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IOT based Attendance Log System using Raspberry PI

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Abstract: In this paper, the development of an attendance log system using Fingerprint (biometric) is proposed. Managing student attendance at the time of lecture periods has become a difficult challenge. The ability to compute the attendance percentage becomes a major task as manual computation wastes a lot of time. And for that reason, an efficient attendance system using fingerprint is designed. This system takes attendance with the help of a fingerprint device and the records of the attendance are stored in a database to a server. Attendance is marked by Students only after giving access code to unlock device by Faculty member of particular subject.

The results will show improvised performance over manual attendance system.

Keywords: Raspberry Pi, Fingerprint, IOT, Database, Students, Faculties, Attendance Log System,

I. INTRODUCTION

The availability of internet has provided almost all the information, which causes the students to be less interest in attending the classes in their working hours.

The roll calling or filling up proxies are however time consuming and laborious because the valuable lecture time that could otherwise been used for lectures is dedicated to student attendance taking and sometimes not accurate.

A technology that can solve this problem and even do more is the IOT based Attendance Log System (Biometric System). Biometric is an automated identification and data collection technology that ensures more accurate and timely data entry. Biometric(Fingerprint Authentication) is not actually a new technology, it only quickly gained more attention now-a-days because of its low cost and its advantages in other computing fields that open up more application areas. Fingerprint module captures a digital image of fingerprint pattern.

The capture image is called a live scan. This live scan is digitally processed to create a bio-metric template which is stored and used for matching.

A fingerprint module has some basic jobs, like it need to get an image of your figure and it need to determine whether the pattern of the ridges and valleys in this matches the pattern of valleys & ridges in pre-scanned image. Only particular characteristics of fingerprint is ever saved, only a series of number (binary code), which is used for verification. The algorithm can't be reconverted to an image, so no fingerprint can be duplicated. WI-FI module is used to send a data stored in device over the Internet after the end of particular session.

In this Project we are not talking only about Student's Attendance marking. This Particular device will get unlocked only by the access code given by the particular faculty of the particular Subject for a specific period. And for latecomers there will be some consequences too. Like, their data will get saved in late coming attendance database or if faculty wants then will be marked absent too. If any student is absent for lecture(s) then an SMS will automatically get generated and get sent to his/her parent's Registered Number. And also on Monthly basis, Defaulters list will get generated using Log System. The whole log system will be saved in a Single Parent Server.

II. RELATED WORK

In this section analysis of some closed related works on student record management and biometric attendance management system was carried out. This section discusses the most closely related, and then provides a comparative analysis between the related works and our system.

The Web Server will be in used of collecting databases of students and faculties. Also the Attendance log plus Defaulter list will be saved on the server. An Attendance Monitoring System. This system is used to track the attendance of students. It is developed to be

accurate, fast and very efficient way of tracking students. It adopts fingerprint verification technique. A survey using this system showed that the fingerprint biometric identifier was found suitable for the student's attendance management system of the institution/college. Fingerprint Based Attendance System.[1]

This system is used to take attendance during lecture periods using fingerprint as biometric for O.P. Jindal Global University. It increases accuracy in attendance-taking, security and also efficiently calculates the attendance percentage. The attendance system makes use of a fingerprint identification which compares the fingerprint record of students with every record in its database.[2] Web-Based Student Academic Records Information System.

This software was used for management and processing of data/information for every student in the college in an interactive manner. It solves the need of tracking students' class attendance.

The System will use Fingerprint sensor to track attendance of the students.[3] This system includes Raspberry Pi 3 technology. It has an attendance report that will be sent to the server on daily basis. On monthly basis a Defaulter/Average List report of Students will be generated and get sent to Parents' number through SMS.

III.METHODOLOGY

The attendance system is implemented which consists of two stages:: 1)The Enrolment Stage, where each student biometric details was taken and stored in the database and 2)The Authentication Stage, where each student's biometric features will get extracted and compared with all fingerprint templates in the database.

There are numerous benefits to using this Attendance Log System. It eases all the system's processes. It has Server storage. The Server Storage Method is more efficient than a paper-based file system. There is another factor which the system has taken into consideration is human error made in the recording and filing process which is avertable in a database system. It also makes provision of easy corrections of errors occurred.

