
Student Tracking System with Bluetooth Low Energy

Vinay Mahendraker, Savitha D

Siddaganga Institute of Technology Tumakuru, Karnataka, India

Siddaganga Institute of Technology Tumakuru, Karnataka, India

PG Scholar, Department of E&I Siddaganga Institute of Technology

Assistant Professor, Department of E&I, Siddaganga Institute of Technology

Abstract-Using different wireless technologies several recent trends have produced student tracking systems to monitor the students' performance. Along with the performance, student's movement tracking is also necessary since it concerns to safety measure. There might be a situation where student has left home but has not reached the school. In that case the tracking will help both parents & teacher to know where the student is. The main aim of this proposed scheme is to keep track of the student & if any unusual activity is found then the parents/teachers are informed with an alarm. With this project the parents will easily get to know where their child is. The whole project consists of two units; first one being the school unit where BLE (Bluetooth Low Energy) device is placed in each student ID card and readers are placed in the class room. The second one is the bus unit where a GSM module with the GPS is placed. With the help of an Android application all the details of the student are sent to their parents respectively.

I. INTRODUCTION

Parents always worry about their child's safety. Since a child spends its most of the time in school, the school plays an important role in a student's life. Tracking of the students' movement will provide information to the parents. The proposed system contains Bluetooth Low Energy model. The BLE as the name indicates it consumes less energy compared to the normal Bluetooth. There will be a database which contains all the details of the teachers & students in a school. Each student will be provided with an ID card which will contain the Bluetooth low energy and Media Access Control IDs. As the students enter classroom with the ID card being on them, reader will read the MAC ID present on the ID card. Then those are compared with the already present data in data base & mark the student as present in attendance report.

At the transportation level, for the bus unit we have a GSM module with the GPS. When a student enters the bus, their respective parents will get a notification in their app that their child has entered the bus and the same process while student gets down from the bus. By mistake, if the student gets down at the wrong stop, it will also be informed to the parents. The bus unit will inform if there is a delay in reaching to the dropping point. In this way every activity of the student will be captured.

The mobile app will contain all the details of each student. Parents and teacher both can be registered to the app. Each parent & teacher will be provided with an ID & password during the registration. Parents can access their child attendance; they can make a leave request & etc. teachers can upload the time table changes, progress of the student. The changes in time table can be seen in the app. If there is a holiday it would be informed to the parents through the app. This will contain all the notification about the student & school.

II. LITERATURE SURVEY

The proposed system maintains the record of the students of a class with the help of RFID tags based tracking and GSM module. System consists of RFID tags that are given to each of the student. The readers are kept in the classrooms and other places so that it could receive the tags easily. The transmitter will transmit its location regularly. The receiver will receive the location of the tags [1]. The GSM module is used to send message to respective parents.

There also has been use of use Wi-Fi model and system to track the attendance of student. The access point is put in the classroom. When the

student mobile phone interacts with the access point attendance is marked. Attendance is marked with the of unique identity number. Then the data is sent to server with the help of AES encryption algorithm [3].

Another proposed system uses Mifare technology; it will consist of Mifare tags and readers. They have considered Mifare technology which is simpler. In this system the reader has to be placed at all the places. As the student enters the school/college premises the readers are kept on different places of the different locations. The drawback of the system is the range of the Mifare reader and tags are very less. Area coverage is less i.e. in terms of centimeters [3]. There also been use of the Bluetooth smart and beacon to take attendance of the student. As the student enters the classroom the Bluetooth will consider the student as present and mark him as present. And all the data will be maintained in the server [4]

They have made use biometrics and Radio Frequency Identification technology. The student need to wear RFID tag and also he has to scan his finger on the fingerprint scanner, then the student will be marked as present. The proposed system in [5] is web based automated system for attendance recording; SMS alerts are introduced in the system so that the regular attendance record of the student can be sent to their parents.

III. METHODOLOGY

Previously there has been use of the RFID for the tracking of the student; it is mainly used for the attendance purpose. The previous systems have some drawback, they are not that efficient. They don't keep track of the student. This is where the proposed system will come into picture. It will track every movement of the student. Parents can easily get information about their child. Here a simple methodology is followed. Every student will be given an identity card. That contains the Bluetooth low energy transmitter. The readers will be kept in the class room, at least three readers in a room that will be fixed in the classroom. As the student enters the classroom the reader will receives advertise that is coming from the BLE present in student's identity card and it will mark as present in the system. In this way the student has been marked as present in the system.

