

An Insight into Face Recognition for Event Management

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ABSTRACT: At one of the most successful application of images analysis and understanding, face recognition has recently received significant attention, especially during the past few years. Facial recognition technology (FRT) has emerged as an attractive solution to address many contemporary needs for identification and verification of identity claims. The proposed system comprises of Camera module associated with Raspberry Pi controller installed with open CV library for facial detection and recognition. The system can then compare scans to records stored in a central or local database. Finally, the face candidates are divided into In-house entry and foreign entry by an enhanced version of the Face ID method.

KEYWORDS: Raspberry Pi, Open CV library, Pi camera, Arduino, LCD display.

I. INTRODUCTION

According to the existing event management system, the accuracy of the data collected is the biggest issue. The reason for the issue is the event might not be reported personally by the original person, in another word, in the event of a particular person can be taken by a third party without the realization of the organization which violates the accuracy of the data. For example, Person A is lazy and took leave, so Person B helped him/her to sign for the presence which in fact person A didn't attend the event, but the system overlooked this matter due to no enforcement practiced. Supposing the event organization establish an enforcement, it might need to waste a lot of human resource and time which in turn will not be practical at all. Thus, all the recorded presence in the previous system of the event is not authentic for analysis usage. The second problem of the existing system is where consumption of time. Assuming the time taken for an employee to sign his/her event management on a 3-4 paged name list is approximately 1 minute. In 1 hour, only approximately 60 employees can sign their presence in the event management which is obviously inefficient and time consuming. The third issue is with the accessibility of those event's data by the legitimate concerned party. For an example, most of the employer are very concerned to track their employee's actual whereabouts to ensure their employee really present for the day in the organization. However in the previous system, there are no ways for the employer to access such information.

Therefore, evolution is needed to be done to the previous system to improve efficiency, data accuracy and provides accessibility to the information for those legitimate party.

II. RELATED WORK

The Bhise, Khichi, Korde, Lokare, 2015 ^[2] - Attendance System Using NFC Technology with Embedded Camera on Mobile Device. The attendance system is improved by using Near Field Communication (NFC) technology and mobile application. According to his system, each student is given a tag that has an ID during their enrolment into the college. Attendance of each class will then be taken by touching or moving these tags on the lecturer mobile phone. The embedded camera on the phone will then capture the student's face to send all the data to the college server to do validation and verification. The advantages of this method is simple to use,

and the connection establishment speed is very high. It indeed speeds up the attendance taking process a lot. However, this system couldn't automatically spot the violation when the NFC tag is not personally tagged by the original owner. Apart from that, the convenience of the system which uses the mobile phone as the NFC reader was actually an inconvenience to the lecturer. Imagine if the lecturer had forgotten to bring their mobile phones to work, what would be the backup procedure for the attendance to be recorded? Moreover, most of the lecturer will not likely to prefer their personal smart phones to be used in this way due to privacy matter. Hence, unique information about the student like biometrics or face recognition, which is genuine for a student should be used in replacement of the NFC tag. This will ensure attendance to be taken originally by the actual student.

The SenthamilSelvi, Chitrakala, Antony Jenitha, - 2014 ^[7] "Face Recognition Based Attendance Marking System" is based on the identification of face recognition to solve the previous attendance system's issues. This system uses camera to capture the images of the employee to do face detection and recognition. The captured image is compared one by one with the face database to search for the worker's face where attendance will be marked when a result is found in the face database. The main advantage of 7 BCS (HONS) Computer Engineering Faculty of Information and Communication Technology (Perak Campus), UTAR this system is where attendance is marked on the server which is highly secure where no one can mark the attendance of other. Moreover, in this proposed system, the face detection algorithm is improved by using the skin classification technique to increase the accuracy of the detection process. Although more efforts are invested in the accuracy of the face detection algorithm, the system is yet not portable. This system requires an independent computer which will need a stable power supply that makes it not convenient. This type of system is only suitable for marking staff's attendance as they only need to report their presence once a day, unlike students which require to report their attendance at every class on a particular day, it will be inconvenient if the attendance marking system is not portable. Thus, to solve this issue, the whole attendance management system can be developed on an embedded design so that it can be work similarly with just batteries that makes it portable.

