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IoT Based Automatic Attendance System

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***Abstract*—Now a days attendance plays a major role in classrooms. The attendance are taken and updated in the lectures logbook manually. Generally the manual work wastes the time for both students and staffs. This problem can be overcomed with the help of the proposed system. The unique characteristics of every human being are their face. In this proposed system, a face recognition technique is used for taking attendance automatically. The proposed system is initially trained with student's database which includes student name, photo and their personal details. The attendance will be taken automatically during every class hours using recognition technique and updated to the student's database. If any student is absent, the message will be automatically sent to their parents or guardian of the absentees using GSM module. The system will also update the everyday attendance database to the Head of department.**

Keywords— Face recognition, Face detection, Open CV, Raspberry pi, web camera

I. INTRODUCTION

IoT makes us to develop a system without human interference. This technology transfers data over the network. It allows objects to be sensed and controlled remotely. Now a day's attendance can be taken manually for every hour by the lectures in an educational institution. The lectures call the students name or their register number. So that, the minimal amount of time can be wasted. And also the lectures manually calculate and overall attendance of the students at the end of the semester. There is a possibility of wrong attendance while calculating overall attendance.

To avoid such problems, the proposed system is implemented on IoT for taking attendance. With the help of IoT, the attendance will be taken automatically which reduces the time and effort of the lecturer. Attendance will be taken for each and every hour in the classroom and it will be automatically updated to the student's database. The absentees are informed to the guardian through SMS. IoT based automatic attendance system will be more secure and efficient technique for taking attendance in the classroom. The login page is created for lecturer using IOT. The attendance database and attendance percentage can also be checked by the lecturer by using the IoT web page.

II. RELATED WORK

In **Face Recognition Attendance System using Raspberry Pi [1],** the attendance are taken using face recognition techniques. The main advantage of face recognition attendance system is to prevent the fake attendance system in the classrooms. The camera module is placed at the center of the classroom. The face recognition method recognizes the face and automatically verifies with the existing database present in Open CV and the attendance is taken.

In **Automatic Attendance system using Face Recognition[2],** the attendance is taken automatically with the help of the face recognition methods. This system is mainly designed to take attendance automatically during class hours. The camera captures the image of the classroom in the beginning of session. The face recognition and detection is performed. Again the image is captured at end of session. Images taken in both the sessions are compared and the attendance is updated in database.

In **Implementation of automated attendance system using face recognition[3],** proposes the attendance system using face recognition. This system can be mainly used in Employee management and Time attendance system. The camera is placed in the entry point of an organization. It can record only the entry time of a student and attendance is updated to the student's database.

In **Smart Attendance system using Face Detection on Raspberry pi[4],** proposes a face recognition attendance system with IOT. Using face recognition and detection algorithm the faces are detected and the attendance is updated to the student's database. The IOT device Raspberry pi use face recognition method for taking attendance automatically and communicates with cloud database.

In **Automated attendance using raspberry pi[5],** the camera is placed at the center of the classroom. Using the face recognition method, the system captures an image of the students in the classroom and compares it with a database already stored. If the image of a student matches it mark it as present otherwise as absent. The attendance will be automatically updated in an attendance database.

