UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF ATTENDANCE SYSTEM FOR STUDENT USING BLUETOOTH DEVICE CONNECTION

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor's Degree of Electronics Engineering Technology (Telecommunication) with Honours

by

MUHAMMAD AINOL HAFIZ BIN MAT DEWI

B071410062

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TAJUK: **Development of Attendance System For Students Using Bluetooth Device Connection**

SESI PENGAJIAN: **2017/18 Semester 1**

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfilment of the requirements for the degree of Bachelor of Electronics Engineering Technology (Telecommunications) with Honours. The member of the supervisory is as follow:

……

(En. Mohd Anuar Bin Adip)

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ABSTRAK

Pembangunan sistem kehadiran untuk pelajar menggunakan sambungan peranti Bluetooth adalah sistem kehadiran untuk membantu pensyarah mengenal pasti pelajar yang menghadiri sesi pembelajaran atau tidak hadir di mana borang kehadiran diisi oleh rakan sekelas. Sistem ini akan berfungsi sebagai rakaman kehadiran pelajar semasa sesi kuliah di bilik kuliah. Sistem merekod kehadiran ini berfungsi dengan cara pelajar perlu log masuk ke sistem kehadiran dua kali di mana log masuk ke sistem kehadiran pada awal kelas (Masuk) dan kemudian log masuk ke sistem kehadiran 5 hingga 10 minit sebelum akhir kelas (Keluar). Pelajar juga perlu berada di kawasan liputan Bluetooth yang berada di dalam kelas. Jika pelajar tidak berada di dalam bilik darjah, pelajar tidak boleh log masuk ke sistem kehadiran kerana di luar kawasan liputan Bluetooth. Data yang diterima pada raspberry pi 3, akan dipindahkan ke memantau untuk memaparkan senarai pelajar yang hadir semasa sesi kuliah. Jika data setiap pelajar terdiri daripada dua kali log in iaitu merangkumi rekod bermula dari sesi kuliah hingga akhir sesi kuliah, kehadiran akan direkodkan dan jika tidak, kehadiran tidak akan direkodkan. Sekiranya berlaku keadaan di mana pelajar lupa membawa telefon bimbit atau kehabisan kuasa bateri, pelajar perlu mengisi borang kehadiran dua kali dengan cara mengisi borang kehadiran di awal kelas (Masuk) dan yang kedua adalah mengisi dalam bentuk kehadiran 5 hingga 10 minit sebelum tamat kelas (Keluar) di hadapan pensyarah untuk mengelakkan ketidakjujuran apabila mengisi kehadiran dengan memadankan kad ID pelajar dengan senarai pelajar dalam borang kehadiran.

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ABSTRACT

Development of attendance system for student using Bluetooth device connection is an attendance system to help lecturer to identify the students who truly represent the learning sessions or absent where the attendance form filled by classmates. This system will function as recording the attendance for students during the lecture session in classroom. The system record the attendance where students have to log in the attendance system twice which is log in the attendance system at the beginning of class (In) and the second one is log in the attendance system 5 to 10 minutes before end of class (Out). Students also have to be in Bluetooth coverage area which is inside the classroom. If students not be in the classroom, students cannot log in the attendance system because of outside from Bluetooth coverage area. The data received on raspberry pi 3, will be transferred to monitor to display the list of students that presence during the lecture session. If the data of each students consists of two times logging in start from lecture session until the end of lecture session, the attendance will be record and if not, the attendance will not record. If there occur a situation where students forgot to bring mobile phone or run out of battery power, students have to fill the attendance form also two times which is fill in the attendance form at the beginning of class (In) and the second one is fill in the attendance form 5 to 10 minutes before end of class (Out) in front of lecturer to prevent the dishonesty on filling the attendance by matching the student ID card with the students list in the attendance form.

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DEDICATION

To my beloved parents, the sacrifices you give will not be forgotten. As a human being knowledgeable of service and goodness you can not reply to me. It is also dedicated to my friends and supervisor of Universiti Teknikal Malaysia Melaka who involved directly or indirectly in assisting me during the course of this final year project and finishing this project report.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will present all the description of this research which is about the students attendance system using bluetooth by declaring the background and the objectives and also the scope of this project. The objectives of this project are to solve the problem statements declared in this chapter.

