UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ATTENDANCE SYSTEM IN CLASSROOM USING ACTIVE RFID

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours.

by

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk: ATTENDANCE SYSTEM IN CLASSROOM USING ACTIVE RFID

Sesi Pengajian: 2019

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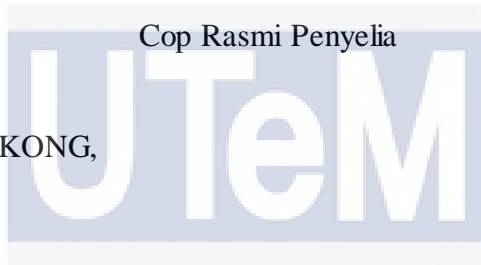Yang benar,   Disahkan oleh penyelia:

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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 Mechanical Engineering Technology (Industrial Automation & Robotics) with Honours. The member of the supervisory is as follow:

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Co-supervisor: EN MUHAMMAD FAREQ BIN IBRAHIM

ABSTRAK

Fokus cadangan ini adalah untuk memantau pelajar dan memperbaiki sistem kehadiran pelajar menggunakan kaedah pengecaman peranti tag RFID dan pembaca RFID. Pembaca RFID akan terletak di beberapa tempat di Universiti tetapi fokus utama adalah di dalam bilik darjah. Apabila pelajar tiba di kawasan pembaca, titik boleh ditemui yang menghantar destinasi ke pelayaran. Modul akan diberikan kepada pelajar dan ia akan digunakan sebagai penunjuk bahawa pelajar telah memasuki kelas dan hadir secara automatik dalam kuliah. Maklumat pelajar mengenai pembaca kad RFID akan diiktiraf. Antara muka pengguna adalah yang bertanggungjawab untuk menguruskan pendaftaran kehadiran dalam pangkalan data. Ini adalah rangka kerja berskala kecil yang benar-benar automatik, mudah untuk diurus, menjimatkan masa dan cekap.

Key: memantau pelajar, sistem pengurusan kehadiran, pembaca RFID, tag RFID.

ABSTRACT

Focus of this proposal is to monitor students and improve the management attendance system using device recognition method of an RFID tag and RFID reader. RFID readers will be located at multiple spots on university but the main focus is in classrooms. Whenever the student arrives in the area of the reader, a point can be discovered which transmit the destination to the server. A module will be provided to the student and it will be used as a indicator that the student has enter the classroom and automatically present in the lecture. The student information on the RFID card reader will be recognized. The user interface is responsible for managing the registration of attendance in the database. This is a small-scale framework that is completely automated, simple to manage, time-saving and efficient.

Key: Monitor Student, Attendance Management System, Reader, RFID Tag.

DEDICATION

I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving parents, Muhammad Zahid bin Muhamad Sabun and Anida binti Abdul Manaf, whose words of encouragement and push for tenacity ring in my ears. My siblings, Muhammad Luqmannul Hadi, Muhammad Alif Hilman, Muhammad Afiq Firdaus and Nur Amalina Maisarah for being very understanding during the timeline finishing my work.

1 also dedicate this dissertation to my many friends who have supported me throughout the process. I will always appreciate all they have done, especially Nur Farahin binti Azman for helping me develop my technology skills and Siti Nur' Aqilah binti Ismail for helping me in recognizing the wrong part of my works and advising to the better way and last but the very loyally helpful person, Muhammad Syazwan bin Muhamad Bahar for endless support, motivation and advice in every inch of process finishing this project.

ACKNOWLEDGEMENTS

This project wouldn't be achievable unless significant encouragement and support. So, I would like to thank everyone who has made it possible for me to complete this venture.

I would also like to bless my lecturer supervisor, Mr. Mazree bin Ibrahim, for supplying the framework with ongoing comments and recommendations all throughout process of this project. I'm also grateful for my co-supervisor Mr. Fareq bin Ibrahim for giving me some advice on doing this project continuously.