IV. SCHOOL UNIT

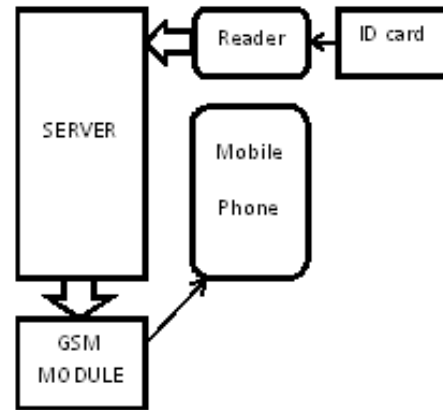


Figure 1: Block diagram of school unit

a) SERVER

It is the main block of the system. The server contains all the basic details of all the students and teachers, the information like the student name, data of birth, student father's name, mother's name and their contact number, it also contains the time table of the class. Here we have made use of php my admin, PhpMyAdmin is a free software tool written inphp, intended to handle the administration of MySQL over the Web. PHP is acronym for hypertext preprocessor. phpMyAdmin supports a wide range of operations on MySQL and MariaDB.

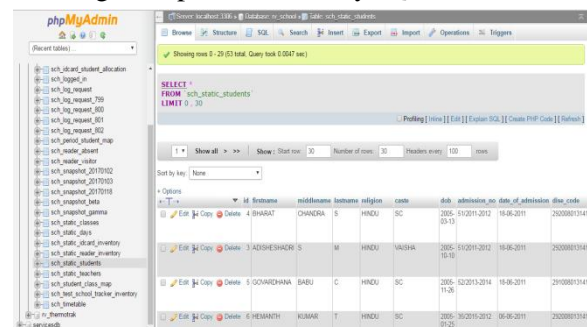


FIG 3: The student database

b) ID CARD

Each student will be provided with an ID card, it contains the Bluetooth Low Energy chip, which contains a unique MAC ID.

c) READER

The reader block mainly contains power supply unit, RTC board (DS1307), ESP module and BLE module. All these blocks are assembled together. For one classroom one reader is fixed.

d) **GSM MODULE**

This will be used to send the message to the parents' mobile phones, which doesn't have a smart phone.

V. **BUS UNIT**

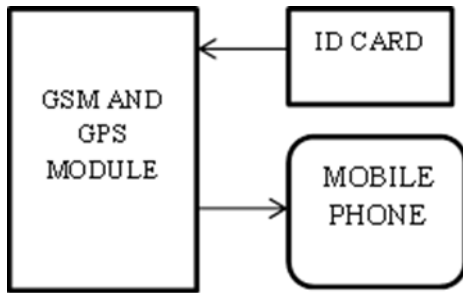


Figure 2: Block diagram of Bus unit

a) **GSM & GPS MODULE**

It is used to get the location of the school bus. It will send the student's location to the app installed in parents mobile, it will also send information about the timings of the school bus reaching to pick up or drop point.

a) **MOBILE PHONE**

The mobile unit contains the application of the student tracking system. The application will be in Android based.

Parents need to download the application and register into the system with their mobile number. Then the details of the student can be seen by parents. Figure 4 and 5 shows the application registration and login page. In the application registered parents can get attendance of the student.