1.2 Background of Project

This project describes about the dishonesty of students on filling the attendance form during lecture session. The idea is intended to help lecturers to identify the students who truly represent the learning sessions or absent where the attendance form filled by classmates. By using signing method for attendance without monitored by lecturer of the subject, it will be easy for students to deceive the attendance. From that, by applying the use of bluetooth connected with students mobile phone, students should attend the lecture session to ensure the attendance recorded and it only will be record if students complete to register during the beginning of class session and the second register within 5 minutes to 10 minutes before the end of class session.

1.3 Problem Statement

The problem that often occurs is about the dishonesty of students on filling the attendance form. This problem occurs because the attitude of some students that are not actually attend the lecture sessions that students should follow but the attendance

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on the form filled by classmates. Based from that to overcome this issues, the concept idea was created.

1.4 Objective

The objectives of this project is recommend to prevent students from dishonesty of filling the attendance form for lecture session. To achieved this project, the objectives should be successes by:

i. To solve problem of dishonesty of filling the attendance for lecture session

ii. To develop attendance system for students using bluetooth

1.5 Scope of Work

In order to achieve the objectives of the project, the scope have been decided:

i. This project will focus during lecture session only within two to three hours in classroom.

ii. The scope of project is using bluetooth connection that connected with student mobile phone in classroom.

iii. Raspberry Pi system used in this project where it operate by receive data transmitted from mobile phone and displaying the data on monitor.

1.6 Project Outline

This report includes 3 chapters that will show and describes the flow of this project. The first chapter consists of the background of this project, problem statement, objectives and the work scope of this project.

In second chapter consists of the literature review where in this chapter describes what should be done to complete this project which is consists of the comparisons of previous related work and to do some analysis on possible hardware and software to be used in this project.

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In third chapter is about the methodology where in this chapter describes the method how to implement this project which is consists of the flow of the whole project and the flow of how the system will work.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter will cover about the informations and comparisons related with this project based on research that has been gathered from previous journals, research's, books or websites about bluetooth attendance system.

2.2 Previous Related Work

2.2.1 Bluetooth Smart Based Attendance Management System

Riya Lodha, Suruchi Gupta, Harshil Jain, and Harish Narula (2015) mentioned that the quality of lecture session is based on the time taken to fill the student attendance and sometimes it is inaccurate when use the manual process. Based on this criteria, they come out with a system known as Bluetooth Smart Attendance Management System which is more efficient and effective where the time of data entry will be more accurate. Furthermore, it only use low cost and compatible with large number of mobile phones, tablets and computers.

This system is a combination of microchip technologies and radio frequency which is to provide a secure system for identification, monitoring and for maintenance of object inventories. This system use tiny chips called tags where it is use to contain data transmit it in form of identifiable information to a Bluetooth Smart enable device. This system suitable use around the

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Mumbai University (MU) policy to ensure a 75% of course attendance by students before examination session for any course. It will lead the students database management system that cannot be manipulate by anyone, reduce the time taken for the students attendance during manual process.

The advantages of this system is the tags can be embedded into the student identification cards (student ID card) where it easy to be read during any motion and the tags does not need to be facing the reader each other. The tag still can be read even it submerged or covered with dirt and because it has a tiny physical, it only use low power consumption.

The bluetooth tags need to be programmed and configured to make it easy to communicate with the Android application via bluetooth. The attendance will be recorded into database entry when students attend the lecture session with accurate time stamp and the bluetooth tags only can be detect within the coverage area in order to avoid detection of tags that outside the classroom.

The spectrum range for the system is from 2.4 GHz until 2.4835 GHz ISM band as Classic bluetooth technology. The database program will continue to register the students attendance for the particular course if the tags is valid where it has been registered to selected student.