Both feedback and recommendations encouraged me to carry out this project. As well, to never be missed, I would really like to thank the following people, all of my friends for the review, for their helpful insights and for exchanging ideas on the process of the project.

Ultimately, I would really like to thank my parents and siblings for their compassion, understanding, motivation and support for the documentation of my project. I not manage to list down all of it since it was a limited space. Thank you so much everyone.

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LIST OF ABBREVIATIONS

RFID   Radio-Frequency Identification

IoT   Internet of Thing

QR   Quick Response

GUI   Graphical User Interface

CHAPTER 1

INTRODUCTION

Global is running with lot of improved technology that rapidly grow, the method that being use to record student's attendance is now getting easier and faster. Most education institution now care about the student traditional attendance that less effective.

1.1 Background

One of the most important things to ensure students attend for the lectures in university is attendance system. Usually in Malaysia, students were asked to present in the class minimum 80 percent per semester or courses otherwise that student will blocked from attending any exam paper. Currently, method in taking attendance in class is by using paper-based method which instructor or lecturer required to pass by the attendance sheet before begin the lecture while students required to initials the attendance sheet. These methods are a time wasting since it is not practical for the large scale of class. This method also high risk in data losses, document paper might lose or damage due to carelessness.

This decennium, we have view expending of IoT permit technology such as wireless sensor, big data network, and cloud communication. Even large company or a person can use inventive systems despite of this intelligent new creations of technologies. Despite it possibilities not yet been completely traverse in education sector, this technology speedy enlarge and profitable. Presently, education is constantly up to date to the advance of Information and Communications Technology (ICT). [1]

In order to cope with the massive growth of telecommunication progression, the method of documenting student's attendance by using RFID system clearly more practical than traditional method. Some technique was created so that the education management recording process much more smooth and time saving.

1.2 Objective

The goal of this paper project is to create and design an **Attendance System in Classroom using Active RFID**. The project plan to:

i. Provide an administrator / lecturer with a structured and efficient method for the attendance database of the students

ii. To eliminate time required by the applied RFID technology for manually sign-in attendance.

iii. Provide accurate and immediate percentage calculation for the student attendance status.

iv. Create a system that helps the administrator print the attendance report for each class.

v. Reduce attendance cheating by enforcing the detection of cheating.

vi. Minimize the use of paper by eliminating the need for attendance sheets.

1.3 Problem Statement

This presents a problem for educators to carry place through the process, which they should use precious time to validate that each student that taken part in the activity. Likewise, the lecturer inspecting the attendance personally, the other way around is by handing the student attendance list. This enables students to learn in very uncomfortable environment.

Student will accept the problem registering own attendance on the attendance list, that individual's kind of have to start till the end of the lecture anyway to be allowed to register. In order to contribute, cheated signature situations frequently occur when absences students are asked other person to help them sign the attendance list.

Effectively, the educators could request student to write name on a paper given or call up each student's name manually. This new type of attendance system may reduce time required to participate manually. In addition, the handout paper can be correctly misplaced or forgotten for submitting in the database system. Through the help of RFID-based system, all information will kept and saved in the database.

As a result, the current method will be significantly enhanced through using active RFID technology, that can obtain without man power during a class discussion or lecture. The system is designed to optimize the methods of inspecting class attendance by immediately activating RFID reader tags and checking the databases that have been activated.

1.4   Significant of Research

The paper focuses on construct and developing a system that uses few inputs of biometric traits to detect a person's physical or behavioral characteristics. This is to confirm that the system is used by legitimate users, this system may contain memory or student databases for specific classes for the documentations. By using this system, any absent record can easily be followed up by lecturers to take future action for students who cheat as the project needs to store the database using the RFID device. This system will be tested within a classroom area that carries the maximum distance of data tracked and stored.

1.5   Relevance of the project

This system is applicable to modern systems in academic institutions, since it is intended to optimize academic achievement in such a way that it decreases as this process is simple, efficient and user friendly. This project offers a improve method for lecturers to supervise the attendance of their students and further to guarantee that their educational achievement is well control.

