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Abstract

Biometric Authentication is presently the easiest to the employee and enough accurate system for several corporates. Hence is Used in various Corporates and Universities as Primary Attendance System However, recognizing fingerprints in UNIX system based mostly embedded computers [Raspberry Pi] continues to be an awfully complicated problem. This complete work is completed in a UNIX system based mostly embedded laptop known as raspberry pi, during which information creation, fingerprint reader access, authentication, and recognition is achieved using a basic computing device known as Raspberry Pi Model 3B+. This paper describes a model wherein using the information of the image of your fingerprint we authenticate a student when his fingerprint image matches in our Database. Updation of the database by creating new enrollments or deleting the already existing ones.

Index Terms – Biometric Authentication, Python, Raspberry Pi

I. INTRODUCTION

To identify the presence of the person is a crucial in numerous fields like school, hospital, supermarket, hotel, etc. within the past people used to maintain Registers to mark attendance

in the company, attendance of the employees within the supermarket and student attendance within in the Academic Place. When the administrative person used muster, he has got to pay their energy, time and he has got to do a lot of manual work in comparison to the automated system. So here in this paper, we've shown a novel finger impression scanner primarily based upon a biometric framework that records the presence later. We have developed this project on a very basic and cheap (potentially) computer known as Raspberry Pi. Therefore, here we've developed system used framework during which first of all student got to registered himself to the database, once the student is register to the database, he can get a message with the ID that student registered with success. Now to verify the student present in the class, student has got to place his finger before of the scanner, therefore, scanner can scan the finger of the student and mark the student Present in the Datasheet if Student Record Exists or else displays that the "Student Doesn't Exist". By developing this method, we are able to achieve various advantages like saving time, fewer efforts are required, accuracy of the result's a lot of in comparison to the manual records and nobody will make presence of the another student as a result of here for the identification we've got used distinctive identification as fingerprint of the student. In order to develop this method, we've got used Raspberry-pi 3B+, Python programming language to achieve the same.

II. PROBLEM DEFINITION

Normally, Students/Employees, Regular Attendance is taken care of by the authority by marking their presence manually. Although in various cases occur when proxy of the person is marked and the wrong result are submitted to the Senior Authority. Therefore, so as to seek out 100 percent accurate result, the automatic system ought to be developed which will identify the person unambiguously by his fingerprint, iris, lips print, etc. Suppose the scenario of a college in which classroom contain 80 percent students present in class and teacher marking 87 percent as present. As a result of 7 percent proxy is recorded and the same incorrect data is being further supplied Senior authorities. So, the drawback is that even though a student isn't present he is being marked present using the help of a fellow student. Therefore, so as to create a restriction on this type scenarios from occurring, we have used a Fingerprint Scanner which can offer virtually 100 percent genuine result.

III. LITERATURE SURVEY

The Sonam Shukla, Pradeep Mishra urged increasing the Accuracy of associate degree Existing Fingerprint Recognition System Using Adaptive Techniques, during this approach developer

primarily focuses on IAFIS which they call Integrated Automated Fingerprint Identification Service is for the foremost renowned police agencies.[1] The pattern extracted using the fingerprints is identified by using a set of ridgelines that always flow parallel, however, run around and end at some points. The singularity of a fingerprint image is set by the native ridge identification and their internal relationships. The Main downside of this model is that this approach isn't thus apt for real-time applications however the accuracy of the system is very adaptable. Most Veritable systems for fingerprint comparison systems are based on detail matching of the recorded image to that with the image data in the attendance database.

Le Hoang Thai and Nhat Tam(2010) proposed a concept of "Fingerprint Recognition System using Standardized fingerprint image model".[2] Currently, fingerprint recognition is one in all the major biometric technologies supported fingerprint distinctiveness. during this approach, they targeted on up the standard of fingerprint images. Using this method, the necessary step that affects the systems exactness is the match between templet and database fingerprint.

This approach functions supported the uniqueness of every person and integrate the biometric device to transmit the data obtained during this approach. It uses the fingerprint extraction algorithm and matching algorithmic program and maintain the database to identify and validate the person approaching for access.