III. PROPOSED SYSTEM

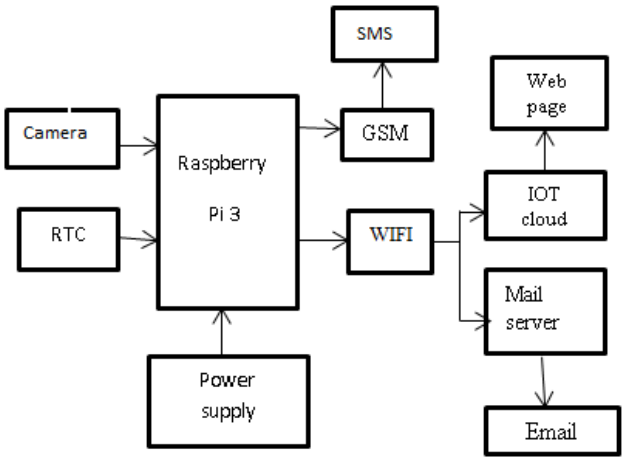


Fig. 1. Automatic Attendance system

The camera is connected with the Raspberry pi. Initially the camera captures images of students present in the classroom and detects the faces as a captured image. The detected faces are compared with the student's database stored in the IOT. When the detected faces matches with the already stored database, then the attendance is marked as present. If not, the absent is marked for the student's those who are not present inside the classroom. After a specified amount of time, the message will be sent to the parents or guardians of the absentees using GSM module. Thus the attendance is automatically updated to student's profile. The web page is created for attendance database using IOT Cloud. The attendance database can also be checked by the faculty advisor by using the web page created with their login id and password. The system will automatically update the attendance database to the Head of the Department. At the end of the semester the faculty advisor can export the student's attendance to calculate overall attendance.

IV. HARDWARE DETAILS

A. *RASBERRY PI 3*

Raspberry pi 3 is ARM based credit card sized single board computer can be used for many applications. Additionally it includes wireless LAN and Bluetooth connectivity for powerful connected designs. The speed of the Raspberry pi 3 is 10 times faster than first generation. Python language is a programming language used in Raspberry pi 3.

Here the Raspberry pi 3 can act major role. It gathers the captured image from the camera. Compare the captured image with the image stored in the database.

Fig. 2. Raspberry pi 3

B. *Camera*

A camera is a hardware device which is used for capturing a photographic images or recording a video which can be stored in a physical medium or photographic film. The image captured can be single image or a sequence of images such as videos or movies. Here the camera is used to capture the images of the students in all the directions. Send the information to the raspberry pi board.

Fig. 3. Camera

C. *RTC*

Real Time Clock (RTC) counts seconds, months, hours, date of the month, month, day of the week and year with leap year compensation up to 2100. RTC is a two wired interface. RTC is the computer clock that keeps tracks of current time.

C. *GSM (Global System for Mobile communication)*

Global System for Mobile communication (GSM) is widely used for mobile communication system. It is a mobile communication modem. GSM is an open and digital cellular technology used for transmitting mobile voice and data services at different frequency levels.

Here the GSM module is used to send the message to the parents or guardians if the student is not available in the class after specified duration of the time.

V. FLOW CHART OF THE PROPOSED SYSTEM

The flow diagram describes the entire operation carried out by the proposed system.

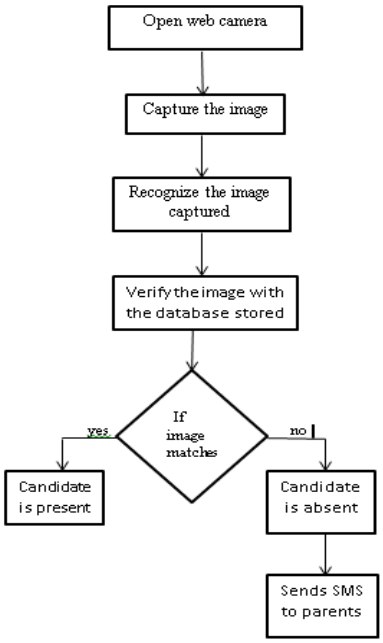


Fig. 4. Flow diagram of the proposed system

VI. EXPRIMENTAL SETUP

Fig. 5. Experimental setup of the proposed system

The different set of images of the students are trained and stored in a student's database. The captured images are compared with trained images and the attendance will be taken automatically using face recognition module.

Fig.6. Trained images

The absentees of the student's will be automatically informed to their's parents through SMS using GSM modem.

