SMART ATTENDANCE SYSTEM USING QR CODE

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Engineering Technology (Computer System Engineering) (Hons.).

by

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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Computer Engineering Technology (Computer System) with Honours. The member of the supervisory is as follow:

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Supervisor : PN.NIZA BINTI MOHD IDRIS

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Co-supervisor : PN.ROSZIANA BINTI HASHIM

ABSTRACT

In this technology era, outstanding innovation are being innovated to change the conventional system to digital system to ease the end user. This project proposes to provide digital solution for one in many conventional systems which is taking record of student's attendance by requesting students to put signature in an attendance sheet where probability of false attendance is higher. The attendance system that will be developing in this project has capability of recording student's attendance based on QR code which will be generated by lecturer during class. In order to get students attendance, lecturer will display the generated QR on lecture slide. The students can then scan the displayed QR code using the application system, provided to them through smartphone market by university (UTeM). The application then communicates the information collected to the server module to confirm the attendance. Once all the student's data match the criteria such as student id and password needed, the student's data will be sent to database. This way, the database will save the transaction as well as register the appropriate attendance status. Students smartphones must communicate with the server via local Wi-Fi coverage offered by UTeM. Since, the attendance is being tracked digitally, there are no possibility to falsify the attendance. This system also prevents students from attending unregistered lecture or subject. Furthermore, this system will be calculating the total attendance and issue warning/barred letter automatically to students via email.

ABSTRAK

Dalam era teknologi ini, inovasi yang mantap akan sentiasa inovatif untuk menukar sistem konvensional kepada sistem digital untuk memudahkan pengguna akhir. Projek ini bercadang untuk menyediakan penyelesaian digital bagi banyak sistem konvensional yang mengambil rekod kehadiran pelajar dengan meminta pelajar untuk meletakkan tandatangan di kertas kedatangan di mana kebarangkalian kehadiran palsu adalah lebih tinggi. Sistem kehadiran yang akan memajukan projek ini mempunyai keupayaan untuk merekodkan kehadiran pelajar berdasarkan Kod QR yang akan dijana oleh pensyarah dalam kelas. Untuk mendapatkan pelajar kehadiran, pensyarah akan memaparkan QR yang dijana pada slaid kuliah. Pelajar kemudian boleh mengimbas kod QR yang dipaparkan menggunakan sistem aplikasi, diberikan kepada mereka melalui pasaran telefon pintar oleh Universiti (UTem). Permohonan itu kemudian berkomunikasi maklumat yang dikumpul dengan modul pelayan tersebut untuk mengesahkan kehadiran. Sebaik sahaja semua data pelajar yang sepadan dengan kriteria yang diperlukan, data pelajar akan hantar ke dalam pangkalan data. Telefon pintar pelajar perlu berkomunikasi dengan pelayan melalui liputan Wi-Fi tempatan yang ditawarkan oleh UTeM. Sejak, kehadiran yang dikesan secara digital, tidak ada kemungkinan untuk memalsukan kehadiran. Sistem ini juga menghalang pelajar daripada menghadiri kuliah yang tidak berdaftar atau subjek tambahan lagi, sistem ini akan mengira jumlah kehadiran dan mengeluarkan surat amaran/dihalang secara automatik kepada pelajar-pelajar melalui e-mel.

DEDICATION

To my beloved parents

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CHAPTER 1

INTRODUCTION

1.1 Background

Attendance is a basic and important criterion which plays a huge role in today's higher education. Attendance is used as a record to access student consistency in attending the class. Most students are prone to absences because of boring classes and laziness to attend the class. Several studies have shown that the attendance is an important predictor of academic outcomes which mean students who attend classes are more likely earn higher final grades. If the attendance is less than 80% of total classes, the student will be subjected to further action or suspended from entering the final exam.

Smart Attendance System using QR code is a project developed to record and manage daily student attendance in class. Currently, UTeM still practicing conventional method which is by having students to manually sign the attendance sheet and another common method is where lecturer calls out the individual names from the students list to validate the presence of student. Such methods of taking attendance have been proven to be difficult and time consuming. Moreover, lecturer needs to analyse and calculate the percentage of presence for all the students manually to make sure the individuals who attendance is below required policy to receive a warning letter. As a result, this method increases number of workloads for lecturer and

prone to human error as it is difficult to ascertain whether the calculation made was correct. Besides that, students need to spend unnecessary time during class to sign the attendance. This will make student lose focus as they are busy passing around the attendance sheet during lecture. Thus, this automated system has been suggested in order to eliminate all of these troubles.