Mukesh Kumar Thakur, along with 3 others suggested a system based on ZigBee Technology which included terminal fingerprint acquisition Section and attendance management Section through the Computer they are using.[7] It was able to realize useful data of the images from the biometric module, process it, wirelessly transmit and could match fingerprints and kept attendance managed.

Karthik Vignesh E along with 3 others proposed a system foolproof system which required the access to a system once for the enrolment of the student.[6] The system uploaded the attendance to the given Web Portal once it came in connection to a known Wi-Fi Network. It was able to send SMS to parents when the student was found absent and informed the HOD when the student was absent for more than three days automatically.

Herdawatie Abdul Kabir along with 3 others(2010) modeled a Student Card embedded with an associated RFID tag for tracking the students.[10] Once the card goes through the RFID reader, it'll let the system know to start scanning information from the RFID tag to the database where it will get to know the access data which are often viewed online by the management for monitoring their students.

Rohit, C., Baburao, P., Vinayak, F., & Sankalp, S. (2015) proposed a system where the camera was fixed at a position wherein front the main door of the class from where Entry and Exit usually took place.[9] What the camera intended to do was take clear pictures of the student

who came In or went OUT of the class and using 3D Face Recognition algorithm marked the Students Attendance.

NirmalyaKar along with 3 others tried to develop a system that could take attendance and upload it in real time. It took pictures of the class which had all the student present within the class.[10] Then the face detection algorithm was applied to the pictures to detect the faces within the image. Pictures were subjected to face segmentation then face recognition is done using the primary match (test image) image to check whether the image recorded presently matches with the student's information pictures and if a match is found attendance is updated to the attendance information and also the report is finally generated. This approach this paper proposes the system for the machine-controlled attending system with the assistance of a face recognition system.

IV. IMPLEMENTATION

The Hardware Arrangement For this attendance system to work is presented in the Model below:

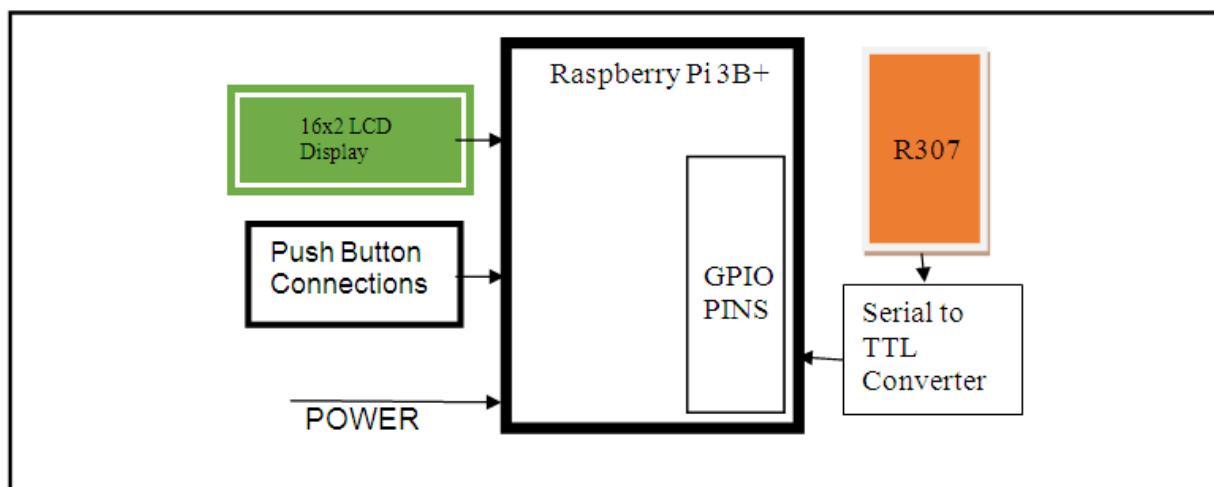


Fig I: Block Diagram for the Proposed System

The Attendance system proposed by us requires authentication to start or end a new session of attendance. This authentication is given by the Master user (in our case the teacher/faculty). After the Master User starts a new session the biometric attendance of students is taken until the Master User places his finger once again on the Fingerprint reader and is recognized as the

same Master user who started the Session. The Master User (Teacher) And the Slave User (Students) have different tables in the database. Only a new slave user can be added Locally in the proposed System. A New Master user is added by the Authorized Authority of the Organization.

