



Hybrid Approach to Detect Face in an Organisation

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Abstract:

In recent years we can see face recognition as an emerging technology. Where these technology can be embedded in various application for recognition of people. Hence we have developed a realtime; GUI based automatic Face detection and recognition system using openCv. It is used to fetch the information of the client .We are considering every client as an object and when an object entered particular place ULTRASONIC sensor will detect the object and call the desktop application for identification of the client With the help of client id from the database the application will fetch the information and alert user . If the detected person is not in the trained set of images then application suggest adding the user details to the program.

Keywords: Face recognition, GUI-Graphical User Interface, OpenCV, ULTRASONIC Sensor, LBPH-Local Binary Pattern Histogram, HAAR CASCADES, HTA-HTML Application.

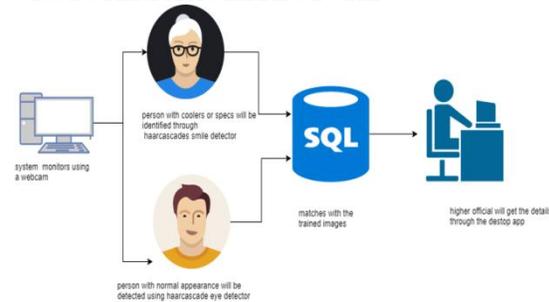
I. INTRODUCTION

Even though there is a lot of improvement in the technology human brain is not a computer to store various bytes of data .For a corporate person it is impossible to remember the every client face and their details. If an application used to do this all with fully automated things the users will be happy with it. .Before client entering into a room of higher official his face will be captured by the security camera and then our application tries to the match with the trained set of images stored in the personal computer of the user .For each user there will be a id .With the help of the id details of user will be alerted into the user system .One thing we have to do we have to train 20 sample images for each client and we have to upload the details of the client to the database .Then we have to train the entire images once again. Ultrasonic Sensor is used for object detection once the object is detected the application will be called recognition phase will be Continued. The face recognition and detection part is written in real time computer vision library called openCV. Python programming language is used for coding in openCV. In openCV for recognition and detection of face we are mainly using two traditional algorithm for the entire process. The LBPH and Fisherfaces algorithms are being used for good results. For creating User Interface of application we are using HTA And calling batch files for performing the required operations Such as upload new client details, training the dataset's.

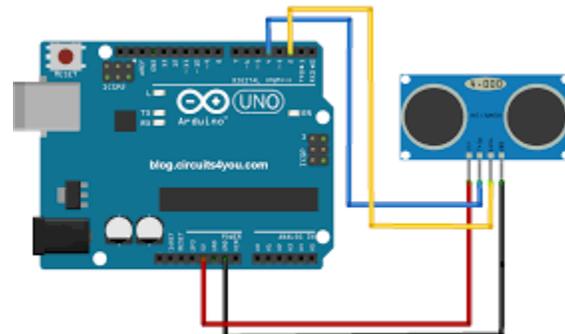
II. RELATED WORKS:

Nowadays in many ways image processing technology is useful for human there are some useful system built .In paper [1] a system for Automated attendance monitoring is developed using LBPH algorithm alone sometime the accuracy may not be good .In order to reduce this problem we are using HAAR CASCADES algorithm also to improve the accuracy rate. Currently no such application is in existence similar to the proposed solution .Since proposed application is fully automated

it won't affect the regular work of user.

II.PROPOSED SYSTEM:**3.1.SYSTEM ARCHITECTURE:****Figure.1. System architecture:****3.2. ULTRASONIC SENSOR WORK:**

Ultrasonic sensor is a sensor able to detect the presence of nearby objects without any physical contact. We are using one of the ultrasonic sensor called ultrasonic sensor. An ultrasonic sensor is a sensor able to detect the presence of nearby objects without any physical contact. Ultrasonic sensor is connected to the Arduino board .Figure 3.3.1 shows the pin configuration of ultrasonic sensor with the Arduino board.

**Figure.2. Ultrasonic sensor work**

Whenever an object interface the path of ultrasonic sensor the Arduino will generate the output to the mentioned port and pause the working for the next ten second.

3.3. ALGORITHMS USED:

3.3.1. HAAR CASCADES:

We have used HAAR cascades algorithm [2] for detection of faces in an image. It is one of the successful algorithm to detect and identify the face in a given image. This algorithm works based on the intensity values that are collected from the image. Usually eyes will have higher intensity values than other parts of the face .Hence using this comparison of intensity values it detects face in the given image.

Three techniques are used by the algorithm

1. It checks lower part of the image values have less intensity than the current area.



2. It checks for the upper part of image values are lesser than the area under comparison.



3. Third approach in the selected area it checks whether the intermediate area have less intensity values compared to the right and left part of the selected area.

