

Smart Attendance Marking Using Face Recognition

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Abstract- In the era of rapidly increasing involvement of technology in human lives, it has become virtue to be smart and to adopt smart ways of getting things done. We have seen a lot of alterations in many basic things around us especially in education sector like the use of the audio-visual method of teaching. But there are many more traditional methods being followed and we intend to propose a smart way for one such method. The process of making attendance could be a very irrelevant and tedious work for teachers and so we intend to develop a device, powered by the concepts of Internet Of Internet and backed up by Machine Learning, that automatically detects the face of a student through the video input, recognizes it and then compares with the available data input, recognizes it and then compares with the available data and marks the attendance accordingly.

Face recognition is a biometric system that can be used to identify or verify a person from a digital image by using the facial features that are unique to each other. There are many face recognition algorithms available and of them, according to our requirements, the best suitable one is selected and applied to the IOT devices. This device will be equipped with a face recognition camera that collects the raw data through the environment in the form of an image of a video and transfers to the processor end for further evaluation of the input.

I. INTRODUCTION

Human identification is a process to identify a person based on one or more unique features of that person. Many varieties of personal verification methods are available in market. In many of the cases we use password for identifying person. But the usage of this method leads to forgery, theft, and lapses in the user's memory. For these reasons, we are focusing on verifying a person through his/her unique biometric features [1].

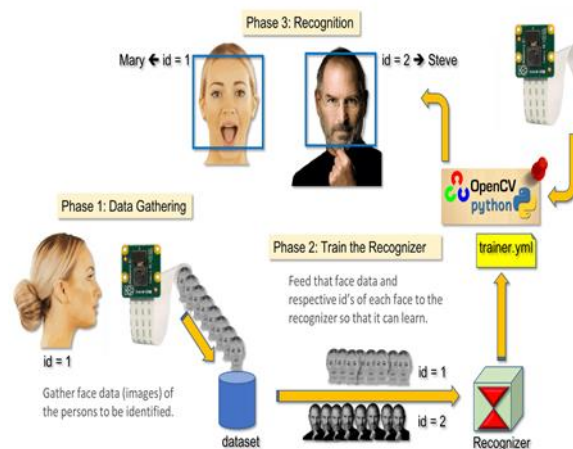


Fig: Block Diagram

These features include face detection, iris, fingerprint, and retina to identify the person with his unique biological feature [2]. Many years ago, face recognition was one of the hardest in Artificial Intelligence (AI) technique. But through a series of success in recent years, it is now not only technically feasible but also economically practical. In short, we can say that nowadays face recognition is a popular identification technology which has numerous commercial and law enforcement applications. In recent years, application of image recognition in different parts of our life has increased many-fold. A foolproof security system solution which includes the sub-system such as surveillance CCTV, video management and wireless backbone has been developed by A. Mike et al [3]. This system can only identify the person within a small amount of area covered by CCTV cameras, because of low quality video. To identify the person standing, we need to stand in front of the video where intrusion took place. In Educational institutions posting attendance has also became more easily using face recognition.

Due to usage of face recognition in several authorized centers like ATM's and BANK's lot of problems like robbery, criminal cases wiped away [4]. Besides, face

recognition technique has also become a useful one in counting the moving people and then using the chromatic feature to locate the people's face [5].

Using of personal component analysis (PCA) in face recognition make attendance more feasible for student. It also gives clear information about the attendance of student by maintaining check-in and check-out times for the faculty, so that they can monitor them properly [6]. Medical centers and Hospitals find face recognition more useful. In many cases hospitals receive patients who are unconscious. Facial recognition provides quicker and effective information of the patients so that treating a patient can be accelerated. Even, to keep the track of newborn baby face recognition can be used [7]. Goods kept in the inventory of an industry having an image recognition inventory management system are safer than the conventional approach [8].

II. DESIGN PROCESS

The design of the proposed system is used for face recognition. There are 3 major steps in implementing the process.

A. Gathering the faces dataset

There are three methods in which we can gather dataset they are:

Method 1: Creating our own custom face recognition dataset from the camera module. This is done through a specific well designed code.

Method 2: Downloading face images programmatically. API (Application Programming Interface) plays a very important role in this method. API lists a bunch of operations that developers can use, along with a description of what they do.

Method 3: Manual Collection of face images.

