

Bluetooth Automatic Attendance Management using Android Application

Rudra Malali, Naman Jangid, Pranjali Satish Deshmukh, Halgaonkar Prasad S.

Abstract—The day-to-day Attendance and its maintenance has become a big problem statement that needs to be solved with an effective but still affordable and portable system. The attendance system currently present in institutes is based on manual methods or RFID, Wi-Fi, Face recognition, etc which has proven to be either time consuming or expensive with complex implementation. While the same is achieved in this paper using Bluetooth system auto attendance management. Hereby proposed method marks attendance by authenticated Bluetooth addresses and also checks for the false attendance, making it reliable.

Keywords—Bluetooth, Attendance, SQLite, Bluetooth Adapter .

I. INTRODUCTION

The regular monitoring of attendance is another obligatory task of faculties in every university which cost them valuable teaching time in their lectures. The attendance plays important role when it comes to applying university criteria of 75% attendance for exam eligibility and smooth monitoring of colleges[8]. The Attendance system should consider following things while marking the present students:-

- The student should be present throughout the lecture hours.
- No Proxy or false attendance should be marked.
- Any error or special case should be tractable and corrected easily.

And this all is achieved in hereby methodology by using Bluetooth addressing for unique identification and tracing of students in class. The Students don't have to use any extra chips or tags with their phone or ID card. Simply the Bluetooth of phone and its unique address will be used for marking the attendance. This system will also use a double check method for tracing the present students to avoid any False Attendance from getting marked. Hereby mentioned method proves to be better as no use of excess identification tags/cards is required.

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Also marking of attendance is not done one-by-one but in bulk which saves time, in introducing the system as well as in using it.

Further the paper is structured as Section II Literature Review, Section III Technical Background and Section IV includes Conclusion and discusses the future scope for research[9].

II. LITERATURE REVIEW

There exists a different Smart Attendance system which uses techniques like RFID reader, Fingerprint Biometric devices, Smart Card system, Face recognition, etc. Like author Ignace T. Toudjeu has RFID smart cards in paper [1] to identify students and RFR101A1M to translate the details on card and mark the attendance. While in [2] RFID reader is incorporated the with ARM LM3S9B90 microcontroller and Philips's MFRC531 transceiver chip[10].

The use of Smart card like Mifare 1K using Raspberry Pi3 for card reading is proposed in paper [3]. This paper has demonstrated the method using two software application GM Card Manager and GM Card Attendance System which enables faster processing of data with detailed information[11].

More advance methods of IOT smart applications were used in [4] for attendance management system. Whereas, [5] uses double check attendance through fingerprints and voice identification. The verification of candidate is done through the application by tracing the fingerprints and voice message sent.

With time, image processing is being used in many applications for smart attendance. The [6] paper uses the face recognition process, where filtering of images is done using Euclidean distances. The student is meant to upload a video of 3 second for marking of attendance. Similarly in [7], the author proposed a method of face recognition and used Convolution Neural Network for identification of student from the video sequence[9].

All these methods used so far take time in initial installation, demand for advance devices like smart phones and tablets and also mark attendance person by person. Whereas the proposed method proves best to all these as it doesn't demand for smart IOT applications or excess external hardware.



III. TECHNICAL BACKGROUND

A. Flow of Implementation

The proposed method includes two stages for implementation, Preparative stage and Attendance Regulation. In first stage every student's data is collected and mapping of Bluetooth address is done. Along with uploading of the timetables of each class[10]. After the process of data preparation the Attendance management system is operated in real-time scenarios using android applications installed in teachers and students phone. The Bluetooth of student's phone is triggered at particular intervals during the lecture hour and students are traced[11]. Finally the teachers verify and submit the attendance to save it into database.

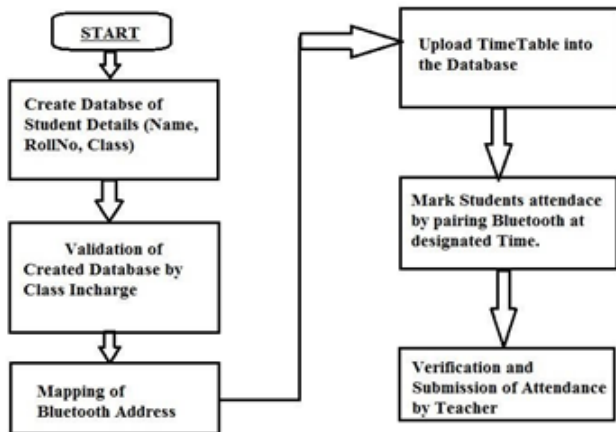


Fig 1. – Flow of system implementation.

B. Preparative Stage

The Database used here is SQLite for maintaining the attendance of the students and regulating the updates. The SQLite database is Relative Database Management System (RDBMS). The defining of schema and contract is followed with creation of dataset with all required student details like Name, Roll number, class, etc. This all is achieved using the SQLiteOpenHelper class functions.

The getWritableDatabase() function helps the admin (teacher) to open the database and then create dataset using onCreate(). The traced Bluetooth addresses are passed with mapped student details into the database using the function insert(petEntry.Table_name, NULL, contentValues());

The features of viewing the database to teachers and students into their respective apps is done using the query() function. Also the SQLite provides onUpgrade() function to update the dataset contents.

Student_id	Student_Name	Class	Attendance_Percentage
1001	ABC	TE	76
1002	PQR	TE	87
1003	XYZ	TE	65
1004	STQ	TE	56
1005	YWQ	TE	94

Fig:-Database entry details

C. Attendance Regulation

The Process of Attendance marking occurs in following steps :-

- Scheduling attendance marking time

- Pairing of devices for tracing students
- Reading the Bluetooth Address
- Mark attendance after identification and verification of address.

- Final update in Database.

The Scheduling of attendance marking time and turning on the Bluetooth is incorporated using AlarmManager class functions. The time constraints used here are for first 15 minutes of lecture hours and again for verification for another 5 minutes picked over by random() function.

Once the Bluetooth is turned on of students present in class the Action_Pair_Request() function pairs the devices and track the students. The list of paired devices and their unique Mac address are obtained using getBondedDevices() function.

The MBluetoothAdapter helps turn on and off the Bluetooth of devices present in its range automatically which reduces the manual efforts. The obtained list is verified by teachers through app and submitted, to update attendance in database. Thus, attendance are marked and submitted without any human efforts.

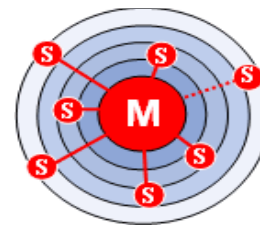


Fig 3 – Tracing Student's Bluetooth (S) by Teacher

CONCLUSION AND FUTURE SCOPE

The Attendance Management system play a crucial role in universities as they cut down the required time and work of teachers and simplify the daily task using an automatic system. The existing methods have many complications over implementation and have high expenses. While cost of implementation and ease of function of proposed method makes it user-friendly and adaptive. The time constraints and double-check functionality avoids the risk of false attendance and error in identification. The auto on/off of Bluetooth eliminates the human interference in the complete system for marking attendance. The time for marking attendance is less as it's done in bulk than individually. Thus, the proposed method proves to be better and adaptive in real-time applications than current system.

The Future Scope may include, improvisation of the system by defining the Bluetooth tracing range and including the challenges for better verification.

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