The Kumar Yadav, Singh, Pujari, Mishra, - 2015 ^[9] - "Fingerprint Based Attendance System Using Microcontroller and Lab View" introduced a solution of using fingerprint to mark the attendance. This system is using 2 Microcontrollers to deal with the fingerprint recognition process. In first process, the pattern from the fingerprint will be obtained through a fingerprint sensor, then the information will be transferred to microcontroller1. Next process the Microcontroller 1 will convey the information to Microcontroller 2 to cross check with the database. After finding a student's match, the details are sent to the PC through serial communication to be displayed. This design is perfect as it generates development while maintaining design flexibility and simplifies testing. But, this system is attached to a computer which make it not portable. Other than that, the database information cannot be accessible easily. Meaning that, for the parents whom are interested in knowing their child's attendance cannot easily or conveniently access the information. Therefore, to provide accessibility of the student's information to the legitimate concerned party, the information can be uploaded to a web server for easy access. While the acknowledgment for the suitable access can be enforced through a login screen.

The Hussain, Dugar, Deka, Hannan, - 2014 ^[10] "RFID based Student Attendance System", they discovered solution is almost similar to the first survey where RFID technology is used to improve the older attendance system. In this system, a tag and a reader is similarly used as a technique of tracking the attendance of the students. The difference between the first journals with this is where attendance's information can be accessed through a web portal. It provides more convenient for information retrieval. 8 BCS (HONS) Computer Engineering Faculty of Information and Communication Technology (Perak Campus), UTAR Again, this system is imperfect in the sense that, firstly, it is not portable, as the RFID reader can only work when it is connected to a PC. Secondly, the RFID tag is not a authentic information that can uniquely identify a student, thus, resulting in the inaccuracy of the collected attendance information. In conclusion, a better attendance monitoring system should be developed based on its portability, accessibility and the accuracy of the collected attendance information.

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III. DESIGN OF THE MONITORING SYSTEM

The design part of the event monitoring system is divided into two modules namely hardware and the software part. Before the software part can be developed, the hardware part is first worked to provide a base for the software to function. In the hardware phase, the process of the raspberry pi's setup configuration will be briefly described below.

3.1 HARDWARE SPECIFICATION OF THE SYSTEM

The hardware used in this project so far consists of only 4 components which are:

- Raspberry-Pi3
- Raspberry Pi - 8mp Camera Module
- Cable – Power supply
- 16Gb Micro SD Card Class 10

