IOT Based Class Room Attendance Management System

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***Abstract*- The conventional method in the institutions are the faculty passes an attendance sheet or make roll calls to mark attendance of the student, which sometimes disturbs discipline of the class and the sheet further goes to the admin department, which is then updated to an excel sheet. This process is quite hectic and time consuming. The proposed solution for the current problem is through automation of attendance system using face recognition. This project describes the method of detection and recognition the face in real time. Here, the camera is fixed in the classroom and which will capture the image. The faces in the images are detected and then recognized with the database after which the attendance is marked. If the attendance is marked as absent, the message about the student's absence is sent to their parents through IOT. This project can be used to replace the manual method, which takes the time consuming, difficult to maintain and manual error.**

***Index terms*- Power supply, Arduino, Camera, Cloud, Display**

INTRODUCTION

Maintaining attendance is very important in all the educational institutions. But it's the most difficult task in various institutions. Every institution has its own method of attendance marking system. Some institutions use the attendance sheet, RFID reader, keystroke or biometric fingerprint techniques. The attendance sheet method has difficulty to maintaining and it has some manual errors. RIFD reader technique consume more time because access is done one by one queue. Fingerprint biometric technique similar to RIFD reader. These techniques are manual consumes more time and it is intrusive. Face recognition is one of the least intrusive and fastest biometric technologies. Face recognition has some special characteristics that other biometrics do not have. The Robust Real-Time Face Detection technique is used to detect faces. The algorithm consists of three major methods such as integral image, Ada Boost, and cascade detection. Verification or identification can be accomplished from the camera is fixed in the classroom and which will capture the image for further process. Then face image is compared with database using face detection, face recognition methods and the attendance is marked for recognized students. If the attendance is marked as absent the message is sent to their parents through GSM. Face recognition has potential applications in security control, office automation, prevention of fraud, automatic personalization of environments, etc.

EXISTING SYSTEM

The Existing system is a manual entry for the students. Here the attendance will be carried out in the hand written registers. It will be a tedious job to maintain the record for the user. The human effort is more here. The retrieval of the information is not as easy as the records are maintained in the hand written registers. This application requires correct feed on input into the respective field. Suppose the wrong inputs are entered, the application resist to work. So the user find it difficult to use. Camera captures the images in the video streaming, while the face detection resizes the captured image up to certain point. The segmented image is compared with the present data sets and faces are recognized. Admin records the attendance if the particular student and generates the report. The result is displayed in the monitor. Raspberry Pi is the main component in the project. We will be using USB webcam to capture photos. We can access Raspberry Pi's console either by using SSH in laptop or by using Keyboard and mouse with the display device like TV connected to Pi. Firstly, the algorithm needs a lot of positive images and negative images to train the Haar cascades classifier. Positive images are images with clear faces where negative images are those without

any faces. Each feature is represented as a single value obtained from the difference of the sums of pixels in white rectangle from the sum of all pixels in the black rectangle. All different possible sizes and locations of classifier is used for calculating of plenty of features.

PROPOSED SYSTEM

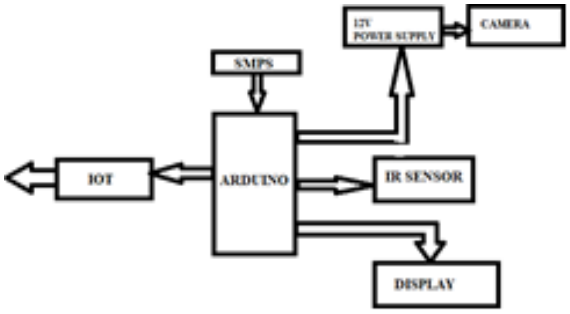

Fig.1.Block Diagram

Attendance marking is necessary to conclude and authentication of students as well as employees of organization. Many researchers have been done in this area to improve and replace the traditional system of attendance by face recognition technology. Face recognition-based attendance marking system provides several advantages over conventional method of taking attendance in class. A number of algorithms for face recognition have been proposed but most of these works deal with only single image of a face at a time. By continuously observing of face information, proposed approach can solve the problem of the face detection and improve the accuracy of face recognition. This system aims to detect the position of each student and capture an image for that particular student in the real time environment, which is latter identified. Related system that uses biometrics i.e. (fingerprint recognition, iris recognition etc.…) to identify user for attendance management system in many institutions.