1.6   The acceptability of the project in the scope and timeframe of the project

This module is estimated to be ready within the timeline. Two semesters are provided for analysis and application creation. Within the first semester, the total duration mainly focuses on the design and implementation phase, however during the PSM 2, it is time for the design, implementation and testing of the project.

1.7   Thesis Outline

The structure and layout of the thesis are as follow:

i.   Chapter 1 – Introduction: This chapter will precisely brief the introduction for this project which tell the objective, problem statement and scopes of this project.

ii.   Chapter 2 – Literature Review: This chapter will explain about the previous existence of attendance system and more review about RFID system

iii.   Chapter 3 – Methodology: This chapter will discuss the methodology of this project, which will brief the equipment that will be used in developing Attendance System using Active RFID in classroom and the specifics of the process for developing this project will be identified. This chapter will also clarify in detail the need for hardware and software specifications.

iv.   Chapter 4 – Result & Discussion: This chapter will explain the early expectation result of the output project data and analyze the data.

v.   Chapter 5 – Conclusion & Recommendation: This chapter will insert about the overall project and recommended for next work implementation. It also finalizes that all of the project's objectives were entirely successful.

CHAPTER 2
LITERATURE REVIEW

The past standard approach used to record and keep the attendance of students, such as wrote name on paper or calling student's name, it is difficult and uncertain. In order to solve the problem, an appropriate system needs to be put in place.

2.1   Type of attendance system that exists

A number of types of attendance systems have been developed to help facilitate human daily activities as part of the growth of technology development. Apart from RFID Based Attendance System, attendance recognition systems that exist on the market, along with Biometric Attendance System, Real Time Face Detection Algorithms and Barcode-based Attendance System. Recognizing the mechanism of each current exist attendance management as a major benefit in the improvisation of the existing arrangement used in universities.

2.1.1   Biometric Attendance System

The Biometric Attendance System relies on multispectral imaging. For this purpose, multispectral sensors are used to manufacture the product. This is the best way to create the best biomedical technology product. They can detect fingerprints precisely. They look it beyond layers of fat, dirt, sweat and moisture.

Multiple wavelengths of light are used to improve the performance of data capture. The surface and subsurface of the fingerprint shall be recorded by the system. These were two primary elements to the sensor. This involves a light source and an image system. The light is illuminating the finger.

A digital imagery array is created by the imaging system. The fingerprint will then be processed as a computer algorithm. The fingerprints could not be recovered from the system. This will increase safety.

Figure 2.1: Illustration of a Biometric Attendance Monitoring System

2.1.2   QR Code Attendance System

QR code (previously known from the Quick Response Code) is a signature look for the variety of matrix barcode (or two-dimensional barcode) first developed for the Japanese auto industry. Bar codes are optical machine-readable labels attached to products that record information relating to the item. It was originally patented, however, the holder of the patent had chosen not to restrict rights. Recent decades, the QR Code system has now become mainstream outside the automotive industry due to its quick usability and increased storage capacity compared to conventional UPC barcodes.

The code includes a lot of black modules (square points) arranged in a square grid on a white background. The information encoded may be made up of four common data types ("modes") (numeric, alphanumeric, byte / binary, Kanji) or, through supported extensions, nearly any data type A QR code is read by an imaging device, such as a camera,

and is algorithmically formatted by underlying software using Reed-Solomon error detection and correction till the image can be properly interpreted. [2]

Figure 2.1.2 shows a sample of an unencrypted QR code that will be needed by the proposed system.

Figure 2.1.3 shows my UTeM student portal phone application that use by student and lecturer to scan the QR code that display on front layout projector.

