

An Enhanced Biometric Based Student Attendance System

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Abstract : The precept purpose of the paper is to beautify and enhance a students' attendance control gadget machine via more advantageous biometric system. The value of attendance and the interaction of class room should known completely for the students'. To improve the skill and ability of the students' the enhanced biometric system control gadget is developed. In addition, online based students' attendance gadget can be evolved for functions to expose the attendance fame of every student, generate records and views related to the students' attendance, and give the messages to their parents. A proper arrangement and planning can be made with the students' level attendance gadget system with the good resource and the challenge techniques to increase the performance of the students'. The students' attendance gadget device will only developed for dealing with the students' attendance and to highly increase the performance of the students' grade and allow the staff members to easily examine the information and statistics regarding the students' attendance. The gadget might be developed and used as the record to maintain the attendance of students' greater effectively and efficaciously through the biometrics fingerprint scanning. The main advantages of the performance of the gadget are to triumph over the contemporary troubles of their modern-day attendance device faced by means of the faculties and universities.

Index Terms: Biometric System, Fingerprint Scanning, Control gadget, Information, Statistics.

1 INTRODUCTION

Students' academic side and the class room attendance is very vital since it's going to have an effect on the students from gaining understanding ,knowledge, sharing and abilities as well as their grades from their respective teachers and by sitting in the classroom. The paper has related approximately the student attendance gadget via biometrics using fingerprint to verify the classroom attendance of the students' for each hour. The principle cause of wearing out the paper is to increase an enhanced student attendance gadget for which computing device-based software is advanced to obtain the attendance of student via fingerprint and put up the review of the outcomes of the attendance using online gadget. The good and best one is the biometric fingerprint. It clearly reviews the information with complete and consistent with no redundancy. In universities and colleges are still using the conventional attendance gadget. It requires a bit of paper on every occasion .The teachers has to maintain all the bits of paper carefully and to record all the information for the entire semester. Using the traditional attendance machine, the teacher has to face many problems. There can be no backup for the attendance statistics once the teacher accidently misplaced the attendance sheet, the friends help their class mates by giving the attendance in the same voice of the classmate .It is very difficult and hard in analyzing and tracking student performances primarily based on attendance issue, scholar lack of expertise and competencies because of the terrible attendance in attending training, and so forth. It's far critical to conquer these troubles. An enhanced biometric system going to assist in enhancing the educational overall performance of students as well as it reduces the burden of the teachers. The main goal of the paper is to enlighten the student's academic performance and help the students in recording the attendance effectively for every hour. An enhanced device helps the teachers to examine and monitoring the students' attendance. It will likely be less complicated to assess and examine the students' overall performance attendance. The reason is that the gadget will file the attendance more correctly and effectively with minimal possible errors. The primary usage of an enhanced digital-primarily based gadget is better than the usage of a paper-based totally gadget because of the accuracy and with the intention to accumulate, manner, and

produce the attendance effects and perform lengthy-term analysis.

2 REVIEW OF RELATED WORKS

The paper "student Attendance Management" enumerated that attendance device gadget software is required to replace the traditional attendance gadget for a cause to reduce the processing time and the paper work value utilized in traditional attendance gadget. "RFID based Attendance control system" by Microtronics technologies, 2013, mentioned that the RFID device is advanced and is appropriate to take the attendance of the students as well as personnel. "Bar Code Scanner based student Attendance system (SAS)" by Subramaniam H. Et al., 2013 had recognized that student attendance and participation amongst a category is very crucial so that it will reap accurate academic outcome of a students'. "Incorporated device for tracking and spotting college students at some point of magnificence session" entitled by Mohammad A. Et al., 2013, had known that the attendance machine using face popularity is greater efficient than other student attendance system strategies. "wireless Attendance control machine based totally on Iris reputation" reported by Kadry S. Et al., 2010, had recognized that iris popularity is one of the biometrics method that is a very dependable identity methods for all people. "A Low-price faraway Attendance tracking machine for growing areas" by Reda A. Et al., 2011, acknowledged that monitoring attendance of the staffs/students is a completely vital attention in enhancing the paintings efficiency of the personnel, academic consequences of the scholars, and etc. "Wireless Fingerprint based college Attendance gadget using Zigbee generation" described by Talaviya G. Et al., 2013, enumerated that the attendance gadget the use of fingerprint recognition is extra efficient than the guide attendance machine because it provide greater automation in managing the attendance of the scholars.

3 PROPOSED SYSTEM

2.1 Initial Idea

During the first phase, there may be a need to identify the all fundamental necessities in growing the device. The developer

will pop out with the advent of preliminary concept and become aware of the specified materials that associated with the paper in this segment. Therefore, the developer may also need to gather the necessities with the aid of conducting survey to folks that seem in all likelihood will contain in the machine improvement consisting of lecturer, student, and so on.

