

COUNTENANCERECOGNITION SYSTEM FOR ATTENDANCE MANAGEMENT

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ABSTRACT

Facial Recognition technique plays a crucial role in today's world. Traditionally, attendance is taken manually by using an attendance sheet given by the school in the school or office, which may be a time-consuming event. In this, a model is proposed for face recognition to spot an individual and mark their attendance. This process mainly works with three parts: 1] Face Detection 2] Face Recognition to spot a selected person and 3] Mark Attendance 4] Send email & generate defaulter list. Within the first part, it'll detect the face of an individual, then within the second part it'll recognize the face of that person with a known database, and within the third part it'll mark the attendance of that specific person with the time and in the last part it will send an email to the absent student's parent and generate a monthly defaulter list. The proposed approach works with the OpenCV and Convolutional Neural Network algorithm. CNN will take an image, then assign importance to various aspects/objects in the image, and be able to differentiate one image from the other. So basically, the system may be a replacement of a traditional time-consuming method, and it works almost perfectly with no errors.

Keywords: Face Recognition, Face Detection, Image Processing, Raspberry Pi.

I. INTRODUCTION

From the invention of phones to AI, technology has come a long way, and we have accepted technology with open arms for easing our tasks at hand. In a company or in a school, it is not easy to keep track of whether all their employees or students are arriving on time or not. Traditional attendance system requires consistent human supervision, and it is also a time-consuming process. Manually calling the person and then marking their attendance is such a lengthy process which takes much effort and time. The best solution for this problem or for time saving is biometric technologies. A few biometric technologies are sparking our imagination quite like the fingerprint scanner, facial recognition. Biometrics are used to detect and recognize a person using a set of recognizable and verifiable data unique and specific to that person. Biometrics provides accuracy, and it authenticates a person directly within less time. Face recognition is the task of identifying an already detected object as a known or unknown face, or we can say that facial recognition is the task of identifying or detecting the identity of a person using their faces. This method focuses on capturing, analyzing and comparing patterns based on the person's facial details. The face detection process is an important method in detecting and locating human faces in images. The face capture process transforms analog information (a face information) into a set of digital information based on a person's facial features. And the face match process verifies if two faces (Captured image and Stored image) belong to the same person or not. Face recognition is easy to use and implement, and there is no physical interaction with the end user. A method designed in this research is simply captures the image of a person with the help of a camera module, and after detecting the face, it will compare the image with already stored database, and if the image is matched with the stored image, then it will record the attendance of that specific person.

II. METHODOLOGY

The prime objective of this paper is to mark attendance without any efforts to save time. The developed system provides help in conditions like covid-19 because it avoids direct contact of a person with an object. In our system we focus on identification of face using a camera module. The basic structure of this proposed system is to detect an image, train the image, compare the image with a known database and mark attendance. In this proposed system, we used CNN algorithm for detection of the face. Facial recognition is a method of identifying a human face through technology. A face recognition system uses biometrics to map countenance from a captured image. It compares the information with a known database of known faces to find a match for the captured image.

Working of module: =

A] Database collection: First step of this proposed system is to collect the data for the database. It is helpful To collect the information of facial features like nose, ears, chin, etc. Etc. The proposed system takes 60 images of each person and stores it into the database.

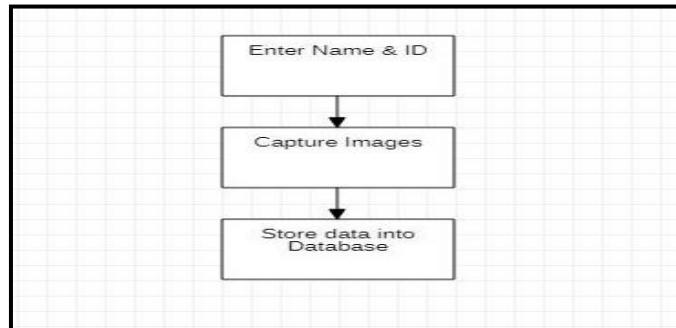


Fig 1: Database Flow

B] Algorithm Implementation:

Convolution neural network

With the help of convolutional neural networks, the achievements made in various competitions are getting much better, making it the focus of research. In order to improve the training performance of the forward BP algorithm, a good method is to reduce the number of learning parameters. This can be done with the help of convolution of the spatial relationship of the neural network. Convolutional neural network, the network structure is proposed, it minimizes the input image pretreatment. In the structure of convolution neural network, the input data is input from the initial input layer, through each layer processing, and then into the other hierarchy, each layer has a convolution kernel to obtain the most significant image characteristics. The previously mentioned obvious features like translation, rotation can be obtained by this method.