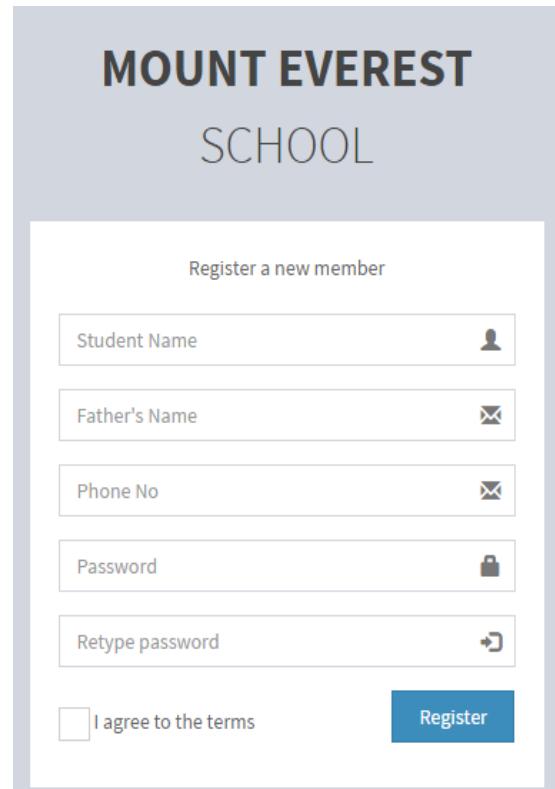


Fig5 : The registration page of application

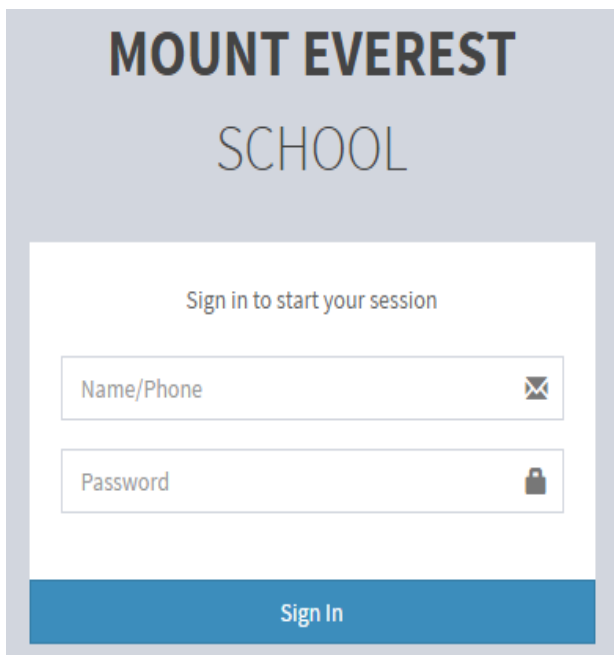
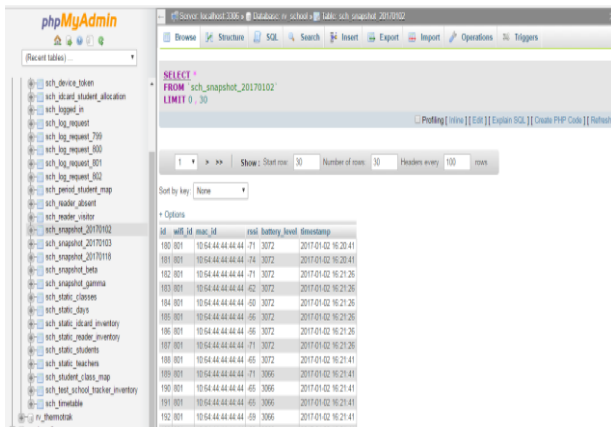


Fig4 : The registration page of application

VI. **TESTING**

For the testing purpose the system has been deployed in the school. The reader is placed at the four walls of a classroom and students are provided with the ID card. As the student enters the classroom, reader will pick up the student's MAC ID and sends the same to the server. The server will collect the data obtained and compares that with the data previously stored in the system, if the data matches then it marks that student as present and if it does not match, it will mark as absent. That will make sure the attendance has obtained correctly.

Figure 6 shows the database of the students present in the classroom. The server will compare this with the student's database that is already present previously & send the number of absent and present students list.



id	wifi_id	mac_id	room	battery_level	timestamp
180	001	1054.44.44.44.41	71	3072	2017-01-02 16:20:41
181	001	1054.44.44.44.41	74	3072	2017-01-02 16:20:41
182	001	1054.44.44.44.41	71	3072	2017-01-02 16:21:26
183	001	1054.44.44.44.41	62	3072	2017-01-02 16:21:26
184	001	1054.44.44.44.41	68	3072	2017-01-02 16:21:26
185	001	1054.44.44.44.41	65	3072	2017-01-02 16:21:26
186	001	1054.44.44.44.41	45	3072	2017-01-02 16:21:26
187	001	1054.44.44.44.41	71	3072	2017-01-02 16:21:26
188	001	1054.44.44.44.41	65	3066	2017-01-02 16:21:41
189	001	1054.44.44.44.41	71	3066	2017-01-02 16:21:41
190	001	1054.44.44.44.41	65	3066	2017-01-02 16:21:41
191	001	1054.44.44.44.41	69	3066	2017-01-02 16:21:41
192	001	1054.44.44.44.41	69	3066	2017-01-02 16:21:41

Figure6: Database of the students in the classroom

VII. CONCLUSION

The system proposed system provides a better solution for student tracking. Each student parents would come to know whether their child is attending class properly or not. This will be really helpful parents in knowing their child's activities. If any other uneven activity is found with the child it will be informed to parents. It can further be enhanced by adding readers at various places like school premises and playground etc.

REFERENCES

1. SaikiranChatrati, Sumanth Naidu and Raghav Prasad, "RFID based Student Monitoring and Attendance Tracking System" 4th International Conference on computing communication and Network Topologies 2013
2. Abhilash Kale, Neil Sharma, Behara Manoj Kumar, Ajay Patil, pp 318-322 volume 6 International Journal Computer Technology & Applications 2015
3. Mi Young, Dae-Jeocho "Design and Implementation of Automatic Attendance Check System Using BLE Beacon" pp 177-186 no10 vol10 International Journal of Multimedia and Ubiquitous Engineering
4. PranaliShirude, MayuriShelar, ManishaThete, VarshaJ undare "Student Tracking And Attendance Monitoring System Using Mifare Technology" volume 1 special issue International Journal of Advance Foundation And Research In Science & Engineering 2015
5. Shrinidhi MB, RonilRoy "A Web Enabled Secured System for Attendance Monitoring and Real Time Location Tracking Using Biometric and Radio Frequency Identification (RFID) Technology" International Conference on Computer Communication and Informatics jan 8-10, 2015
6. ShoutaNagochi, MichitoshiNiibori "Student Attendance Management System with Bluetooth Low Energy Beacon and Android Devices" 18th International Conference on network based information system 2015