

+Smart Attendance System

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Abstract— Biometric based attendance systems attracted the user because of its accuracy. It is found in many real time applications. The development of the fingerprint based attendance system is usually done using Linux platform. In this approach, the attendance system using Linux based Raspberry Pi has been proposed since Linux can support complex programming or working. The process is initiated with the database creation through fingerprint reader and proceeds with the recognition and authentication using the given system. The entire process is done on raspberry Pi platform. This paper presents the standardized fingerprint authentication model which is able to extract the finger print of the individual and test it with the stored database. Also, it provides daily and monthly attendance to the teachers and sends monthly attendance and marks to parents. [1]

Keywords—Attendance system, Fingerprint, Linux platform, Raspberry pi,

I. INTRODUCTION

The human body has an advantage of having the unique features for each individual. These unique characteristics proceed in the field of biometrics and its application in the field of security. Biometrics gained popularity in less time and proved to be reliable mode ensuring the privacy and security. This system has number of applications in the places like schools, colleges, airports, hospitals, offices etc.

Biometric is the study of involving the application of statistical analysis to biological data. The main concern in the biometrics is the inherent and uniqueness in the features. It includes various physical traits like fingerprint, palm, veins structure, face, iris etc. When it comes to the term of security, the accuracy and reliability are two important parameters.

Fingerprint based biometric systems are one of oldest techniques and widely used for biometric authentication because of its simplicity and accuracy. Fingerprint of everyone is different, hence it is most useful to initiate the model.

In this paper, the smart attendance system using fingerprint as a biometric has been proposed. The main aim of the development of this system is to do automation of attendance of the students and to maintain their records of the attendance accordingly. The system itself informs the parent whether their ward is present or not in the college/ school. The Smart attendance system also provides the monthly attendance and marks of the students at every last day of the month.

II. LITERATURE SURVEY

Sonam Shukla et al [2] proposed the adaptive fingerprint authentication system. In the given approach, the fingerprint pattern is determined by ridgelines. The unique features are determined by the local ridge characters and their mutual relationship. There is a limitation to this model like it is not adequate for real time applications.

Le Hoang hai et al.[3] proposed system based standardized fingerprint model for the recognition. In this approach, there is focus on the improvement in the quality of the fingerprint images. The algorithm which is matching the template is taken into consideration for matching the test image with recorded fingerprint samples.

Biometric identification[4] systems used fingerprint pattern as a unique identity. It is one of the most accurate system which run effectively today. But recognition of an individual fingerprint from a set of enrolled fingerprints is a difficult process. The fingerprint system fails to reveal any information about original. This could be proved to be false as there are many algorithms reveal that a fingerprint can be reconstructed with minute templates.

Mukesh Kumar Thakur et al [5] present the wireless fingerprint based security system using Zigbee. This system mostly focus on the uniqueness of the fingerprint of each person and integration of the system with wireless Zigbee module to transmit the information to the server. The fingerprint information is tested with the stored database on the server and provides the results accordingly.

Gunjan Talaviya et. al [6], proposed attendance system and record maintenance system for schools and colleges. This system automatically takes the attendance using fingerprint module and maintain the record in the computer. The report will be generated after 15 days.

From the literature survey it is revealed that less work is done in generating reports of exam results and delivering them to parents automatically along with attendance records. In the smart attendance system, record of marks of respective exams will be generated and an excel sheet containing marks will be prepared and delivered or sent to parents. Such things will help to bring improvement in the academic performance of students. Average record of attendance will be analyzed daily and monthly report of attendance will be created.

III. PROPOSED SYSTEM

The block diagram of the proposed system is as shown in Fig. 1.

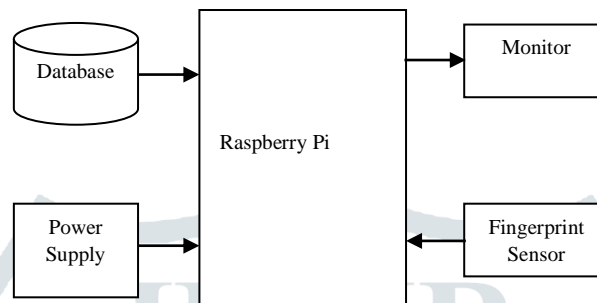


Fig. 1. Proposed Smart Attendance System

The proposed Smart Attendance System consists of raspberry pi as main controller and fingerprint module. This system provides facility of real time authentication.

A. Raspberry Pi

The raspberry pi is the credit card size, single development board with Linux or Raspbian operating system. The Raspberry Pi was developed in UK. In this approach, Raspberry Pi 3B is used. This board has a inbuilt Bluetooth 4.1 module and powered by Broadcom BCM2837 64bit ARMv8 processor. It is clocked at 1.2 GHz. It has HDMI, 4 USB ports, Ethernet and one 802.11n WLAN. It can be powered by 5v via GPIO header or micro USB. It also has 26 pins including 8 General purpose Input/output (GPIO), one SPI bus, one I2C bus, one UART bus and 3.3V, GND and 5V. For booting its operation an external SD card is used. [7]



Fig. 2. Raspberry Pi 3B module

B. Fingerprint module (R307)

The fingerprint module (R307) has been used in this system. This module has TTL UART interface for connection with microcontroller through RS232 serial bus. The fingerprint module (R307) is vital as it has a facility of storage of data and can configure in 1:1 or 1:N mode. MAX232 is required to interface with the PC serially. This device can control calibration, encryption and data transfer via USB. This module can work in all available operating system very efficiently. It is even easy to interface with raspberry pi (debianOS).[8]

It has great features which are enlisted below:

- Integrated image collecting and algorithm on chip together, ALL-in-One
- Low power consumption, low cost, small size, excellent performance
- Professional optical technology, precise module manufacturing techniques
- Good image processing capabilities, can successfully capture image up to resolution 500 dpi.