Convolution neural network basic structure

Neural network can be divided into two types, biological neural network is one of them, and artificial neural network is another kind. Here mainly introduces artificial neural network. An artificial neural network is a data model that processes picture information and is similar in structure to the synaptic connections in the brain. Neural network is composed of many neurons the output of the previous neuron can be used as the input of the next neuron. The corresponding formula is as follows:

$$h_{W,b}(x) = f(W^T x) = f\left(\sum_{i=1}^3 W_i x_i + b\right)$$

This unit is also called Logistic regression model. When many neurons are connected together, and when they were layered, the structure can now be called a neural network model. Figure 1 shows a neural network.

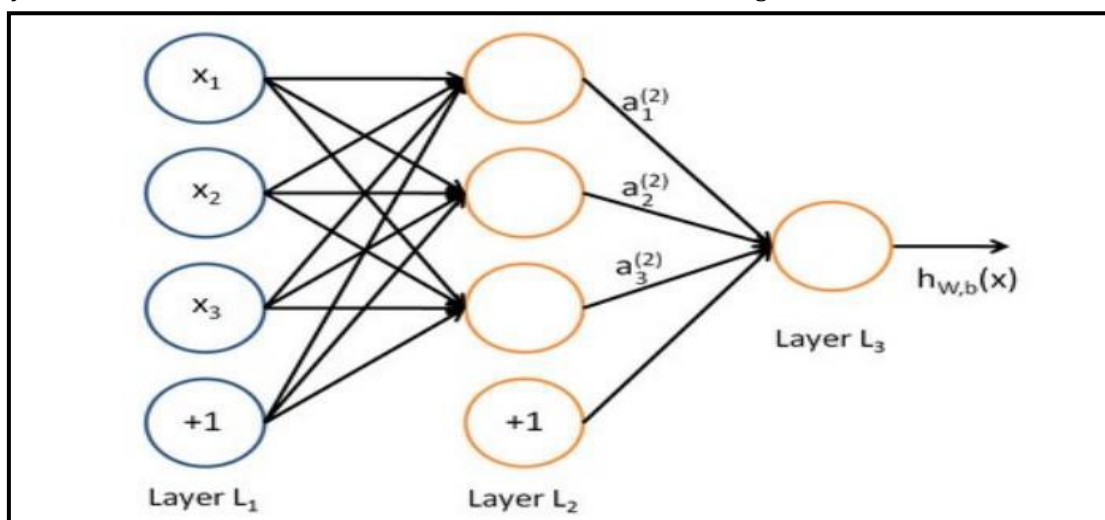


Fig 2: Neural Network

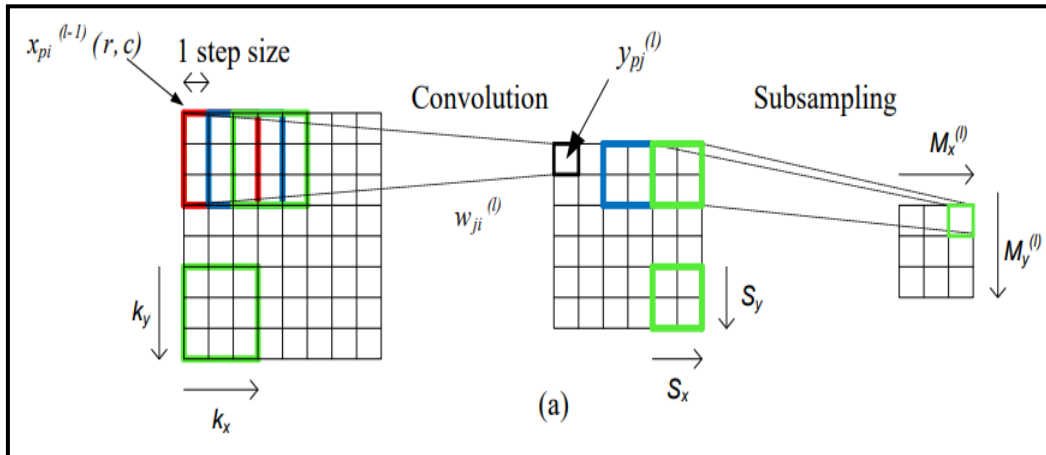


Fig 3: Convolution/Subsampling

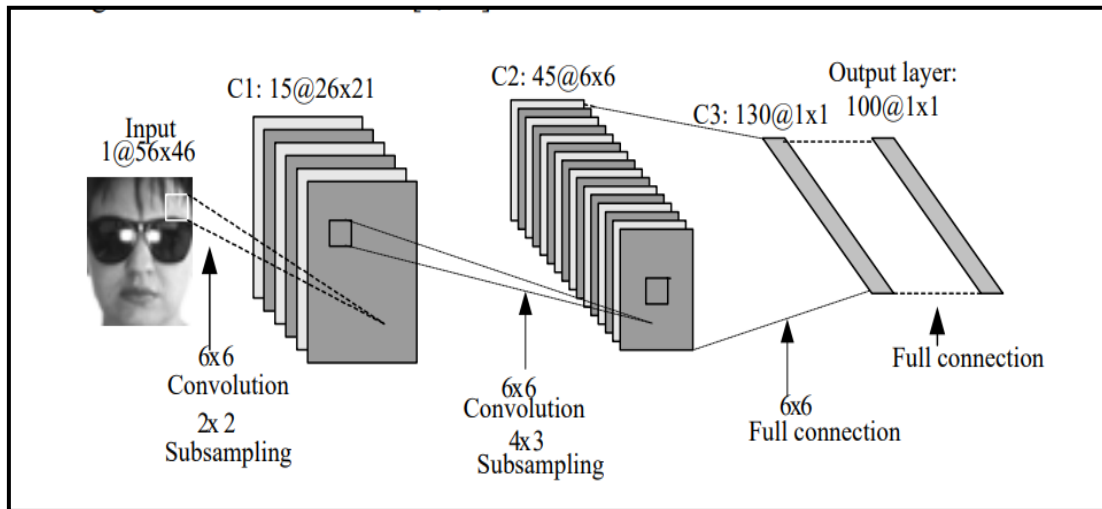


Fig 4: Real time working

C] Mark Attendance: After the successful completion of face recognition, the system will record the attendance of that person with time. The system will also generate the daily, monthly and yearly attendance record. On the screen it will show the total attendance of that person. We can also set a timer to the system so that the system can only take attendance within a particular time.

D]Send Email and Generate defaulter list: After the completion of attendance, a mail will be sent to the parents of the absent students, so there is no need to call the student's parent personally to inform them that their child is absent. The system will also generate the monthly defaulter list. It will save the teacher's time. No need to manually calculate the attendance of each and every student.

FLOWCHART OF SYSTEM :