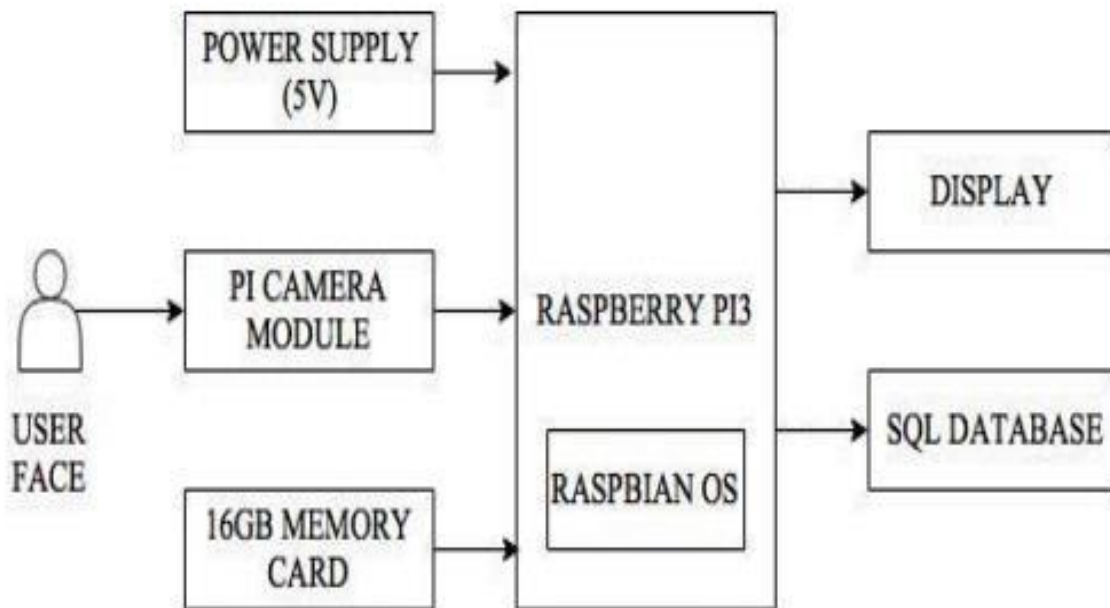


Figure 3.1 Block Diagram of the system



Figure 3.2 Connections of pi-fan and pi-camera onto the raspberry pi 3 board.

3.2 RASPBERRY PI 3 SET UP PROCEDURE

Figure 3.1 & 3.2 shows when the raspberry pi 3 first arrived, its casing, pi-fan, and the pi camera are not assembled. First, the pi-fan in place on the casing provided and next secure the pi board onto the casing by again tightening it with screws. For the fan to function, it's edge has to be connected to a 5v pin and a ground pin which are pin 4 and pin 6 respectively with the red-wired connector to pin 4 and black-wired connector to pin 6. Then, assemble the pi camera onto the raspberry pi by first lifting up the camera port's tab which is located in-between the Ethernet and HDMI ports on the raspberry pi to loosen it up, next insert the pi camera. After that, push the port's tab downwards to make the connection secured. After the hardware is assembled, it is ready to install the particular operating system into the raspberry pi. The installation process begins by downloading NOOBS (New Out of Box Software) from the raspberry pi official website into the micro SD card. Then the micro SD card is inserted into the micro SD slot located below the raspberry pi board. The next process would be the installation of Raspbian operating system (OS) into the raspberry pi. The raspberry pi is integrated to a monitor via the HDMI slot on the raspberry pi through the HDMI converter to the VGA port on the monitor for display. Following up, a mouse and a keyboard are connected to the raspberry pi via the USB ports to provide communication platform between the raspberry pi. Finally, the raspberry pi is powered up and the initialization is ended by following the on-screen instruction.

