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Enhanced IOT Based Secured Automatic Biometric Attendance Management System

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ABSTRACT

The use of biometric data an individual's measurable physical and behavioural characteristics – isn't new. Today, In order to deal with security, authentication plays a vital role. There are various challenges and issues to build low cost, flexibility, scalability and time complexity biometrics systems. There are various conventional methods have been proposed in the literature and still needs improvement. Hence in this paper addresses how biometrics can use the maximum advantage of cloud's boundless computational resources and striking properties of flexibility, scalability, and cost reduction in order to reduce the cost of the biometrics system requirements of different computational resources (i.e. processing power or data storage) and to enhance the performance of biometrics systems' processes (i.e. biometric matching). Here, Raspberry Pi is used to build a low-cost biometric system. Raspberry Pi (RPI) is a credit-sized mini-computer with great capabilities similar to a PC. Using the biometric technology, a new system to enhance the IoT based biometrics is proposed new conventional authentication technologies like RFID tags and authentication cards. Biometrics such as fingerprints, voices and ECG signals are unique human characters that cannot be tampered or replicated. This facilitates real time system implementations and it is also proven to be more accurate with less than 2 seconds of processing time, facilitating the authentication system to be faster and reliable and attendance management system. Attendance Management System is the implementation of Internet of Things through Raspberry Pi 3 and RFID Technology in order to reduce the time consumed by the traditional system of recording daily attendance in schools and institutions. So everything here in turn gets automated. An attempt has also been made to develop an Android application (app) and help the students' to view their attendance anywhere, anytime.

Keywords: IoT, Sensors, Embedded, Machine Learning approaches.

1. Introduction

Since the early days, the method of maintaining the attendance *has been* always manual. Monitoring the attendance is very important in all the institutes for checking the attendance and presence of students. Some teachers take attendance manually using the traditional pen and paper and some uses automatic attendance methods. There are many ways existing for this purpose they are as Biometrics based Attendance System (Iris, Face, Thumb, etc...), RFID Based System, Extracting Features from an image based Attendance System, Bluetooth Based Attendance System. Now-a-days two types of attendance system are available as Manual and Automated system. Manual attendance systems use paper by teacher to fill out and afterwards overseen for accuracy. However time and attendance information is subject to human error. A lot of man hours go into calculating and maintaining records of attendance when using a manual system. Automated systems uses RFID tags, bar-codes cards or biometrics and touch screens [1] in place of paper which students touch or swipe to identify themselves and recording in and out time. The recorded information is then automatically transferred to computing device. An automated system reduces the risk of errors that are commonly appear in manual system and reduces man power instead of wasting time on tedious administrative work. This paper proposed an Automated Attendance Monitoring System using Raspberry PI and GPS i.e. location based system.

2. Overview of the Proposed system

In this research work, the methodological steps of the system are pictured by the block diagrams and shown in Figure-1

This method works with the following phases,

- a) Scanning of a finger print image: The quality of the scanned finger print image is the decisive factor for the identification purpose. This can be achieved by using a high-definition finger print scanner which can tolerate the skin types, colours, damages and dryness factors.
- b) Image quality improvement: Here an optical improvement is applied to the structure on the scanned finger print image
- c) Image processing: This is the preparatory phase for the feature extraction and classification purposes
- d) Feature classification: All the finger prints show certain global similarities facilitating a rough classification. There are 3 principal finger classes exist. In this process the image is classified under anyone of the principal classes.
- e) Feature extraction: In this process the location of the minutiae (ridge bifurcation & ridge endings) in the finger print is detected and extracted. At real time, the quality of the finger print image impacts this process a lot. So proper care should be taken to avoid the negative influence caused due to poor quality image.
- f) Verification process: In this process two features are compared. The algorithm functioning strongly depends on the quality of the extracted minutiae and the comparison image.

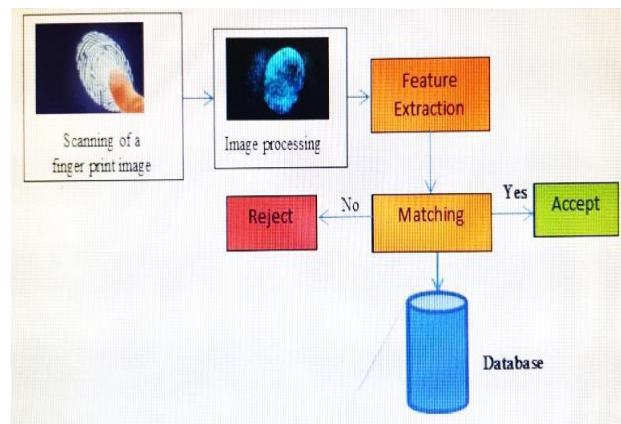


Figure 1: Block Diagram of Proposed work

First, the *fingerprint* of the users should be stored on the server to recognize the user. You can program the system in such a way that whenever you press 'E' the *enrollment* action will be activated. And then the *fingerprint* of any user can be stored. During the authentication or attendance process, you can press the 'ST' button to start the process. A green LED glows and indicates the status of the system. Then the handheld device can use for the authentication purpose. And once the authentication process is done you can press 'SP' button to stop the process and the green LED will stop glowing. The *fingerprint* modules are connected to the *Arduino* and the serial communication is done through the *ZigBee* module, which establishes the connection with *Raspberry Pi*. Once the authentication or attendance system process is over, the data will be uploaded to the cloud server for storage and analysis purposes

3. Conclusion

An applicable attendance management system was designed for educational organizations. This paper mainly comprised of development of the attendance management system and fingerprint identification system and it presented a framework in which attendance management was made automated and on-line. There are some limitations of the fingerprint technology. In these cases, one needs to consider other biometric features. Also, it can suffer some small changes along the time. To overcome this problem, the system may be necessary to re-enroll the fingerprint and/or use multiple *fingerprint* enrollment. The system needs to deploy specialized devices for fingerprint enrollment.

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