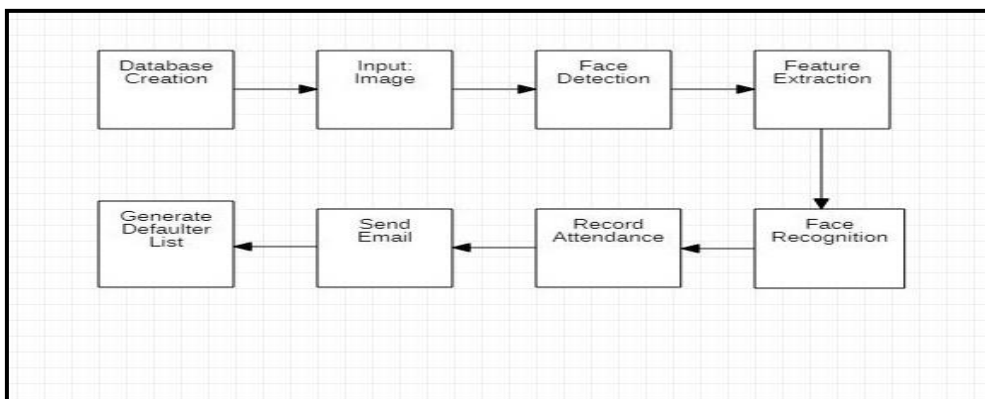


Fig 5: Block Diagram

This is the flowchart of our model. The system will create a database. After the successful completion of database, the actual working of the system is started. Whenever a person comes to record attendance, system will take his/her image as an input. After detection of the face with the help of CNN algorithm, the System will complete the feature extraction task and checks whether the captured image is matched or not with the stored database. Once the face is recognized it will record the attendance of a particular person with the time after that those people who are absent system will send an email to that person's registered mail ID, and it will generate the weekly, monthly and yearly defaulter list. There are some institutes in which this is the faculty's task to calculate every student's attendance and generate the defaulter list. This system will definitely help them to save time. Also there are some faculties who regularly call absent student's parents to inform absence of their child which is time consuming and nowadays everyone is busy so it is not always possible to receive phone call of faculty, for such conditions this system is better option once the email is sent parents can check email with their suitable time and again it will save faculty's time there is no need to call personally to parents and also no need to send email because system will automatically send the email to absent student's parent.

III. RESULT AND DISCUSSION

This Screenshots presents the system's GUI to register database and mark attendance