Therefore, Smart Attendance System using QR code is proposed to help reduce lecturer's work. In this proposed system, student needs to scan their own QR code which is created by lecturer and displayed in the class room for student to scan. QR code will change in every lecture schedule. Attendance System using QR code facilitates to access and manage the attendance of all the classes. The QR code that contains student information will be generated to database. This system will automatically tick the student name in the attendance and count the number of absents and percentage of present for all the students based on the subject. Once the number of absence exceed the attendance policy, appropriate warning letter will be generated automatically to the absentee email. Hence, this system provides a tedious work in maintaining attendance records of all the students.

1.2 Problem Statement

The problem statement of the projects are as follows,

i. Paper-based printed attendance sheet easily can be misplaced or lost
ii. Paper-based attendance system required lectures to manually calculate student attendance end of semester and issue warning letter if the attendance is less than 80% of total classes.
iii. Paper-based attendance indirectly increases lecturer's work
iv. Paper-based attendance encourages false attendance

1.3 Objectives

Objective of this project is outlined as follows:

i. To develop mobile attendance system to record student attendance using Quick Response Code (QR Code).

ii. To store, access and manage student attendance data.

iii. To generate a warning letter/barred letter automatically to the student

1.4 Scope of Project

The scope is listed to ensure the project is conducted within its intended boundary. This project is developed for only Lecturer usage. The system enables lecturer to store, access and manage student's attendance and to generate confidential documents such as attendance list, warning letter and attendance report. This system is not accessible to students as it can be misuse by students to falsify their attendance. This mobile application scanner will be developed using Ionic Framework and only can be accessed by Android phones. About 5 dummy Student name and QR code will be created to test the functionality of the system. The data and attendance record will be securely kept in database for easy storage, accessing and managing.

1.5 Thesis organization

This report and project are about the development of Smart Attendance System using QR Code. There are total 5 chapter in this report where each chapter is divided into subsections which will discuss on specific topic in detailed. The first chapter gives a brief explanation and idea of the project, then followed by problem statement, objective and scope of this project. While in chapter 2, method and technique used from previous related work is discussed. Several theoretical analyses of the body of the method and principles associated with the project needed to accomplish in this project will be described in detail in chapter 3. Fourth chapter will be covered the result and analysis from the simulation followed by final chapter where conclusion of the overall project and recommendation for future works is explained.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

In this chapter, the background of the project will be explained briefly for better understanding of the research. A review of previous related works will be discussed to obtain some useful information by synthesizing their work to make this research successful.

2.2 Attendance Monitoring System

Attendance is a basic and important criterion needed in education system. Attendance is used as a record to access student consistency in attending the class. (Yee, 2013).This system is used to collect attendance information by mobile phone application. Student details is compiling in QR code technology. This application needs to verify the record of student by scanning their QR code. All the details regarding student's attendance are stored in a database which is

controlled by the lecturer. There are two ways to monitor student attendance which is Conventional method and Smart attendance system.

2.2.1 Conventional Method

Traditionally, universities often used the conventional method by calling student names and manually signing attendance sheet to record the attendance of the student. (Karwan Jacksi, 2018) This method has proven to be very tedious especially for large number of students and can be easily compromised through the help of students signing on behalf of their friends. These non-effective system lead students to cheat and encourage false attendance. Besides that, the attendance sheet can be easily lost, and lecturer needs to manually analyse number of absences and calculate the percentage of present according to attendance policy. Therefore, modern methods have proposed as a solution to the problems faced by conventional methods.

2.2.2 Smart Attendance System

Smart attendance system is widely used in company or universities in order to record the attendance of the employees and students. Since the record of attendance is very important

for the students to prove their presence, education institute used this smart attendance system to record attendance of the student as it is also including in student evaluation report (Sunil Jadhav, 2018) . Smart attendance system has been built to eliminate the time and effort wasted in taking attendance in universities and colleges. This system greatly reduces the amount of paper resources needed in attendance data management. Today, many advanced attendance systems such as QR code attendance system, RFID, Biometric and Barcode as identification method have been developed from manual attendance system with the growth of technology (Osman Duman, 2018)

2.2.2.1 QR Code

A Quick Response code (QR code) is a two-dimensional bar code designed by Denso Wave in 1994 in Japan. A QR code has been designed to be read by smart phone and it is arranged in rows and columns of black and white (Baban, 2014). QR code is known an encoded piece of data which the data in QR code can be alphanumeric, numeric and binary. A QR code is used to contain web address information and links. Essentially, a QR code works in the same way as a barcode. It is a machine- scan able image that can instantly be read using a smartphone camera. The black squares and dots in QR code represent information. The marketers used QR code to simplify the process and therefore, entice more people into visiting a website. This is why marketers regularly place QR code on banners, business cards, flyers, leaflets, posters and