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ATTENDANCE MONITORING SYSTEM USING FACE RECOGNITION WITH TEMPERATURE SENSOR AND HAND SANITIZER

Dr. Dinesh Kumar[1], Arfa Tasneem[2], Ajay Kumar[3], Chirag Shah[4], Subramanya Udupa GR[5]

[1]DS, Associate Professor, Dept. of Telecommunication, KSIT, Bengaluru, India

[2-5]Dept. of TCE, KSIT, Bengaluru, India

Abstract: The world that we live in has been subjected to major changes since the outbreak of the COVID-19 pandemic. One of the biggest problems brought upon our generation due to this virus is the inability to go about with normal life. Fundamental aspects of our lives like going to in-person classes, attending programs and going to jobs have become impossible without a large amount of risk beinginvolved. In order to make sure educational institutes, businesses and programs can function efficiently and effectively over an internet connection, we have devised a system titled "Attendance Management System Based on Face Recognition". A conventional attendance monitoring system, the concerned teacher takes attendance manually in a classroom. In general, it is a time- consuming and very difficult task to take attendance of a huge number of students in a short period of time and involves proxy attendance. To overcome these issues, we proposed a face recognition-based student attendance monitoring system in a classroom environment. The proposed method uses the Histogram of Oriented Gradients (HOG) as features extractor, Convolutional Neural Network (CNN) as face encoding and Support Vector Machine (SVM) as a classifier. The proposed system recognizes theface in real-time using a webcam and generates attendance report automatically without any human intervention.

Keywords: Face recognition, Histogram oriented gradients.

I. INTRODUCTION

The main objective of this project is to develop face recognitionbased automated student attendance system. In order to achieve better performance, the test images and training images of this proposed approach are limited to frontal and upright facial images that consist of a single face only. The test images and training images have to be captured by using the same device to ensure no quality difference. In addition, the students have to register in the database to be recognized. The enrolment can be done on the spot through theuser-friendly interface. Background Face recognition is crucial in daily life in order to identify family, friends or someone we are familiar with. We might not perceive that several steps have actuallytaken in order to identify human faces. Human intelligence allows us to receive information and interpret the information in the recognition process. We receive information through the image projected into our eyes, by specifically retina in the form of light. Light is a form of electromagnetic waves which are radiated from a source onto an object and projected to human vision.

Robinson-Riegler, G., & Robinson-Riegler, B. (2008) mentioned thatafter visual processing done by the human visual system, we actuallyclassify shape, size, contour and the texture of the object in order to analyze the information. The analyzed information will be comparedto other representations of objects or face that exist in our memory torecognize. In fact, it is a hard challenge to build an automated systemto have the same capability as a human to recognize faces.

II. PROBLEM STATEMENT

Traditional student attendance marking technique is often facing a lot of trouble. The face recognition student attendance system emphasizes its simplicity by eliminating classical student attendance marking technique such as calling student names or checking respective identification cards. There are not only disturbing the teaching process but also causes distraction for students during exam sessions. Apart from calling names, attendancesheet is passed around the classroom during the lecture sessions. Thelecture class especially the class with a large number of students might find it difficult to have the attendance sheet being passed around the class. Thus, face recognition student attendance system is proposed in order to replace the manual signing of the presence of students which are burdensome and causes students

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get distracted inorder to sign for their attendance. Furthermore, the face recognitionbased automated student attendance system able to overcome the problem of fraudulent approach and lecturers does not have to countthe number of students several times to ensure the presence of the students. One of the difficulties of facial identification is the identification between known and unknown images. In addition, to this training process for face recognition student attendance system is slow and time-consuming. Most of the existing attendance systemsexisting in institutions & organizations are RFID and Bluetooth ID CARD attendance systems which had issues of faking and false identifications. Fingerprint systems were also used but the main flawis a lot of time to authenticate finger print. In COVID era many organizations & institutions stopped using Fingerprint Attendance System, considering COVID measures. Hence the best and speedy method available is facial recognition based attendance system.

III. LITERATURE SURVEY

This paper uses android platform to take attendance. The device's camera will be used as a sensor that will read the barcode printed on the ID cards. The updated attendance list is then uploaded to an online database and can also be saved as a file to be transferred to a PC later on. the application to run on the instructor's existing Android mobile device Besides that, to prevent data loss, an online database will be used specially to store the recorded student's attendance. The system wassuccessfully developed by following the client-server framework.There are a few paperless attendance systems that have been developed but such systems need to be equipped with either a computer or RFID reader, resulting in additional cost for hardware and its maintenance. With that in mind, we have aimedto address this issue by having a system with minimal hardware requirement and at the same time, enhancing the mobility aspectof the existing attendance systems [1]. Advantages is it uses android platform to take attendance. The devices camera will be used as a sensor that will read the barcode printed on the ID cards. The updated attendance list is then uploaded to an online databaseand can also be saved as a file to be transferred to a PC later. Thedisadvantage is the total system stops working further if the mobile location is off. If the employee forgets to get his/her android device to the work place this system will not work.

