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ATTENDANCE CAPTURE SYSTEM USING FACE RECOGNITION

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ABSTRACT:

To maintain the attendance record with day to day activities is a challenging task. The conventional method of calling name of each student is time consuming and there is always a chance of proxy attendance. The following system is based on face recognition to maintain the attendance record of students. The daily attendance of students is recorded subject wise which is stored already by the administrator. As the time for corresponding subject arrives the system automatically starts taking snaps and then apply face detection and recognition technique to the given image and the recognize students are marked as present and their attendance update with corresponding time and subject id. We have used deep learning techniques to develop this system, histogram of oriented gradient method is used to detect faces in images and deep learning method is used to compute and compare feature facial of students to recognize them. Our system is capable to identify multiple faces in real time.

Keywords: OpenCV, Face Detection, Face Recognition.

1. INTRODUCTION

Every organization requires a robust and stable system to record the attendance of their students. and every organization have their own method to do so, some are taking attendance manually with a sheet of paper by calling their names during lecture hours and some have adopted biometrics system such as fingerprint, RFID card reader, Iris system to mark the attendance. The conventional method of calling the names of students manually is time consuming event. The RFID card system, each student assigns a card with their corresponding identity but there is chance of card loss or unauthorized person may misuse the card for fake attendance. While in other biometrics such as finger print, iris or voice recognition, they all have their own flaws and also they are not 100% accurate

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Vol. 20, Issue.2, 2024

Use of face recognition for the purpose of attendance marking is the smart way of attendance management system. Face recognition is more accurate and faster technique among other techniques and reduces chance of proxy attendance. Face recognition provide passive identification that is a person which is to be identified does not to need to take any action for its identity

Face recognition involves two steps, first step involves the detection of faces and second step consist of identification of those detected face images with the existing database. There are number of face detection and recognition methods introduced. Face recognition works either in form of appearance based which covers the features of whole face or feature based which covers the geometric feature like eyes, nose, eye brows, and cheeks to recognize the face

Our system uses face recognition approach to reduce the flaws of existing system with the help of machine learning, it requires a good quality camera to capture the images of students, the detection process is done by histogram of oriented gradient. And recognizing perform through deep learning. The frontend side (client side) which consist of GUI which is based on electron JS and backend side consist of logic and python (server side), an IPC (Inter Personal Communication) bridge is developed to communicate these two stacks. The images capture by the camera is sent to system for further analysis, the input image is then compared with a set of reference images of each of the student and mark their attendance.

2. LITERATURE SURVEY

Plenty of research has been conducted so far on the various available methods for implementation of an effective attendance monitoring system. These methods vary in terms of the types of input method used, the types of data processing employed and the controllers used to implement the systems. In this section looking for the various available solution with the advantages and disadvantages of each system. First system, “Attendance System Using NFC Technology with Embedded Camera on Mobile Device” (Bhise, Khichi, Korde, Lokare, 2015). Near field communication is a type of short distance wireless communication that takes place between two devices, one active and the other passive. The two devices are basically inductor coils which can respond to an electromagnetic induction. The active device is utilized to produce an electromagnetic field of a given radius and strength. Which used to implement an

International Journal of Engineering Research and Science & Technology

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Vol. 20, Issue.2, 2024

attendance system. In a school setting for example, students can be given NFC tags that are uniquely programmed with their unique identification numbers. Upon attending the classes, the lecturers bring the NFC readers and a student is required to swipe their NFC tags near the reader, say the lecturers' phone. This information is then transmitted to the school database to mark the attendance of the student. However this system is vulnerable to impersonation where one person can sign in for someone else. The other related systems that use biometrics (Fingerprint recognition RFID, etc) to identify end user are time management systems used in many colleges, institutions and schools. However, these system introduce further privacy concerns. These systems are also subject to physical damage from their users. Therefore they need additional maintenance costs. The idea proposed by us, Removes physical access from anyone to the automated system.

EXISTING SYSTEM:

Problem Statement Attendances of every student are being maintained by every school, college and university. Empirical evidences have shown that there is a significant correlation between students' attendances and their academic performances. There was also a claim stated that the students who have poor attendance records will generally link to poor retention. Therefore, faculty has to maintain proper record for the attendance. The manual attendance record system is not efficient and requires more time to arrange record and to calculate the average attendance of each student. Hence there is a requirement of a system that will solve the problem of student record arrangement and student average attendance calculation. One alternative to make student attendance system automatic is provided by facial recognition.

3. AN OVERVIEW OF PROPOSED SYSTEM

MODULES:

Capture Face Image

Capture Face Image' button to capture face is detected.

Train Model

In this Module screen train model generated with 100% accuracy and now show face to web cam.