2.2 Design and Enforce Preliminary Idea

In the preceding phase, the developer had diagnosed all of the primary facts which include the business plan, mission plan, and a list of initial requirements from the users. So, the developer will perform the layout sports and implement the initial idea in growing the system. To begin with, the development of prototyping of the simple person interface might be mounted. The established simple person interfaces will consists of the interface of fingerprint scholar attendance machine in order to offer the clear pictures what the system will look like.

2.3 Refine Prototype till Perfect

In the preceding phase, the developer had come out with a list of verified necessities, gadget design, and assessment and comments approximately the lacking requirements. So, in this section, the developer will alter the device design thru the comments and assessment on the preceding phase. Inside the development of the first prototype, the developer will ensure that the development of the machine has fulfilled the verified necessities and gadget design received. In addition, the developer can even remember about the excellent of the system whilst developing it as well as carry out operations which includes program the gadget, carry out debug and check the machine. Hence, the first prototype of the biometric attendance system is created. After the evaluation of the primary prototype, the developer will file down the new or changed requirements for a reason as a overview for next prototype improvement. This section will be repeating time and again till the final set of requirements stated is set up. At the give up of this section, the developer will want to come out with a demonstrated very last set of necessities.

2.4 Whole and release prototype

In this segment, the developer will expand a complete enhanced attendance gadget primarily based on the validated very last set of necessities. Then, the developer will put in force the machine and carry out checking out to the final device. After all the necessities met, the system might be introduced because the permitted system with the needed functionality and best integrated. Consequently, the general goals/sub-objectives of the machine may be met at the quit of this phase. The contemporary attendance machine will get replaced by way of absolutely-computerized and automatic enhanced student attendance machine at the stop of this phase. The enhanced biometric fingerprint student attendance gadget may be executed ultimately of this segment. The document technology regarding to the student attendance could be to be had on the cease of this phase.

2.5 Machine Overall Performance Definition

In developing the machine, several centered enhancements were made for a motive to improve the accuracy, cost, time, and so on for the student attendance management system. To start with, the brand new student attendance system will assist

in ensure the accuracy of the scholar attendance records seeing that each student could be required to mark their attendance by means of scanning their fingerprint to the provided fingerprint reader. Consequently, none of the scholars might be able to faux their attendance within the new system. Further, because the device will robotically update the scholar attendance file in database whilst college students attend every class, so, the record technology function will promote a totally accurate records and end result for analysis cause. Within the file technology characteristic, calculation of the proportion of scholar attendance could be covered inside the behind code of the gadget which suggest teachers/staffs will handiest need to generate the document in a totally easy way every time. Besides that, the new student attendance gadget will help in store value and time for paperwork.

2.6 Implementation Problems and Challenges

There are numerous troubles and demanding situations were diagnosed in enforcing the brand student attendance control gadget. First of all, the first diagnosed implementation issue and mission is the value of hardware. However, because the contemporary attendance machine is the usage of paper-based to gain the students' attendance document. Consequently, initial price to buy the fingerprint reader hardware for each class could be very luxurious which require the college to aid a massive amount of modal in enforcing this device to the university. Aside from that, the second implementation problem is the lack of implementation time. As recognize, the entire paper from initial stage until the very last degree of the development is treated by means of best one developer. Therefore, time given to complete the challenge won't sufficient and someday may also cause negligence. In this case, the system might not be able to meet the final requirement. Besides that, the third implementation problem is stable network required in imposing this machine. Since the attendance obtained in each magnificence could be replace to database server without delay through the network, so, stable network is needed to quicker the processing. As demonstrated in this document, the numbering for sections upper case Arabic numerals, then upper case Arabic numerals, separated by periods. Initial paragraphs after the section title are not indented. Only the initial, introductory paragraph has a drop cap.

Activity Diagram:

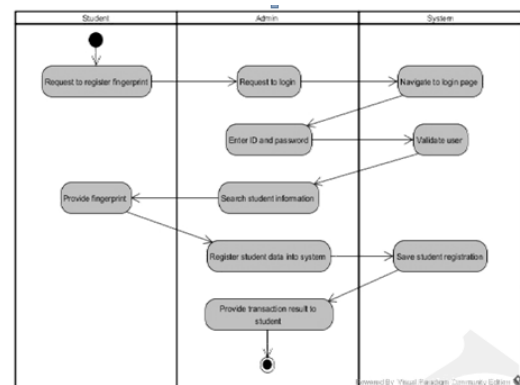
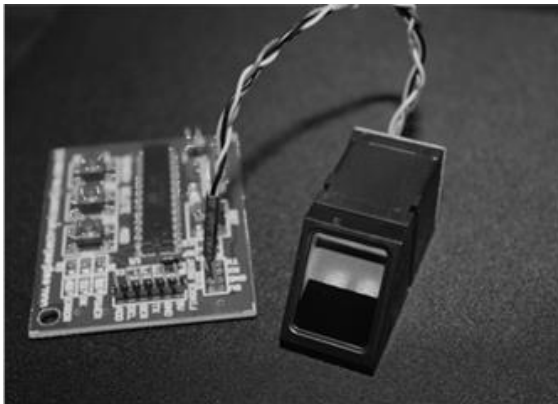