A. Benefits of Proposed System

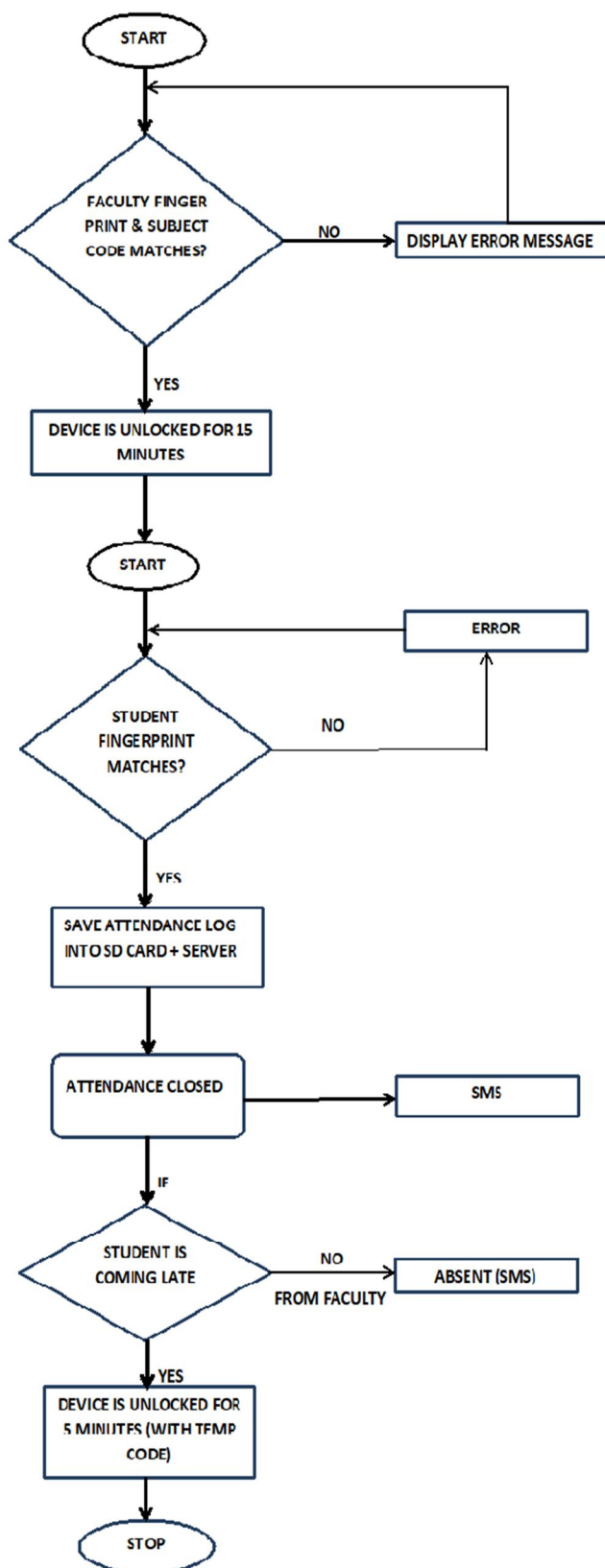
- 1) Reduced Time Consumption: It'll reduce the time taken to process the queries of users, get student records for decision making etc.
- 2) Reduced Manpower With Paperless Record: It'll reduce the manpower needed to perform all the record keeping and administration task by reducing the paper works needed.
- 3) Cost Reduction: It'll reduce the cost involved in the student record management process.
- 4) Operational Efficiency: It'll improve the operational efficiency by improving the quality of the process.

B. Modules of the Project:

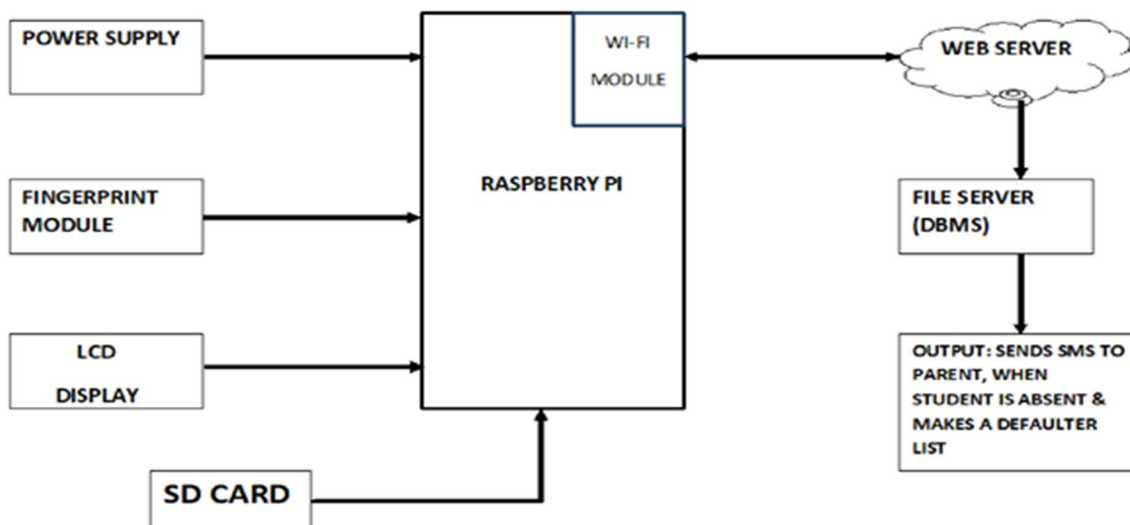
The system is designed in a way that only particular faculty of particular subject is allowed to access the module. The records would be modified by only the admin (faculty/H.O.D).

- 1) *Lecturer*: This module is protected by user access code. It consists of all lecturers that have a hand in access code for unlocking the Device.
- 2) *Students*: This module is protected by a fingerprint code and some access code. This is where students have to put their finger on the device after unlocking that with access code to mark their attendance, which will go directly to the Server.

FLOWCHART:



BLOCK DIAGRAM:



IV. EXPECTED EXPERIMENTAL RESULT

Raspberry Pi In this thing we'll install the OS on which our project is going to run. We will dump some code like Python, Java etc. which relates with Fingerprint module, Server, Database, SMS thing and all.

- 1) *Fingerprint Module:* How this thing going to work? It's going to work in the manner like, the Student will put his/her finger on it and using the sensor the student's authentication, the database matching takes place and finally the attendance is going to marked and will be saved on server.
- 2) *GSM Module:* There will be some cool modifications, and one of them is if a student is late or absent for a particular lecture, then a SMS will automatically get generated and get sent to their parents number.
- 3) *Attendance Database:* In the end, on monthly basis, also a Defaulter' list will get generated and will show the monthly Student's being Absent and Present record for the lectures.

V. CONCLUSION

We are implementing an Attendance System based on IOT using Raspberry Pi technique. Our algorithm successfully authenticates the Student's Identity from his/her fingerprint and database from server and registers his/her attendance. We are applying our algorithm on many objects (person) and found that it successfully detect the fingerprint and capable of make it matching with right database.

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