This paper presents the design methodology of a simple and high real time ZigBee - biometric system for easy and time saving attendance management using the finger prints of the employees at any organization along with the employee incoming and outgoing log maintenance. Firstly, employee's fingerprints are scanned by software and an identity number is allotted as their enrolment. During the attendance time when employees impress their fingerprints, against the scanner, the system compares the new fingerprint patterns and the connection between various points in the fingerprint with the enrolment database. But the serious problem which the paper causes is the physical damage thus causing errors. Also the biometrics involves maintenance and cost of the hardware device needed [2]. The advantages of this system is that they are highly secure with most efficient and organized security features

Classroom attendance using face detection and raspberry piRaspberry Pi is the main component in the project. [3] We will beusing USB webcam to capture photos. The algorithm needs a lotof positive images and negative images to train cascades. The advantages are the same project can be utilized for severalsecurity applications where authentication is needed to access theprivileges of the respective system. The disadvantage of this model was face recognition algorithm can be improved with respect to the utilization of resources so that the project can recognize more number of faces at a time which can make the system far better.

Web-Based Attendance Management System, in this paperat the very first, Users/Lecturers on their device will fetch the listof students of the class for which attendance is to be recorded. They have used SQLite as a local database to store the data. For the purpose of demonstration of this application, they have used the WAMP [4]. The advantages are that the proposed system is web based which will be fully responsive and the user can use it in their mobile, tablets and computers. It is trouble-free to use. It is a relatively fast approach to enter attendance Is highly reliable, approximate result from user.

The main disadvantage is that massive data storage burden. The MLtechnology used in face detection requires powerful data storage thatmay not be available to all users.

Survey on Student Attendance Management System in this paper,the system deals with the maintenance of the student's attendance. Itgenerates the attendance of the student on the basis of presence and absence in class. The staffs will be provided with the separate username & password [5]. The advantages are relatively easy to administer Can be developed in less time (compared to other data- collection methods). Cost-effective, data is centralized and accessible. It had some disadvantages they are poor image quality limits facial recognition effectiveness. Different face angles can throw off some similarities. Storing the data requires more space andprocessing of data.

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Mobile application for student attendance and mark management system. The process is developed and deployed in the cloud server. This application is also installed in the mobile devices of the users such as student, staff and parents, faculty members for accessing the student marks and attendance details. The users are divided into two groups namely student and staff. The student user can be either students or parents. The staff users are members of educational institution [6]. The advantages of using this system, the subject handlers, staffs or the authorities can verify the number of students present or absent in the class meeting sessions. This application allows the users to mark attendance through mobile devices and to keep in touch with students. The main drawback of this system is that the computer systems are not portable hence it cannot be kept anywhere to perform the task such as mark and attendance entry. The entered marks can be viewed only on the particular system if the desktop is not connected with network.
Attendance System Using Face Recognition and Class Monitoring System This system takes the attendance automatically using face recognition. However, it is difficult to estimate the attendance exactly using each result of face recognition independently because the face detection rate is not sufficiently high [7]. Advantages are attendance can be easily monitored and it is also easy to manage the entire set of data. Accessing the data is easy and doesn't require much time and the data generated can be easily transferred to many other devices and attendance tracking can be effectively done. Disadvantages are face occlusion. If a face is hidden by hair, a hat, a hand, glasses, or a scarf, it may result in a false negative. Complex background. When lots of objects are present in an image, facedetection's accuracy is reduced. Illuminations. An image might not have uniform lighting effects; part of the image may be overexposed, while another part is very dark. Again, this can contribute to false negatives.

Survey on attendance management system using face recognition this system can achieve l00% accuracy under good illumination. Under the environment of poor illumination, the accuracy is 85.9%, but the accuracy can reach more than 90% through preprocessing. When the illumination is poorer, the accuracy of the recognition decreases. [8] Some advantages are automated time tracking system Offices or work places or even just public places where the entry and exit times of employees or a person are strictly noted down will have a ready-made automated system to record the entry and exit time of each person for a given time. Disadvantages are Biased Performance There is the possibility that facial recognition systems might not be able to identify women or people of color. Some factors could lead the system in the wrong way, such as poor light, wrong camera angle, bad image or video quality, and more.

IV. METHODOLOGY

Automating the attendance process will increase the productivity of the class. To make it available for every platform we have chosen the Raspberry pi 4 for face recognition. A Webcam is associated with the Raspberry Pi module. Face identification separates faces from non-faces and those countenances that can be perceived. The main methodology involved in this module is, Initialize the camera and set an alert message to grab the attention of the students. Get user id as input. convert the image into gray scale, detect the face and Store it in database by using given input as label up to 20 frames. Initialize face recognizer. Get faces and Id's from database folder and save the trained data. Then save the trained data in xml file. The next time the trained face is recognized by the web camera, the time of attendance and temperature of that particular person is saved in a data sheet.

