handles missing or partially labelled data. We show how using appropriate priors exploiting the structure of image data helps with efficient feature selection. Different regularization strategies and its importance to combat overfitting are also investigated. In addition, we analyse the effect of the quantity of training data on the accuracy of the predictions and explore the effect of data augmentation using

synthesized data.

3. WORKING METHOD:

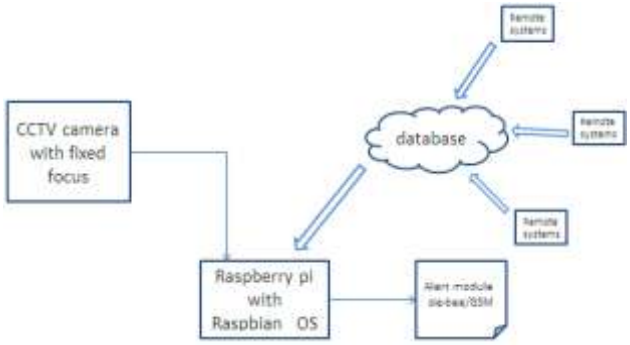
- A cctv camera with fixed focus is connected to a pc
- Along with live video stream from cctv, image from database is fed to the raspberry pi.
- Comparing with the facial features from database and video stream , the person is identified
- Based on the person identified, an alert is sent to required personnel via zigbee/gsm module.

The live stream from the camera is divided into frames in which the human face, if present is detected, and converted into 56x56 pixels with whatever may be the original size is, the same type of cropping and resizing is done with the image from the database, thus both are almost of equal format to be compared , also as we have used fixed focus, we could easily detect faces at every moment. The obtained data in the raspberry pi is then compared based on the few selected facial features which can be able to separate and identify different human faces. Based on the matching between the database image and data processed from live stream, the required person is identified and an alert is sent to the programmed destination via gsm module. Thus the process simplifies searching of missing and searched persons.

4. PROPOSED SYSTEM:

The video stream from the lens focused generic cam is sent to the processor which divides the frames , extract facial features compares with the images stored .If both matches the alert module is triggered This process is to be done in the most simplified way to be affordable and feasible for residential applications as well as with the efficiency that can be useful at wide range of public places like railway stations etc., the lens focuses every particular individual crossing the camera with best possible accuracy so that it assists easy detection and recognition of faces at a particular distance from the camera. This data is then sent to be processed by Raspberry pi 3B+ system powered by Raspbian operating system, which is preferred due to its compact size and powerful processor to support image processing without any discrepancies. Also here we use generic pi camera for surveillance for compactness, stability and clarity of CCTV stream, also a module is provided for entering images of persons who is to be searched, thus the same kind of face detection and framing is done at the images in order to assist comparison, finally based on the output of the comparison, the alert module through GSM is enabled to alert the programmed user.

5. BLOCK DIAGRAM:



6. RASPBERRY PI 3B+

Raspberry pi is a pocket sized computer that is capable of peforming all modern programming languages like python , java, etc. it also comprises of several different ports which includes 16 general purpose input output pins, hdmi, usb ports etc, Some of the important features are ARM Cortex-A53 1.4GHz processor with Quad core 64-bit processor clocked at 1.4GHz.

1GB LPDDR2 SRAM for faster acces of data.

Dualband 2.4GHz, 5GHz WLAN- fast connect.

Bluetooth 4.2/BLE to connect any BLE device.

High speed ethernet up to 300Mb per second.

Power-over-Ethernet capability (via a separate PoE HAT).

7. CAMERA SPECIFICATION:

Generic camera ver. 1.3- which has increased quality of image with a smaller camera size that cam be easily fit to the raspberry pi. 5 megapixels, which is quite enough for perfect face detection without needing much storage. Video Camera Module Board, capable of transferring the video files to the raspberry system. 1080p 720p recording size that can give frames for face recognition.

8. GSM MODULE:

The SIM card mounted GSM modem upon receiving digit command by SMS from any cell phone send that data to the MC through serial communication. While the program is executed, the GSM modem receives command 'STOP' to develop an output at the MC, the contact point of which are used to disable the ignition switch.

9. CONCLUSION:

The results of the project concludes the simple use of face recognition from residential cctv. It has enabled Remote access to the database. Fixed focus lens in cctv cam avoids the neglection of multiple faces in a video stream at any moment. Thus it ensures the detection of missed people and wanted personalities to a greater extent. With more compact and feasible technology

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