As associate implementation of the purposed system, we tend to have developed application which can facilitate us to identify the present students from the class and mark student present if the thumb identification from the database is successful. So in order to spot whether or not the student is there in the database or not initial we've to enroll the student in the database. Thus, once the student goes to enroll within the database our system can perform some number of enrolment steps which are mentioned below.

Enroll A Student to Database

To Enrol a new student into the database we shall use the Push Button allocated to New Enrolment. The Algorithm used for the internal working of the same is given below

ALGORITHM:

1. START.
2. Initialize Fingerprint Scanner using the Serial Ports.
3. Enable Receiving Sensor Information from the Module.
4. Start Receiving images of Fingerprint.
5. Record Fingerprint Image.
6. If the first fingerprint recorded matches a Master User Fingerprint in the database then proceed to Step 7.
7. Display "YOU ARE NOT AUTHORIZED" and proceed to Step 5.
8. Get Fingerprint Images to match it with Slave User Fingerprint in Database.
9. If Matched with database display details and proceed to Step 16.
10. Scan Fingerprint Again.

11. Convert the image into Characteristics.
12. If both the records match proceeds to Step 13 else go to Step 8.
13. Create a New Templet and store the new sensor information.
14. Get ID and Position and store in the Slave User Fingerprint in Database.
15. Print "SUCCESS!!"
16. EXIT

As mentioned earlier we shall use Raspberry Pi 3B+ (Fig II) as the controller for performing all our tasks. We have further used Serial to TTL Converter to convert the serial signal data transmitted by fingerprint module to Transmitter-Transmitter Logic signals.



Fig II: Raspberry Pi 3B+ as the main Controller

(Fig.III) confirms that the fingerprint sensor is working and the Fingerprints are Recognized by the Ports and is Displays on LCD as well.

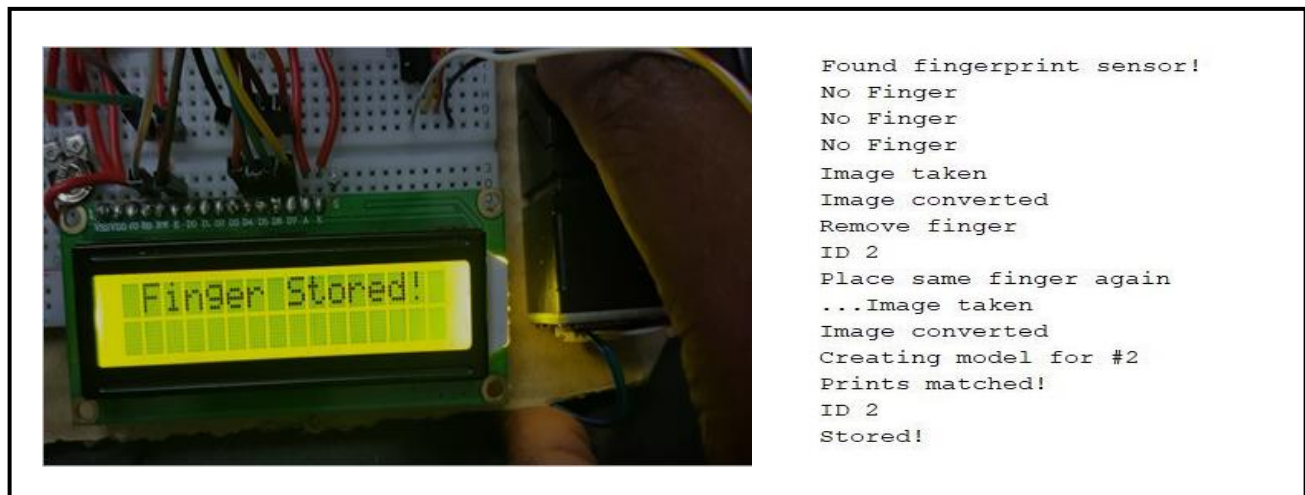


Fig III: Display Result and Port Results after Identification

Recognize Student from the Database

To verify a student, the student must be first enrolled in the database. After making that sure we shall use the Push Button (Increment Button) allocated to Recognition. The Algorithm used for the internal working of the same is given below