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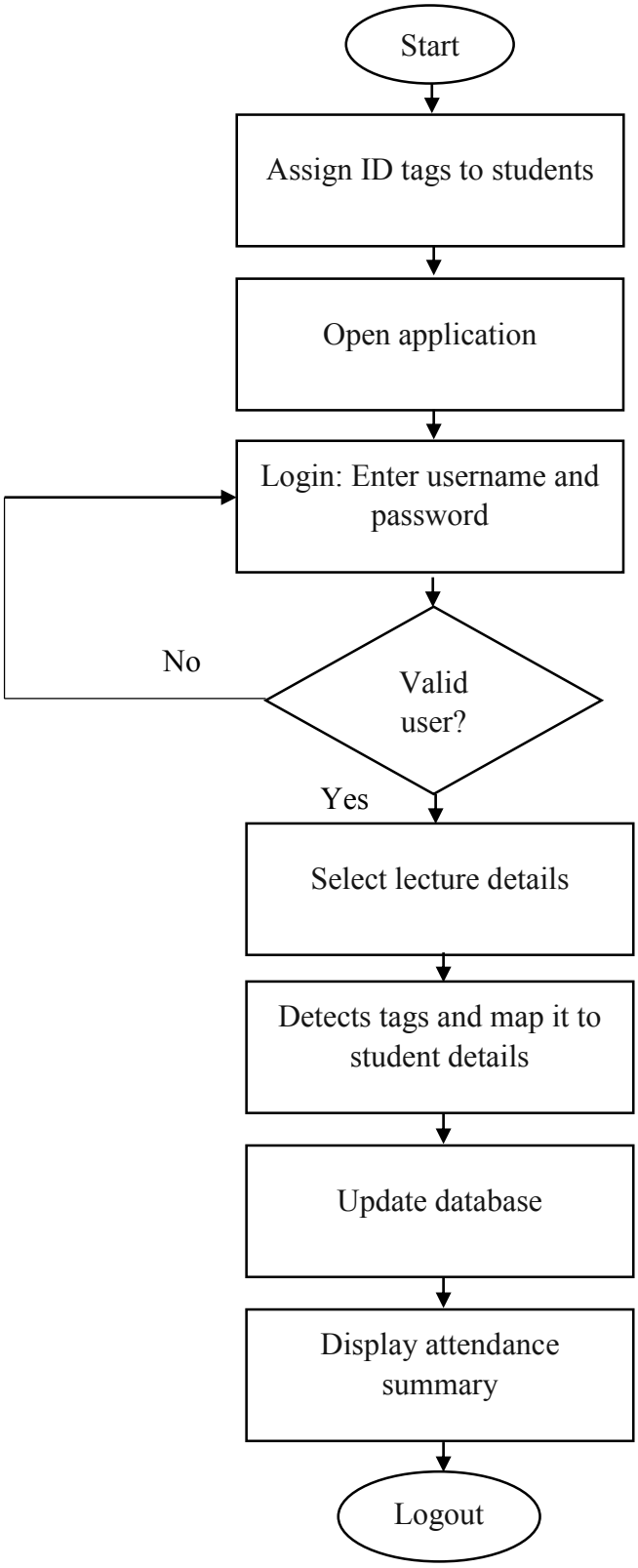

Figure 2.1: Flowchart for the student attendance management system

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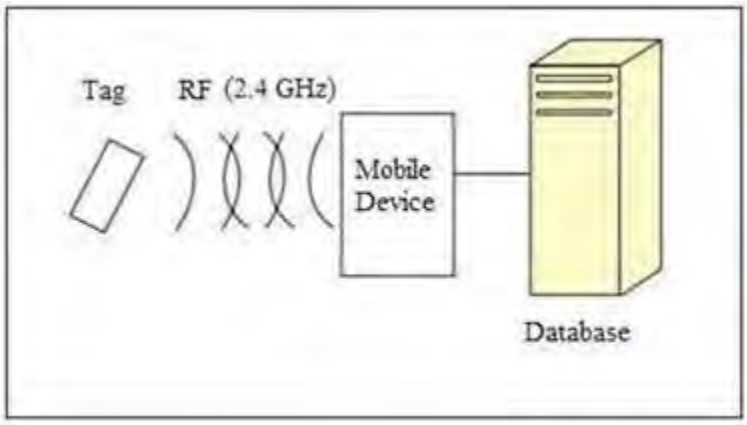

Figure 2.2: Bluetooth Smart System Operation

2.2.2 Smart Attendance Management using Bluetooth Low Energy and Android

Raghav Apoorv and Puja Mathur (2016) mentioned that by collecting the students attendance manually on attendance form is a burdensome and take a long time. Based from that, the idea to create smart attendance monitoring using Bluetooth Low energy was created. The students attendance taken when the beacon stickers that attached to students card sensed by the bluetooth sensor that turned on by teacher within range around 200 meter when students enter the classroom.