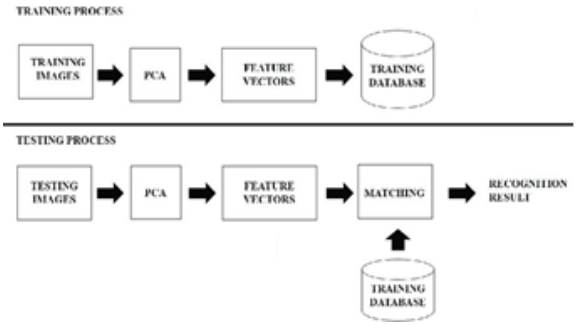

Fig.2. Proposed System

A. Creation of database: The database is created, in prior to recognition process, which constitutes of images of all students of the class under different criterions like different facial elevations or positions and different lighting conditions. Capturing the image: The next step is to continuously capture the image of the students in the classroom in order to get adjusted to proper lighting conditions and elevations.
B. Face Detection: The next part is face detection which determines the location and sizes of human faces in the captured image. The faces are detected from the captured image using Viola-Jones algorithm.
C. Face Segmentation: The main objective here is to eliminate the foreign objects other than faces, which are detected. The detected faces are segmented from the image and are pre-processed and stored for recognition. The segmented image will be converted to gray scale for efficient.
D. Face Recognition: The face recognition is the most important part of this system. It is an automatic method of identifying or verifying a person from a digital image or a video frame. It is done by comparing the extracted features from the captured image with the images that are previously stored in the predefined database. The recognition process is implemented using PCA algorithm.
E. Identification of absentees and IOT: The absentees are those who are present in the data base but not in the captured image. The data is update to the online server using IOT. The parents can view the attendance using the android mobile application.

HARDWARE DESCRIPTION

- Arduino uno.
- Camera.
- Video drive.
- Display drive.
- Display monitor.
- Cloud server.
- Client devices.
- Power supply.

ARDUINO UNO

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

Fig.3. ARDUINO UNO

Uno means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

VIDEO DRIVE

When the VCR was first introduced to the public, the television industry reacted with panic. Here was a device that would let people record programs, watch them when they felt like it as opposed to when the programming staff decided they should, and (scariest of all) skip through the commercials! But the television industry survived despite the widespread popularity of vcrs. Now the dreaded VCR is in its death throes and a more modern innovation has come along that makes recording television programs even easier. Several manufacturers have different DVR types on the market, including tivo, Motorola, RCA and Scientific Atlanta. Some companies, such as replay, are targeting PC users, offering software packages that turn your computer into a DVR. In addition, Sony, Panasonic and Toshiba produce DVD recorders that include a hard drive, allowing them to act as dvrs. Some cable companies like Time Warner, Comcast and Cox offer cable television packages that include a DVR. In this article, we'll learn all about dvrs and find out what sets them apart from other recording technologies.

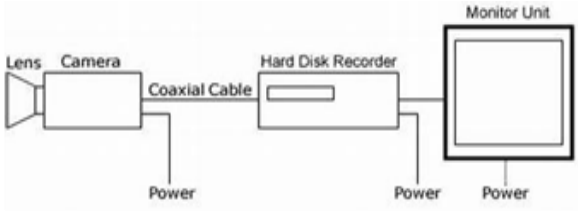

Fig.4. Video Drive

MONITOR DISPLAY TECHNOLOGY

The display provides instant feedback by showing you text and graphic images as you work or play. Most desktop displays use liquid crystal display (LCD) or cathode ray tube (CRT) technology, while nearly all portable computing devices such as laptops incorporate LCD technology. Because of their slimmer design and lower energy consumption, monitors using LCD technology (also called flat panel or flat screen displays) are replacing the venerable CRT on most desktops. Resolution refers to the number of individual dots of color, known as pixels, contained on a display. Resolution is expressed by identifying the number of pixels on the horizontal axis (rows) and the number on the vertical axis (columns), such as 800x600. Resolution is affected by a number of factors, including the size of the screen. As monitor sizes have increased over the years, display standards and resolutions have changed. In addition to the screen size, display standards and resolutions are related to something called the aspect ratio. Next, we'll discuss what an aspect ratio is and how screen size is measured.

Fig.5. Hardware Module

CONCLUSION

Student attendance system using face recognition was designed and implemented. It was tested with different face image. This study represents a facial detection and recognition model with different windows working in parallel and independently. If face recognition is to compete as a viable biometric for authentication, then a further order of improvement in recognition rates is necessary. Under controlled condition, when lighting and pose can be restricted, this may be possible. It is more likely, that future improvements will rely on making better use of video technology and employing fully 3D face models. We hope that this system provides some additional insight into the field of face recognition and contributes to the development of the field. The MATLAB code was developed and it met the design criteria and solves the problem. Future work will be focused on verifying the algorithm performance against general images and studying the required modifications to make the algorithm robust with any image. We came to realize that there are extensive varieties 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. A system generates correct attendance without any human Interfacing.

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