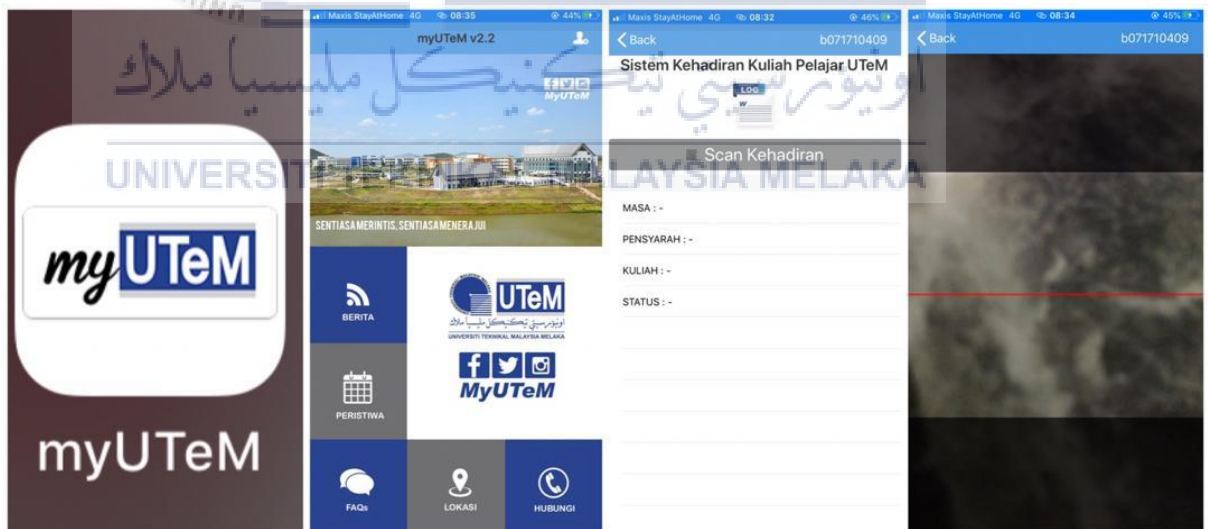Figure 2.1.2: A Sample of an Unencrypted QR Code

Figure 2.1.3: My UTeM Student Portal Phone Application.

2.1.3 Real Time Face Detection Integrated On an Existing Learning Management System (LMS)

This program incorporates computer vision and face recognition algorithms into the attendance management process. The system is manufactured and use a non-invasive digital camera installed in classroom and scans the room, identifies and extracts all faces from the image obtained. Related to all of the processes, after faces have been removed, they are linked to the current student image database. A list will be created based on a good student recognition and stored in the database. [3]
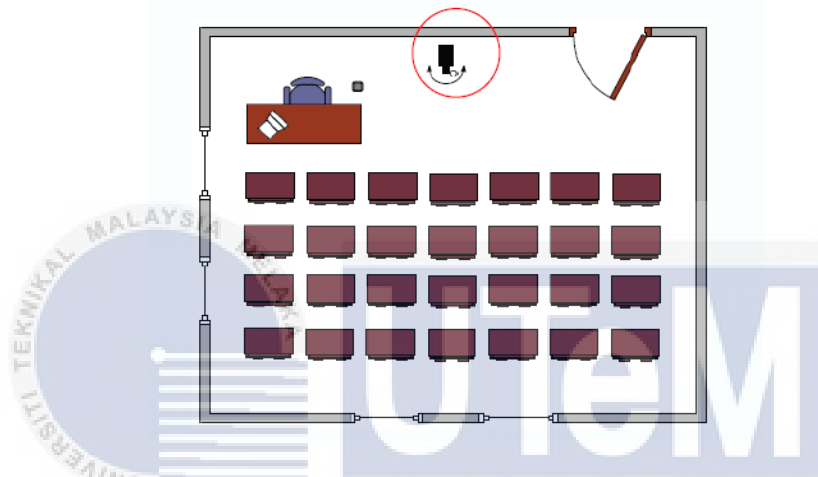

Figure 2.1.4: Illustration of LMS System in Classroom.

The classroom infrastructure is needed a rotating camera to be centrally arranged in front of the classroom. Through this configuration, the camera is able of capturing students' front-facing images as seen in Figure 2.1.4.

Figure 2.1.5: A Classroom with Students

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