Fig. 1 Activity Diagram for Register Fingerprint (Student)

2.7 Hardware Design Specifications

Finger print scanner (R305 model): that is a finger print sensor module with TTL UART interface for direct connections to microcontroller UART or to laptop via MAX232/ USB-Serial adapter. The consumer can keep the finger print statistics inside the module and may configure it in 1:1 or 1: N mode for figuring out the character. The FP module can at once interface with 3v3 or 5v Microcontroller. A degree converter (like MAX232) is required for interfacing with computer serial port. Optical biometric fingerprint reader with top notch features and can be embedded into a variety of stop merchandise, including: get entry to manage, attendance, safety deposit box, car door locks. 328 controller: The Atmega328 is a totally popular microcontroller chip produced by way of Atmel. It is an eight-bit microcontroller that has 32K of flash reminiscence, 1K of EEPROM, and 2K of inner SRAM. The Atmega328 is one of the microcontroller chips which can be used with the famous Arduino Duemilanove forums. The Arduino Duemilanove board comes with both 1 of 2 microcontroller chips, the Atmega168 or the Atmega328. Of these 2, the Atmega328 is the upgraded, extra superior chip. In contrast to the Atmega168 which has 16K of flash software reminiscence and 512 bytes of inner SRAM, the Atmega328 has 32K of flash program reminiscence and 2K of inner SRAM.

Fig.2 Finger print sensor with interface board



3 TESTING AND DISCUSSION

Testing 1: Personal Profile. (admin, Student)

Testing Objective: To make sure users successfully inserted their personal details. (Admin, Student)

No	Test Case	Attribute and Value	Expected Result	Result
1	Verify the login ID and password entered by users after click on "Login" button with correct data provided.	User ID: 15L00002 Password: abc123	Login successfully.	Pass
2	Verify the login ID and password entered by users after click on "Login" button	User ID: Password:	Required Validator validation shown and require users to key-in	Pass

	with null value.		ID and password.	
3	Verify the login ID and password entered by users after click on "Login" button with invalid data provided.	User ID: 15L02 Password: 123	Login failed. Error message prompt out showing invalid login.	Pass

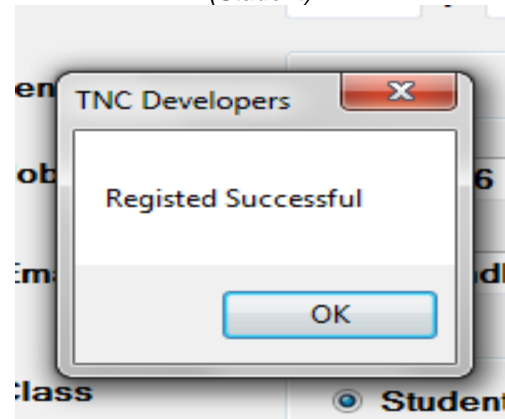
Table.1. Table of Login as Users (admin, Student)

Testing 2: Record Student Fingerprint Templates. (Student)

Testing Objective: To record student fingerprint templates into database.

No	Test Case	Attribute and Value	Expected Result	Result
1	Record the student fingerprint templates into database for attendance verification purpose.	fingerprint Templates: Long text – nvarchar(MAX)	Successfully store the student fingerprint templates into database.	Pass

Table.2. Table of Record Student Fingerprint Templates (Student)



Testing 3: Take Attendance. (Lecturer)

Testing Objective: To take attendance of student based on specific class.

No	Test Case	Attribute and Value	Expected Result	Result
1	Take attendance of student by matching their fingerprint.	fingerprint Templates: Longtext – nvarchar(MAX)	Successfully match the student fingerprint from database based on that class.	Pass
2	Send email to student who did not attend the class on fingerprint matching.	Email: Attendance taken for "studentID"	Send email to those who did not successfully verify their attendance on fingerprint matching.	Pass
3	All students who late for 15 minutes will automatically considered as	Countdown timer: 900s	Student who came to class after 15 minutes will be considered as	Pass

	late.		Absent.			form.		
4	Attendance taken session will be ended if the class attendance full.	Total student = Total attended	Attendance taken session will be ended once the attendance is full.	Pass	5	Remove student from the list once student successfully registered his fingerprint templates.	Remove grid view.	Remove the student id from the gridview list upon fingerprint registration succeed.
5	Those student who had been verified as attended will displayed on grid view for them to view.	Display on grid view.	Student ID of those who verified as attended will displayed on grid view automatically.	Pass	Functional Testing 3: Manage Class Attendance (Lecturer)			
Testing Objective: To take attendance of student during class.								