3.3.2. LBPH:

Input image will be divided into cells each of 16*16. For each pixel in a cell, compare the pixel to each of its 8 neighbors (on its left-top, left-middle, left-bottom, right-top, etc.). Follow the pixels along a circle, i.e. clockwise or counter-clockwise

A more formal description of the LBP operator can be given as:

$$LBP(x_c, y_c) = \sum_{p=0}^{P-1} 2^p s(i_p - i_c)$$

, with (x_c, y_c) as central pixel with intensity i_c ; and i_n being the intensity of the neighbor pixel. S is the sign function defined as:

$$s(x) = \begin{cases} 1 & \text{if } x \geq 0 \\ 0 & \text{else} \end{cases}$$

Which produces a 8 bit binary number.

3.4. DETECTION:

When a person enters the range of ultrasonic sensor sense the object, the image of the object would be passed to HAAR cascades algorithm if the face in the image is not detected in HAAR cascades algorithm then the respective image is passed to smile detector algorithm and then image is detected.

3.5. TRAINING:

With the help of the HAAR cascades algorithm the images that are collected which is present inside the dataset directory are passed to the algorithm. This algorithm crops the boundaries of

the face that are present in the images. This algorithm returns a collection of images which consist of only faces are trained to the LPBFaceRecogniser object. The trained dataset are stored in the form of YML file format this file stores the features that are extracted from the trained set of images. These YML files has a set of features which helps to identify the image of the person who enter the range of ultrasonic sensor. If a face is not detected in HAAR Cascades eye detector image sample will be forwarded to HAAR Cascades Smile detector algorithm and the training process will be continued.

3.6: CLASSIFICATION:

The trained YML file will be passes to the recognizer Recognizer will predict whether the image is trained one or not and it will fetch the details from the database help of the id of the client.

3.7: DESKTOP APPLICATION OVERVIEW:

Using this desktop application the virtual environment is set up and all the dependencies needed are automatically downloaded and they are stored to a particular folder. Once the desktop application is setup then the user need not to worry about the supporting packages that are needed to run the files. The desktop application is created using HTA and link will be present in the application , once the user needs the dependencies then user needs to make a click if the supporting packages are not available. Once supporting packages are downloaded they are installed at a particular folder and all these works are automated using batch files. These are files which are used to automate commands in the command prompt rather than directly used by the user. Using these batch files the virtual environment is setup. Then these separate batch files for identification, training and classification are used to run the appropriate files automatically with just a click. The Batch files are executed through the HTA application .In HTA applications simple buttons are created and they are linked to these batch files. Finally when the end user click the button all other functions are automated hence based on the type of batch file run respective actions are taken. The output produced by the command prompt after executing the files are copied to the specified text file which are specified in the batch file. Once the output are redirected to the particular file, they are accessed from the HTA application and the details of the detected person or client are displayed in the desktop application Once a person is detected the application ask whether to continue or to quit the application. Depends upon the user response the application will perform. The application will pop up an alert if any person is detected and the details of the person will be there in the alert.

IV. RESULTS

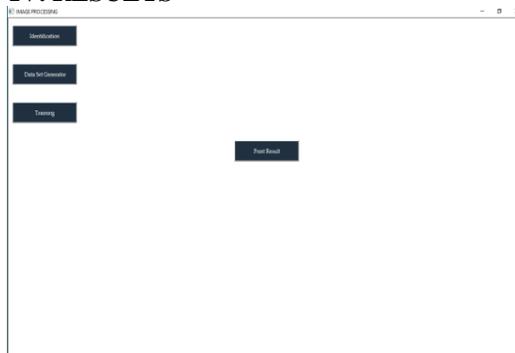


Figure.3. Application



Figure.4. Training

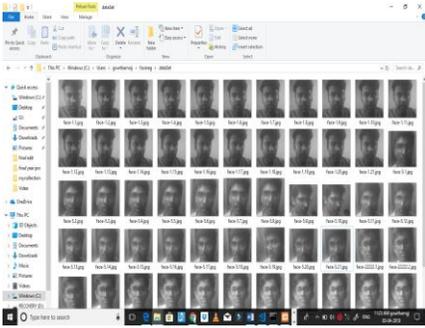


Figure.5. Dataset

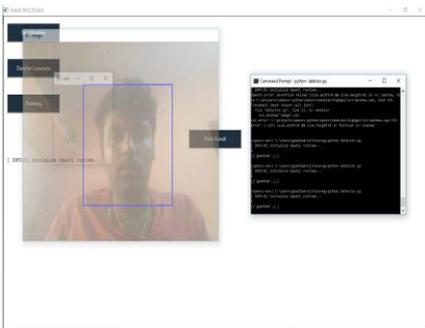


Figure.6. Detection

V. CONCLUSION:

This application will be very much useful for industry peoples to know about client without searching their name in excels sheet or something like that.

VI. REFERENCES:

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- [2]. R. Padilla-Evaluation of HAAR Cascade Classifiers Designed for Face Detection
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- [4]. OpenCV usage documentation <http://docs.opencv.org>