V. BLOCK DIAGRAM

Primarily the face of the person which is needed is taken and various training faces are taken and a separate training folder is been created in order to train the faces then different facial images mean there are changes in textural or geometric information. In order to perform face recognition, these features have to be extracted from the facial images and classified appropriately. Then the results obtained from the trained images and their feature extraction processes are stored in the database which is helpful in monitoring the attendance Viola-Jones object detection framework will be used to detect the face from the video camera recording frame. The limitation of the Viola-Jones framework is that the facial image has to be a frontal upright image, the face of the individual must point towards the camera in a video frame. Testing set and training set images are captured using a camera. There are unwanted noise and uneven lighting exists in the images. Therefore, several pre- processing steps are necessary before proceeding to feature extraction. Pre-processing steps that would be carried out include scaling of image, median filtering, conversion of color images to grayscale images and adaptive histogram equalization. The model is trained in such a way that the captured image is detected and preprocessing operations are performed to know the authenticity of the face and the attendance is updated once the face is recognized.

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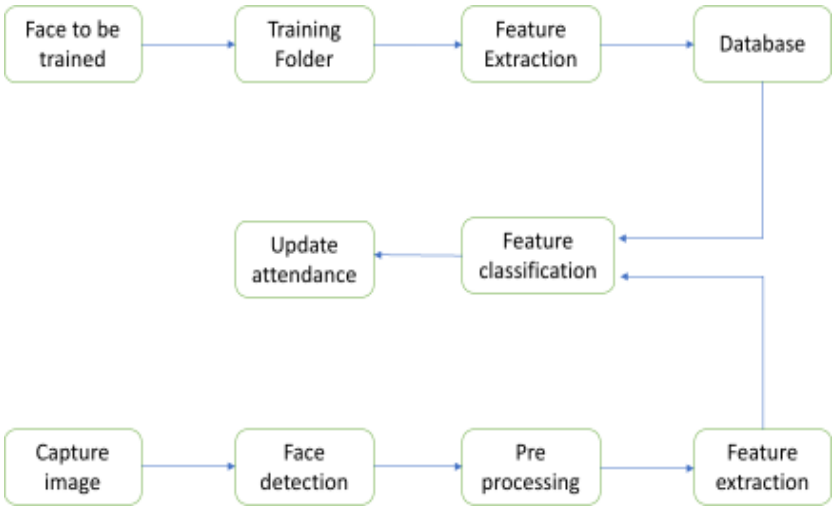

Fig 2. Working Block Diagram

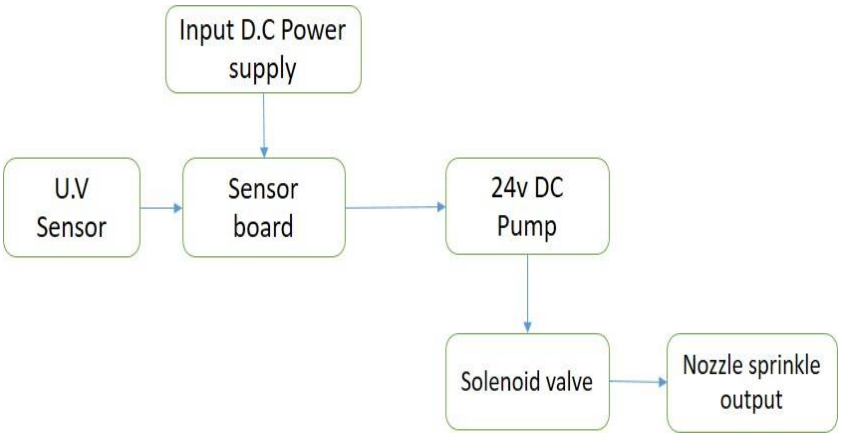

Fig 3. Block Diagram for Hand Sanitizer

CONCLUSION

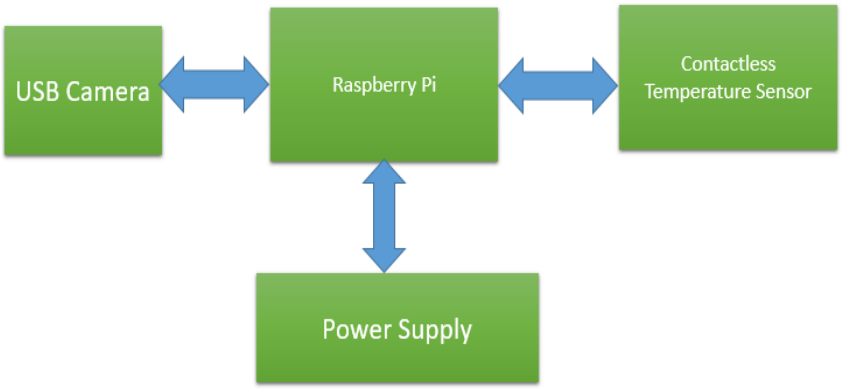

Fig 1. Hardware Block Diagram

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We came to realize that there are extensive variety of methods, for example, biometric, RFID based and so on which are tedious and non-productive. So to defeat this above framework is the better and solid arrangement from each keen of time and security. Hence we have accomplished to build up a solid and productive participation framework to actualize an image handling algorithm to identify faces in classroom and to perceive the confronts precisely to check the attendance.

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