Khulna University of Engineering and Technology

Department of Computer Science and Engineering

**CSE 3200**

**System Development Project**

Biometric Attendance System

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**Contents**

**Abstract:**

In this project , the design and development of a portable classroom Biometric Attendance System based on fingerprint is presented. The method of recording attendance data is done with the help of Fingerprint Module. The circuit of this device is strategically constructed to have an independent source of energy to be operated,as well as its miniature design which  
made it more efficient in term of its portable capability**.**Rather than recording the attendance in writing or queueing in front of class which is time killing attendance can be recorded easily and shortly with the help of this system. Also it prevents proxy of students which has become a bad trend nowadays.

**Objectives:**

* Introducing a new system to the educational era.
* To design fingerprint based biometric attendance system.
* To enroll fingers of the students for the system.
* To take attendance of the students.
* To calculate average attendance of a student from the attendance sheet at the end of the semester.

**Introduction:**

In every educational institutions, the authority keeps track of the attendance of all students. But the attendance system is poor. The system can easily be manipulated. For example, a teacher has to pass a printed sheet to record the attendance of the students. A student needs to fill the sheet with his/her signature. In this case, some of the students can imitate their friends' signatures even though they are absent. To avoid this issue, many teachers are to call out the students' name or roll. But this approach is very time consuming. Most of the universities in Bangladesh have a procedure to exclude their students from taking examination if their attendance is less than 60 percentange.

To solve these issues, we are going to introduce a new system that is **Fingerprint based Biometric Attendance System**. The fingerprints are one of the main forms in biometric field which are used to identify the individuals and their uniqueness. Above all the mentioned problems will be solved by using this system.

**Motivation:**

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Educational institutions still use attendance registers for managing students’ attendance. The teacher has to call out names or roll during the lecture time. Increased number of students causes wastage of reasonable amount of time from the valuable lecture time. Again sometimes students give proxy. Even sometimes teachers mishear as a result present students get “absent” and absent students get “present”. Main motivation behind designing the system was to solve this problem. And to overcome all these problems and obstacles, “Biometric Attendance System” is fruitful enough. We tried to do something which will be helpful for our education system. Again we added a storage where the attendance data will be stored securely. Overall this system will save time wasted on calling out names and it gives a full proof method of attendance marking.

**Project Description:**

In this fingerprint attendance system circuit, we used Fingerprint Sensor module to authenticate a true person or employee by taking their finger input in the system. Here we are using a keypad. We used “A” for enrollment. “B” for Attendance. And “C” and “D” for controlling ID no. “A” key is used for enrollment of a new person into the system. So when the user wants to enroll new finger then he/she need to press “A” key then LCD asks for the ID, where user want to be store the finger print image. Now if at this time user does not want to proceed further then he/she can press the key again to go back. When user enrolls new finger, then he/she need to select finger ID by using two key “C” and “D” and then press “#” to proceed with selected ID. User needs to press “B” for attendance. As all the students id are enrolled, when a student place his/her finger on the sensor,if the id saved against his finger matches his given finger he will be considered present. The fingers which will not be placed on the sensor will be considered absent. **SD Card Module** has been used for moving data from the arduino memory to a datasheet.

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**Required Apparatus:**

* Arduino Mega
* R307 Fingerprint Module
* DS3231 Real Time Clock (RTC) Module
* SD Card Module
* 4\*4 Keypad
* 16\*2 LCD Display
* Micro SD Card
* Potentiometer
* Bread Board
* Connecting wires
* Power Supply

**Block Diagram:**

**Circuit Diagram:**

**Methodological Steps:**

The methodological steps of the system are shown by the block diagram below. And the proposed system has the following five major components.

a) User and Device Interface

b) Data Acquisition with Fingerprints

c) Fingerprint Processing

d) Fingerprint Verification

e) Attendance Report Generation

**Working Procedure :**

Working of this fingerprint attendance system project is fairly simple. First of all, the user needs to enroll fingerprints of the user with the help of key “A” of the keypad. To do this, user need to press “A” and then LCD asks for entering ID for the fingerprint to save it in memory by ID number. So now user needs to enter ID by using “C” and “D” keys. After selecting ID, user needs to press “#” key to select the ID. Now LCD will ask to place finger over the fingerprint module. Now user needs to place his finger over finger print module and then the module takes finger image. Now the LCD will say to remove finger from fingerprint module, and again ask to place finger again. Now user needs to put his finger again and module takes an image and convert it into templates and stores it by selected ID into the finger print module’s memory.  Now the user will be registered and he/she can feed attendance by putting their finger over fingerprint module.By the same method, all the users will be registered into the system.

Now if the user wants to remove or delete any of the stored ID or fingerprint, then he/she need to go to “file” then “examples” then “Adafruit Fingerprint Sensor Library” and then choose the respected file and run it to delete or remove any template. SD Card Module has been used to transfer data from the memory of Arduino to a datasheet. All the records of the students attendance will be then stored on the SD Card which will be shown on a datasheet.

**System Testing:**

White box testing: Unit testing: In this regard, before integrating any part each module unit (like Fingerprint Module,RTC Module,LCD Display,Keypad,SD Card Module, 10K potentiometer) has been tested. Every portion of the code has been tested individually.

[Integration Testing](http://softwaretestingfundamentals.com/integration-testing/): After attaching all the parts again the output has been checked and rechecked until all valid outcome was found.

Black box testing: The Fingerprint Module has been tested for all the cases. The RTC Module and the SD Card module has also been checked using library examples.

**Experimental Result:**

**Prototype Design:**

**Discussion:**

Biometric Attendance System is very helpful to eliminate duplicate or fake data entry and errors in time and attendance entries. But to implement the system we had to face some obstacles. For example the Fingerprint Module faced loose connection several times. And “module not found” problem was arised. To solve it every time we had to tighten the wiring. The main problem was created by the SD Card Module. After every few minutes it was loosing connection. Even sometimes in the middle of the process it was loosing connection. We overcame it by checking and tightening the wiring several times. Every time any error was occurring,we had to restart the procedure. In spite of all the obstacles, a successful system has been created which will be very helpful for our education system.

**Conclusion:**

An applicable attendance management system was designed for

educational organizations in this project. This project mainly

comprised of development of attendance management system and

fingerprint identification system. This project presented a framework in

which attendance management was made automated . changes along the time. The system needs to deploy specialized devices for fingerprint enrollment. In future this project can be extended to store fingerprint databases on the remote server that can be used over world-wide. A website will be hosted on the server for online access to attendance reports. The proposed system has been developed using C programming paradigm platform. The proposed system can be implemented for all classes of the university.

**Limitations:**

There are some limitations of the fingerprint technology. These are the inability to enroll some users for poor fingerprints. For these cases one need to consider another 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 fingerprints enrollment.

**References:**