B. Computing the face recognition

Beginning with capturing input frames from the Raspberry Pi, our workflow consists of detecting

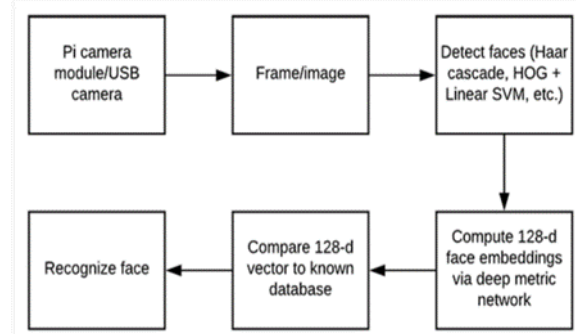


Fig: Steps used for Face Recognition

C. Recognize faces in video stream and marking the attendance

This can be achieved through a pi camera. Now coming to recognition, it must be done only with Raspberry Pi. We have got to be careful not to overload the Raspberry Pi's limited memory. The face detected in the input video stream is checked for matches with the dataset using a voting system to determine whose face it most likely is. This by checking which person in the dataset has the most matches. Then the rectangles are drawn surrounding each face along with the predicted name of the person simultaneously, the attendance file will be saved for the corresponding recognized name.

III. RESULTS

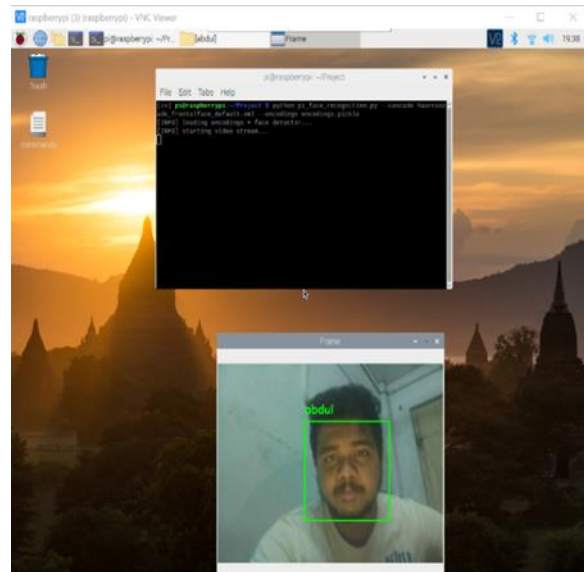


Fig: Output images of a known person

Before executing the code in the python language, we should create a new folder of the saved database and if the image is already present in the saved database then the person's name appear with a rectangular frame and if the persons data is not present in the database then it displays the person as unknown data. The following images suggest the posting of attendance.

CONCLUSION AND FUTURE SCOPE

Python is used in this system for its open-source library facility. The open-source library we used is Open CV which mainly aims to process real-time computer vision. The still image which is a python library for processing multidimensional array is used to process the still image faster. The system has a storage management system that is intended to store the data of the persons of interest. SQLite, a popular database management system is used for data management purpose. The system is very helpful and efficient because there is no background effect for recognizing the person. It can recognize a person even though the environment and background changes. And it works satisfactorily in different lighting conditions. Moreover, the system is fast enough to process four frames per second.

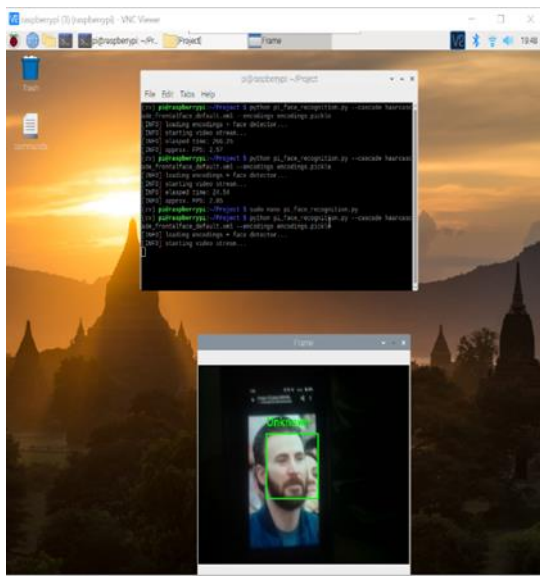


Fig: Output images of an unknown person

So, it can be integrated with any system to enhance automation, effectiveness, and user-friendliness of that system. The attendance marking system in this

research work uses the facial recognition method. This can be employed in educational institutions and places of work to record their presence and maintain their data. Another use of this result is the automated door opening. When samples of the person requesting to enter are already stored in the database by applying the result of face recognition to some basic machines one can develop an automated door.

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