ALGORITHM:

1. START.
2. Initialize Fingerprint Scanner Module using the Serial Ports.
3. Enable Receiving Sensor Information from the Module.
4. Start Receiving images of Fingerprint.
5. Record Fingerprint Image.
6. If the first fingerprint recorded matches a Master User Fingerprint in the database then proceed to Step 7.
7. Display "YOU ARE NOT AUTHORIZED " and proceed to Step 5.

8. Get Fingerprint Images and calculate the equivalent hash.
9. If Matched with database display details, mark present and proceed to Step 8 if Increment Push button pressed.
10. If Not Matched, Display "DETAILS NOT FOUND!".
11. If Increment Push Button not pressed and Master user Fingerprint recognized End Session.
12. Display Total Present and Total Absent Students.
13. EXIT.

The Output After using the Recognition Algorithm is displayed in a 16x2 LCD Display in (Fig IV)



Fig IV: Output After Recognition

Delete Student Information from Database

To Delete student information, the student must be first enrolled in the database. After making that sure we shall use the Push Button allocated to Deletion. The Algorithm used for the internal working of the same is given below

ALGORITHM:

1. START.
2. Initialize Fingerprint Scanner Module using the Serial Ports.
3. Enable Receiving Sensor Information from the Module.
4. Start Receiving images of Fingerprint.
5. Record Fingerprint Image.
6. If the first fingerprint image recorded matches a Master User Fingerprint in the database then proceed to Step 7.
7. Display "YOU ARE NOT AUTHORIZED " and proceed to Step 5.
8. Get Fingerprint Images.
9. If Student is found in Slave Users in Database proceed to Step 11.
10. Display "STUDENT NOT FOUND!".
11. Wait till templet is read.
12. Delete The row from Database.
13. Delete from Device.
14. Display "SUCCESSFULLY DELETED!".
- 15.EXIT.

(Fig VI) showcases the displayed output of the deleted students.

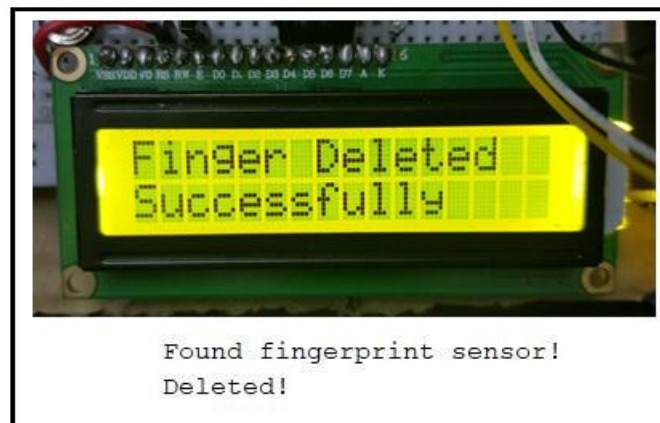


Fig V : Deletion Output

V. RESULT ANALYSIS

The created system is supposed to work upon a Master-Slave Algorithm. When done so, it is observed that not only the authenticity of the attendance data is restored but also a major factor known as “time theft” is handled properly with the help of the faculty. When we combine all this we can ensure that the present marked students attended the whole lecture.

VI. CONCLUSION

The created system is deployed with success and it'll facilitate to scale back the manual work and mistakes that are made manually. Conjointly it'll scale back the large amount of proxy attending and provides accurate knowledge.

System conjointly saves data and generate the report timely. Additionally, it decreases human mistakes, evades and carries on the student attending records properly thus it can even be used in the future for generating the various reports.

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