IV. CIRCUIT DIAGRAM

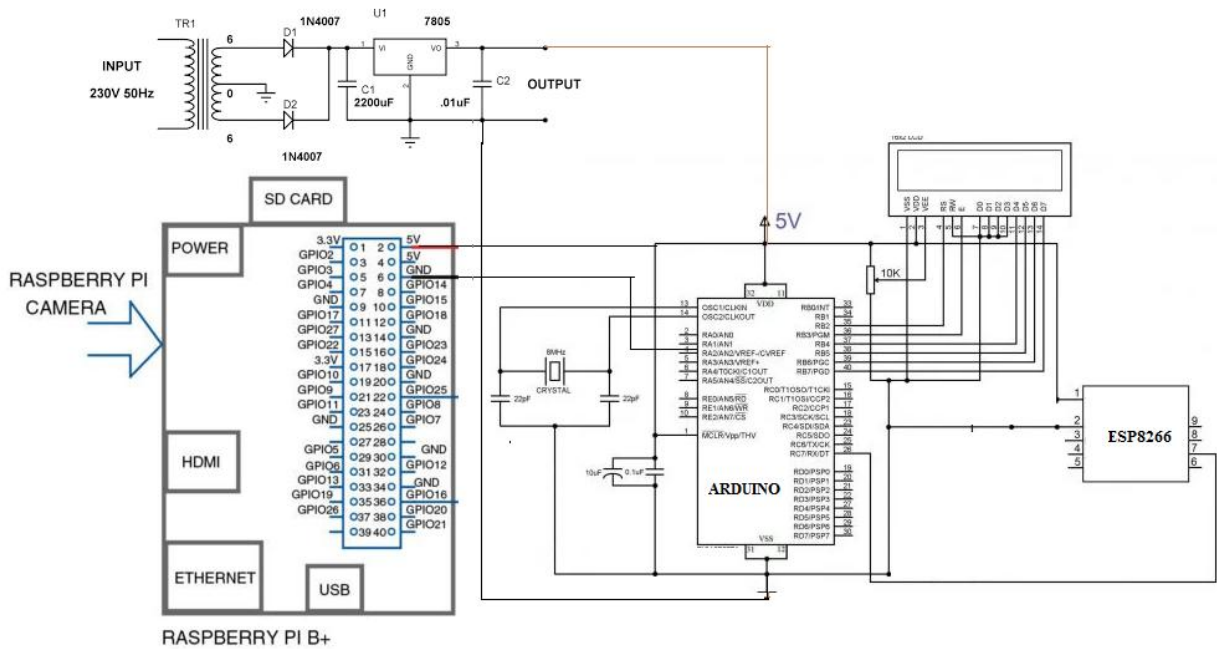


Figure 4.1 circuit diagram

V. METHODOLOGY

After the all the configurations are done, the website now is available for use and thus users such as the employer can start taking down presence in the event. However, in order for user to access this tab, he/she has to be authorized to do so by logging in into the system as a “contributor” role. After logging into the respective tab, the user will be prompted to select the current timetable ID from a table and also select the current date to start the process. When the user selected the “submit” button a .php file called employee_event.php will be called which a python script named record_event.py will be executed from the .php file. In this employee_event.php file, two variables which are the timetable ID and the current date (passed by POST method from the html) will be passed into the python script upon calling-it.

VI.RESULT AND DISCUSSION

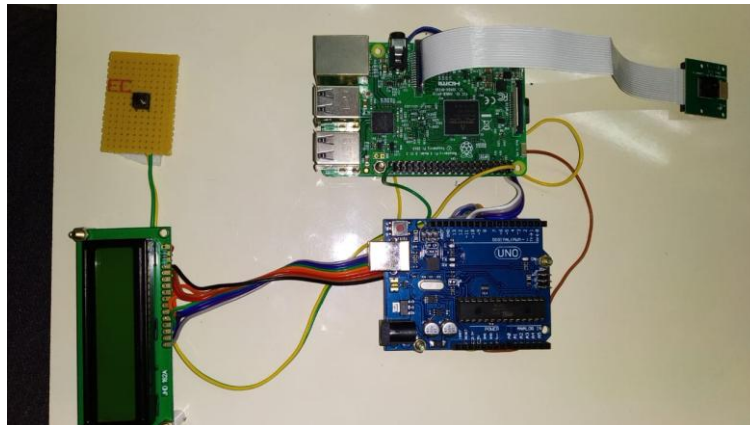


Figure 6.1:working model

```
===== RESTART: /home/pi/Desktop/atten1/camera.py
-----
Face Recognition using Raspberry pi
-----
Show Me your Face Front of PI Camera
('Train Face ', 12)
('Train Face ', 13)
('Train Face ', 14)
('Train Face ', 15)
('Train Face ', 16)
('Train Face ', 17)
('Train Face ', 18)
('Train Face ', 19)
('Train Face ', 20)
('Train Face ', 21)
Scan Complete
```

Figure 6.2: output of the scanning proceses

VI.CONCLUSION AND FUTURE ENHANCEMENTS

Event management can now be taken with a portable mini box (raspberry pi + pi camera) in a Wi-Fi coverage area. This technology can reduce the effort of enforcing employee in the organization as everything is automated. Since Wi-Fi coverage is not a problem for most of the organization, by using a mobile phone, the employer can enter the current information into the Event Management System Webpage hosted by the raspberry pi to start the presence in the event. This had provided convenience not only to the employer but also to the employee. Other than that, this system provides excellent graphical interface to the user. Data accessing can be easier nowadays simply by logging in into the webpage where searching of a record can be done easily. This also reduces the need of the employer to keep on entering the event record manually into the system.

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