Table.3. Table of Take Attendance (Lecturer)**FUNCTION TESTING****Functional Testing 1: View and Edit Personal Profile (Admin, Lecturer, Student)**

Testing Objective: To make sure users able to view and edit their own personal details.

No	Test Case	Attribute and Value	Expected Result	Result
1	Retrieve own details from database and display to web control.	Textbox Name = "Kenya West"	Display details of login user correctly to the web control.	Pass
2	Click on Edit Profile button to redirect to edit profile page.	Click "Edit Profile" button	Redirect user to the edit profile page.	Pass
3	Click save button to save the personal details that had been amended.	Click "Save" button	Redirect user back to the view personal details page.	Pass
4	Click Change Password button to redirect to change password page.	Click "Change Password" button.	Redirect user to change password page.	Pass
5	Check on validation of the input details.	Check input validation.	Restrict users to simply enter wrong format details.	Pass

Functional Testing 2: Record Fingerprint (Admin)

Testing Objective: To record the fingerprint of those who not yet registered.

No	Test Case	Attribute and Value	Expected Result	Result
1	Show the student lists who have not register their fingerprint.	FP Record: Not Found.	Display a list of student who have not register their fingerprint to gridview.	Pass
2	Click on register button to start register fingerprint of specific student.	Click "Register" button	Show successful message upon registration success.	Pass
3	Single click on grid view to view details of clicked student.	Single click	Show details of student of the selected row.	Pass
4	Double click on grid view to open the register fingerprint	Double click.	Open the register fingerprint windows form.	Pass

No	Test Case	Attribute and Value	Expected Result	Result
1	Open the list of class on that day that belongs to the lecturer.	Class List	Redirect to take attendance page based on the class that class lecturer click.	Pass
2	Click on start button to start the timer and allow the students to start take attendance by matching their fingerprint.	Click "Start" button	Verification of student attendance will started upon the start button clicked.	Pass
3	Display the timer showing the time left for student to take their attendance.	Timer	Show countdown timer showing how many time left for student to take attendance to prevent student lateness.	Pass
4	Show the total number of student who attended the class.	Verify attendance	Show the total number of student who attended the class on a textbox.	Pass
5	Email student upon attendance verified.	Email: email address	Email student automatically once his/her attendance verified by the system.	Pass

4 CONCLUSION

In conclusion, an enhanced biometric based student attendance system is developed to switch the standard traditional attendance system to biometric system that is presently widely used by several colleges and universities. The paper is considered as a success once because of the enhanced biometric based student attendance. The system is designed for the teachers to make the whole attendance process to be easy, safe and accuracy. The implementation of biometric technology can facilitate in scale back errors. The paper is designed to aim in eliminating noticed issues throughout the initial analysis. The problems noticed are buddy-signing, missing the bit of attendance sheet, skip class issue, and exhausting hard in analyzing the students' academic performance and the attendance record earlier. These issues are the major problems long faced by most schools, colleges and universities. It means that the problems are faced by both the teachers and the students' because of the usage of conventional student attendance system. Therefore, this paper is designed in effort to eliminate these problems. Some resolution has been applied to avoid the

problems which includes and enhance the use of biometric technology, changing the current system to fully-computerized online system, provide accurate, easier way to generate the reviews and reports. With the planned solutions, clearly seen not solely can eliminate these noticed problems but at the same time conjointly promote a really reliable time ways in managing the enhanced biometric student attendance record.

5 FUTURE WORK

The enhanced biometric based Students' Attendance System is developed only for the use of teachers and students'. In future, the work of the paper is enhanced and it be used by the entire teacher in a university, school, or college. The student has only the limited feature to use the system. In the future period, the resources are higher and then the student should be able to work in the system directly without the help of the teacher and other faculties. The report generated will only be in the PDF format. There is no other challenging option for the teacher to generate the report. Besides that, the system developed only can be used only on the desktop or laptop. There is no usage on Smartphone. In future work, this system should focus more on smartphone development to ease the attendance process. Last but not least, an enhanced biometric based Student Attendance Management System will still have a lot to improvement in order to meet every roles requirement. However, current version is good enough to be implemented to the real life to be used.

6 REFERENCES

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