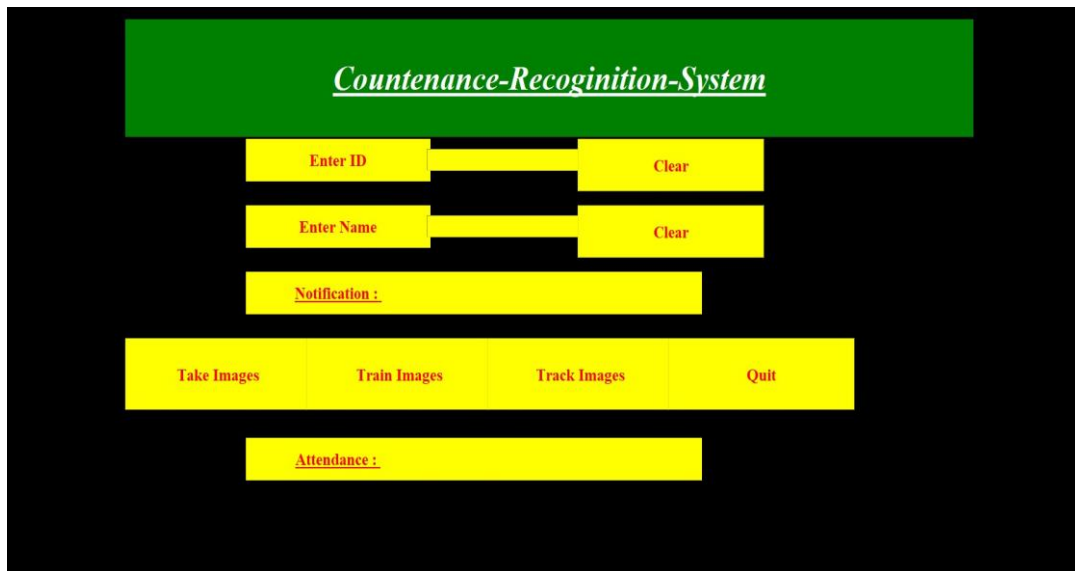


Fig 6: GUI

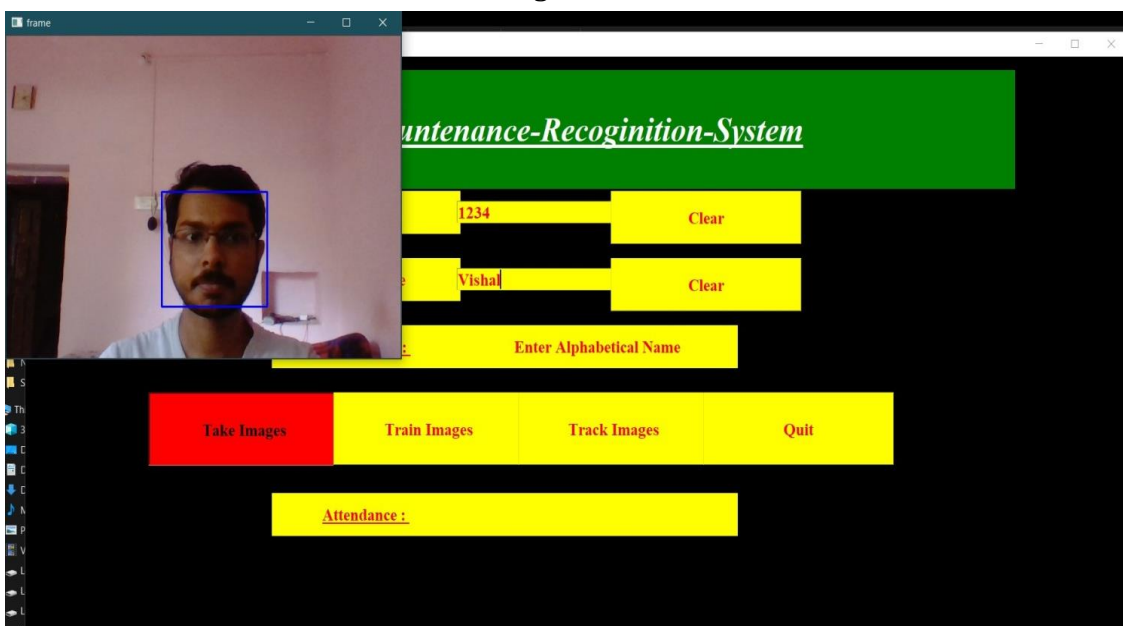


Fig 7: Face Capturing Process

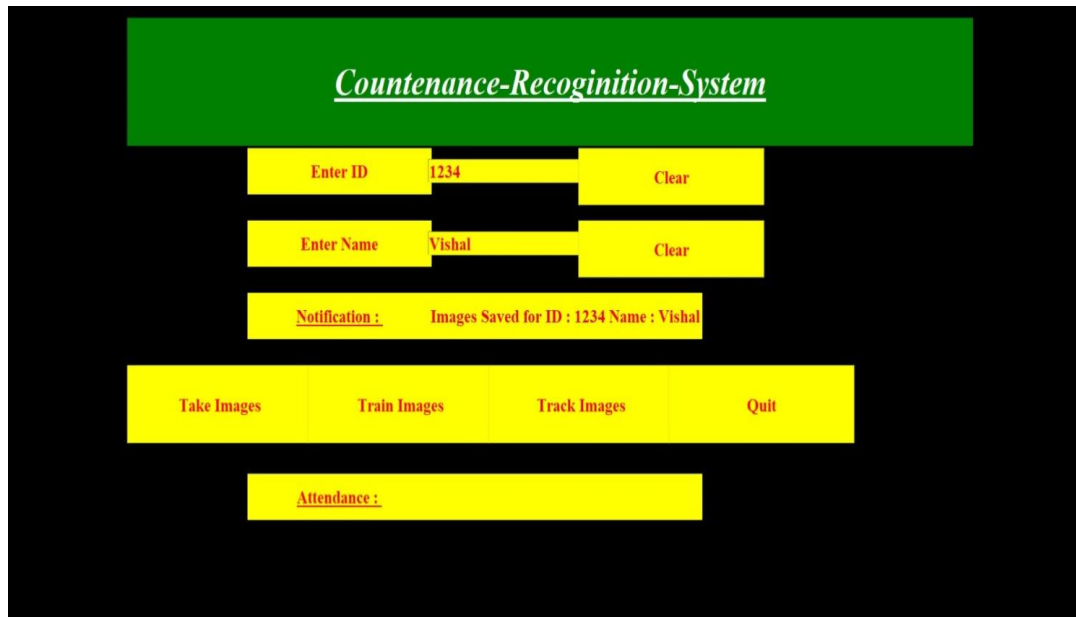


Fig 8: Image Saved Successfully

IV. CONCLUSION

A system generates correct attendance without any human interaction to provide high security or avoid fraud documentation. It reduces teachers' documentation work and required time for attendance. Using this system, teachers will give more time to teaching. The Automated Time and Attendance marking system can definitely help schools and Institutes to not waste their time on attendance. With automatic class attendance system, teachers can more accurately and without wasting time track students time in the classroom. It eliminates duplicate data entry and errors in time and attendance entries. We conclude that in this project we learn the hardware and software specification, and we also studied literature survey properly.

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