The data can be visualize in different modes such as a list mode and a pie chart to make the data easy to analyze. The use of sensor is to avoid any kind of error or false attendance where the number of students in the classroom counted by the sensor. If there any mismatching data, it will notify the teacher. The data also can be manually change by teacher if there are some sensor stops working.

The use of Bluetooth low energy (BLE) technology in this system is because it can reduce usage of power and cost [2]. Furthermore most mobile operating systems natively support Bluetooth low energy including Android. The sticker beacons used for this application where it is microcontroller consisting of a CPU, accelerometer, temperature sensor and a 2.4GHz radio. The radio uses Bluetooth 4.0 also known as Bluetooth low energy.

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The estimote sticker beacons used for this application is in regular size beacons compared with the usual size [6]. The battery life is around a year and it can easily be replaced. It has low usage of power and cost which make it as suitable for this project. It only can be attach on one side to the identity cards of students. It can transmit Bluetooth signals up to 7 meters (20 ft) [7] and also as a waterproof device. There is no limit to the number of stickers that can be monitored in a region.

The application for taking attendance and storing records was develop on an open source mobile operating system Android since is used widely in smartphones where Android currently has 84% of the world's share in the mobile industry. It was designed mainly for touchscreen devices such as smartphones and tablets based on Linux Kernels.

The development of Android comes with its Software Development Kit (Android SDK) which provides the developers the API (Application Programming Interface), libraries and developer tools necessary to build, test and debug applications. The IDE used for the development of this Application is Android Studio developed by Google, it is the official integrated development environment (IDE) for Android Platform Development. Android applications are developed in JAVA hence, JDK (JAVA Development Kit) is another requirement for the compilation of the code for the application.

Android Bluetooth APIs allows device to wirelessly communicate, scan or connect with others Bluetooth devices through it [12]. The Bluetooth adapter is one of main component for bluetooth activity in an application where it needs to check whether the Bluetooth is enabled or not. If the Bluetooth is not enabled, it will request to enable the Bluetooth of the device. The callback method used to scan Bluetooth enabled devices.

The creation for User Interface in Android application is using Material Design guidelines as stated by Google. JAVA and the XML used as language mode of communication between the applications where it is considered as a standard process to transport and store data. By using JAVA, the layout elements are initialised and the functionality is programmed.

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The application for the smart attendance management system contains class activity when students run the application. It provides the user interface of the application. The main activity of the application contains a switch button to toggle between the class attendance and bus attendance mode, reports button which is the attendance reports for class taught by the teacher and button to take the attendance which is clicking starts the beacon detection.

Figure 2.3: User interface for attendance system

Figure 2.4: Beacons scanning process

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The beacons within the classroom range will be detect by the sensor and added to a list. The detected beacons are displayed as Figure 2.4 and it will keeps updating the adapter as soon as the beacon is detected. All the detected beacons are then displayed in a list as a recycler view. The detected beacons provide the UUID, Major and Minor values where these value are checked in the SQLite Database and provides the Roll Number against which the particular beacon is mapped and attendance is marked for the beacon. The undetected beacons will be marked absent for the class. The data will be visualize using pie chart when the attendance process is complete where it shows the precentage of students that presence and absent for the class session.

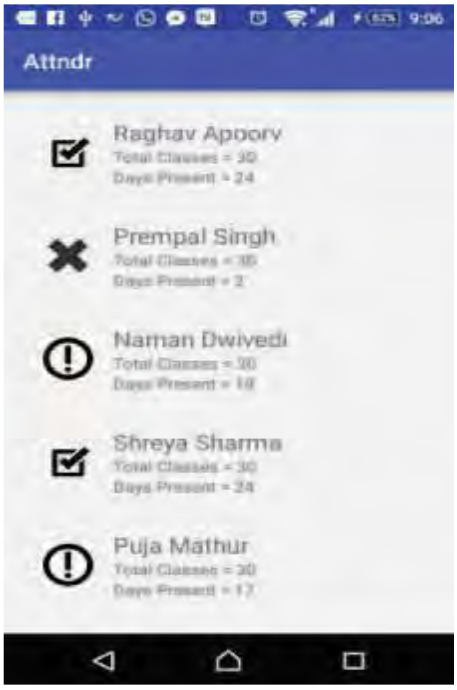

Figure 2.5: Attendance List

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