Take Attendance

Training completed with accuracy 75% and then any time click on 'Take Attendance' to recognized student and mark attendance

Working:

International Journal of Engineering Research and Science & Technology

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Vol. 20, Issue.2, 2024

Conventional methods are still being followed to mark attendance in many schools and colleges which is a more time-consuming task. The most common conventional methods being practiced in routine lifestyle are, the student is supposed to sign the attendance sheet manually, which is passed around the classroom while the lecturer is giving the lecture, sometimes this particular approach could undoubtedly allow the students to cheat about their attendance, where a student present in the class may sign for a physically absent student. Uncommonly, this attendance sheet could easily be either misplaced or lost with/without the lecturers' knowledge. Another stricter conventional method which is more commonly used in practice is the roll call system, where the student is supposed to answer to his/her roll call made by the lecturer, sometimes this method also allows the student to cheat about their attendance by answering the roll call as present for a student who is not available in the class which is again a time-consuming task. These manual methods of taking students' attendance have been proven to be a difficult and time-consuming process. Thus, there is a need for either a semi-automated or automated attendance marking system that would eliminate all of the above-stated issues.

Face Detection

From the extracted frames, each face image needs to be segregated. For this segregation purpose, we go with the process of face region bounding box methodology usually called marking the Region of Interest using HAAR cascade classifiers and MTCNN Model available in the OpenCV and face-recognition library respectively. After segregating the frame, the first frame is taken and the face image is detected and marked. Then the second frame is taken ad the face image is detected and marked. The same process is repeated for all the available frames.

Face Recognition

The face image detected in each frame is taken and it is compared with the directory where the pre-trained face image of the student has resided. The same process is repeated for all the frames. To perform this comparison process Decision Tree Machine Learning algorithm is employed.

IMPLEMENTATION:

Many of the toolbox functions are PYTHON M-files, a series of PYTHON statements that implement specialized image

International Journal of Engineering Research and Science & Technology

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Vol. 20, Issue.2, 2024

processing algorithms. You can extend the capabilities of the Image Processing Toolbox by writing your own M-files, or by using the toolbox in combination with other toolboxes, such as the Signal Processing Toolbox and the Wavelet Toolbox. The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

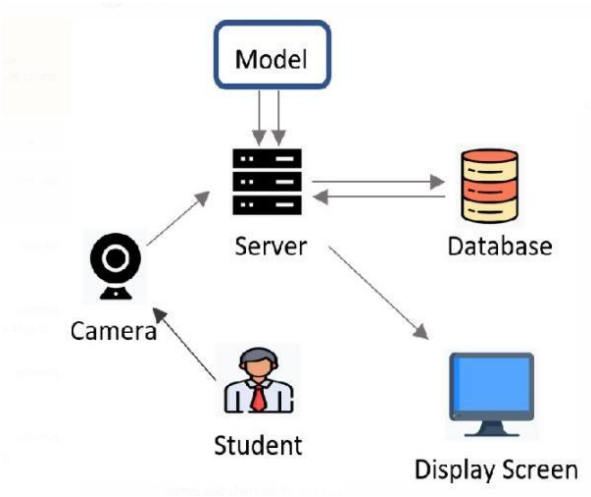


Fig.1. Architecture Diagram.

Algorithm:

1) Feature Extraction: CNN compose of multiple layers and first layer define for feature extraction and this features will be extracted from given input image dataset or any other multidimensional dataset.

2) Feature Selection: Using this layer features will be selected by applying a layer called pooling or max polling.

3) Activation module: using this module RELU will be applied on input features to remove out unimportant features and hold only relevant important features

4) Flatten: This layer will be define to convert multidimensional input features into single dimensional input array

5) Dense: This layer can be used to connect one layer to other layer to receive input features from previous layer to new layer to further filter input features in next layer to get most important features from dataset to have best prediction result

OPERATION:

To run project double click on ‘run.bat’ file to get below screen

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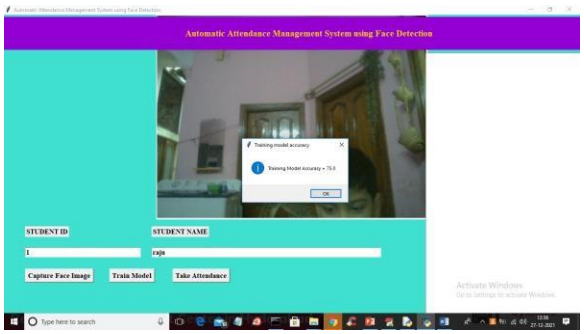
Vol. 20, Issue.2, 2024



In above screen enter student id and name and then click on 'Capture Face Image' button to capture face like below screen



In above screen face is detected and now click on 'Train Model' button to perform training like below screen



In above screen training completed with accuracy 75% and then any time click on 'Take Attendance' to recognized student and mark attendance



In above screen in text area we can see student identified as Raju. Similarly you can capture N student and take attendance.

Note: this application depend on camera clarity so identifying of student may be correctly recognized 5 times out of 10. This types of application need more refinement to build accurate model

Note: to train model at least two students must be added or registered

4. CONCLUSION

Smart attendance management system is designed to solve the issues of existing manual systems. We have used face recognition concept to mark the attendance of student and make the system better. The system performs satisfactory in different poses and variations. In future this system need be improved because these system

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Vol. 20, Issue.2, 2024

sometimes fails to recognize students from some distance, also we have some processing limitation, working with a system of high processing may result even better performance of this system

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Vol. 20, Issue.2, 2024

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