Fig. 3. Fingerprint Module R307

C. Power supply

Micro USB slot is available to provide power supply of 5v and 700mA on raspberry pi. Apparently normal mobile phone chargers are applicable and it is not necessary to take efforts to power off Raspberry pi from a USB port of another computer or hub because they are frequently incapable of supplying the required current.[9]

IV. SOFTWARE ARCHITECTURE

The system works on python language. The algorithm and features of python language are explained as under:

A. Python

The python language can be easily learnt and is being used in variety of applications. For the reason that this system can execute code line by line this language has been used and therefore this is said to be an 'interpreted language'. Python is easily executable on different platforms like Linux, Windows, and Macintosh as well as on Unix. It is open source language. The language is recognized as object oriented language too.

B. Software Algorithm

The software algorithm system works in different manner in four different modes. The explanation of each step is as given below:

Mode-1:

1. Select mode-1 using button.
2. Place a thumb.
3. By scanning thumb, it sends message to the parent that student is In/Out from college.
4. Finish.

Mode-2:

1. Select mode-2 using button.
2. Place a thumb of authorized person to unlock the student database.
3. The student's appropriate information (e.g. Roll No, Name, Mobile No, Subject Marks etc.) will be stored, and an excel sheet of marks will be prepared automatically.
4. There is automatic transmission of message to parents after providing all required information.
5. Finish.

Mode-3:

1. Select mode-3 using button.
2. The mode helps to record the attendance of students.
3. The attendance of students will be taken, verified and granted hourly, an excel sheet of attendance gets prepared.
4. Finish.

Mode-4:

1. Select mode-4 using button.
2. The mode is useful in sending messages regarding the attendance of the student to respective parents.
3. First Roll number from excel sheet of Mode-2 and the attendance record from mode-3 excel sheet will be taken and after combining them it will be sent to respective parents.

C. Flow Chart

Flow chart of the proposed system is as shown in Fig. 4.

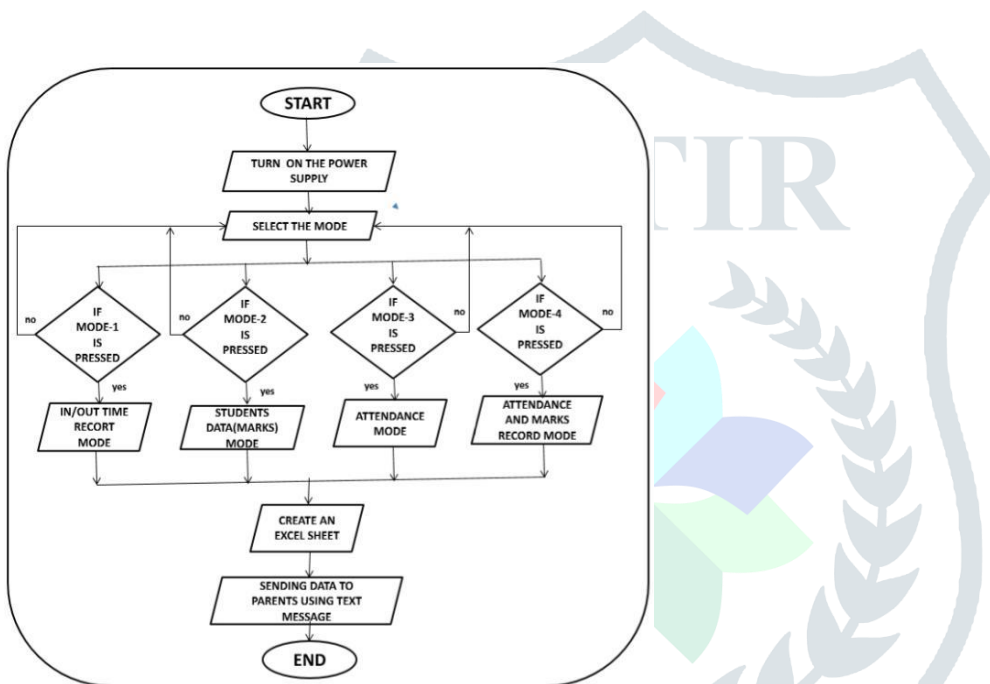


Fig. 4. Flow chart of the proposed system

For marking the attendance, student has to place his/her finger on the fingerprint sensor module. On identification of particular student, his/her attendance record is updated in the database. In this system Microsoft excel attendance report is generated on computer. This report will generate automatically after a month (depends upon user). Then this attendance report will be sent or delivered to the respective teachers and to respective parents.

V. EXPERIMENTAL RESULTS

1. Attendance of students is being maintained.
2. The delivery of the arrival and as well as departure times will be made.
3. It will save the record of student's marks in particular exam
4. Entire academic data of respective student's is delivered to parents via message.

VI. CONCLUSION

This system is very useful to Guardian Faculty Members, class teachers and as well as to respective parents, since every student's academic record is maintained and it is for the betterment of students that their data is delivered to parents. Real time authentication facility is provided in the proposed smart attendance system. The problem of fake attendance (proxy) can be solved.

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