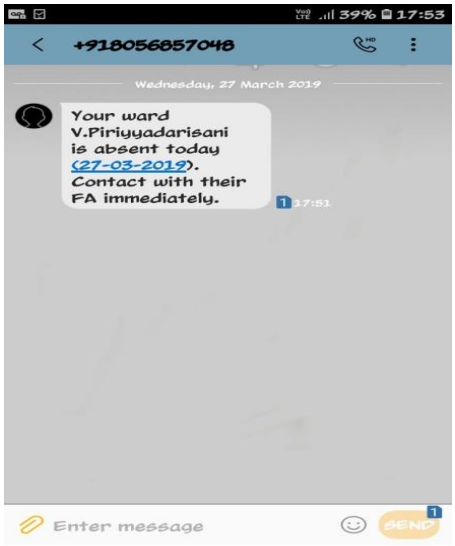


Fig.7. SMS to the parents

The updated attendance can be checked by the faculty advisor using the login page created.

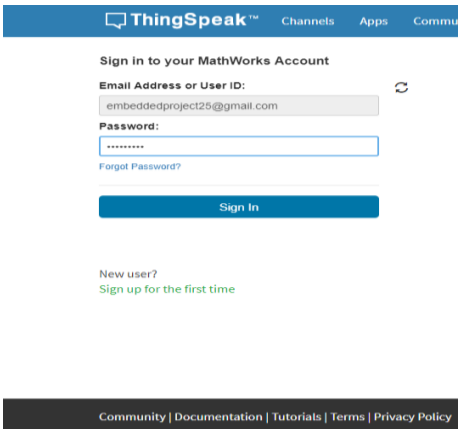
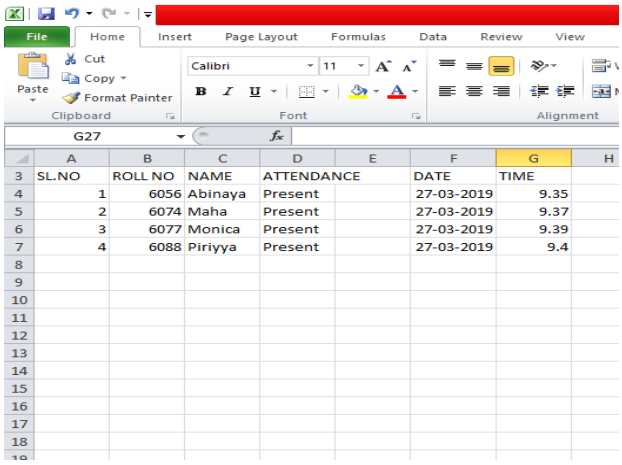


Fig.8. Lecturer login page

The updated attendance of the student's in an excel sheet



	A	B	C	D	E	F	G	H
3	SL.NO	ROLL NO	NAME	ATTENDANCE		DATE	TIME	
4	1	6056	Abinaya	Present		27-03-2019	9.35	
5	2	6074	Maha	Present		27-03-2019	9.37	
6	3	6077	Monica	Present		27-03-2019	9.39	
7	4	6088	Piriyya	Present		27-03-2019	9.4	

Fig.9. Consolidated attendance at the end of the semester

VII. CONCLUSION

The automatic attendance system using face recognition technique has been developed for replacing a manual attendance system. The propsoed system can capable of working under numerous styles of lighting conditions, different seating arrangements and environments in various classrooms. Most of those conditions are tested on the system and system has shown 95% accuracy for many of the cases. There can also work for exist students depicting numerous facial expressions, varying hair styles, beard, spectacles etc. All of these cases are tested to get a high level of accuracy and efficiency. This proposed system will be enforced for higher results relating to the attendance management. So the proposed system is proved to be more secure, reliable, fast and efficient system. The system can save time, and reduce the quantity of work of the faculty in the administration and can replace the attendance sheets with electronic equipment and reduces the quantity of human resource required for the purpose.

VIII. FUTURE SCOPE

The proposed system can be further developed by improving the recognition rate and by using the Raspberry pi Infra Red camera module. So that the system can be uses as a security surveillance system.

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