DEVELOPMENT OF IOT FOR EXAMINATION ATTENDANCE SYSTEM BASED ON RFID TECHNOLOGY

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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

by

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I hereby, declared this report entitled DEVELOPMENT OF IOT FOR EXAMINATION ATTENDANCE SYSTEM BASED ON RFID TECHNOLOGY is the results of my own research except as cited in references.

Signature: 

Author : NOR SYAFIQA BINTI ALI

Date: 12/2/2021

APPROVAL

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

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ABSTRAK

Sebahagian besar pentadbir institusi pendidikan mengambil berat tentang kehadiran pelajar terutamanya semasa peperiksaan. Biasanya semua pelajar perlu menandatangani kehadiran secara manual setiap kali mereka menghadiri kelas menduduki peperiksaan. Kemudian pada akhir kelas pensyarah atau tenaga pengajar akan mengumpulkan kertas kehadiran pelajar secara manual dan kemudian kehadiran akan direkodkan dalam sistem. Dengan adanya sistem kehadiran peperiksaan, kehadiran pelajar dapat dicatat apabila pelajar menyentuh kad RFID mereka pada pembaca RFID. Dengan cara ini akan menjadikan proses pengambilan kehadiran pelajar menjadi lebih mudah dan dapat menjimatkan masa. Oleh itu, masalah seperti kehadiran pelajar tidak direkodkan dan kertas kehadiran yang hilang dapat diselesaikan. Tujuan projek ini adalah untuk mengambil kehadiran pelajar dan menyimpan dalam pangkalan data. Dalam menyelesaikan projek ini, teknologi Radio Frequency Identification Technology (RFID) dan teknologi Internet of Things (IoT) dilaksanakan dalam mengembangkan sistem ini. Di sini data kad RFID pelajar akan dibaca dan direkodkan di dalam pangkalan data. Sistem ini dapat mengenal pasti kehadiran pelajar dengan mudah kerana setiap kad RFID mengandungi ID yang berbeza. Sistem akan segera mencatat kehadiran pelajar berikut dengan masa pelajar menyentuh kad RFID mereka pada pembaca RFID.

ABSTRACT

Mostly of administrators of an educational institution are concerned about student attendance, especially during the examination. Usually, all students need to sign the attendance manually each time they attend for the examination. Then at the end of the exam session, the invigilator will collect the student attendance paper manually, and then the attendance will be recorded in the system. By the existence of an examination attendance system, student attendance can be recorded when the student scanned their RFID card on RFID readers. This will make the process of taking student attendance become easier and time-saving. Therefore, problems such as student attendance are not being recorded and attendance papers are missing can be solved. The purpose of this project is to take the student attendance and save it in the database. By completing this project, Radio Frequency Identification Technology (RFID) technology and Internet of Things (IoT) technology are implemented in developing this system. The system can be easily identified student attendance as each of the RFID cards contained a different ID. The system will immediately record the student attendance followed with the time the student touches their RFID card on the RFID reader.

DEDICATION

Firstly, I would like to thank both of my parents who have supported me and give me motivation throughout my degree life. Secondly, I would like to thank all my friends who have been with me from the beginning until the end and also through thick and thin until all of us have graduated with good results.

Besides that, I would like to thank my lecturers as well as my supervisor, Dr Suhaila Binti Mohd Najib, who have advised and guided me to complete my final year project.

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LIST OF ABBREVIATIONS

RFID	Radio Frequency Identification
QR Code	Quick Response Code
IoT	Internet of Things
LCD	Liquid Crystal Display
RF Tags	Radio Frequency tag
PEAS	Portable Examination Attendance System
SQL	Structured Query Language
LED	Light Emitting Diode
GUI	Graphical User Interface
UART	Universal Asynchronous Receive Transmission
TRU	Tag Reader Unit
LAN	Local Area Network
IDE	Integrated Development Environment
PHP	Hypertext Preprocessor
HTTP	HyperText Transfer Protocol
ERD	Entity Relationship Diagram
HTML	HyperText Markup Language

CHAPTER 1

INTRODUCTION

This chapter explained the background, problem statements, project scope and objective of the project.

1.0 Background

The examination attendance system is a system that uses Radio Frequency Identification (RFID) to monitor student's attendance in the examination hall. RFID is an integrated identification method uses devices known as RFID tags to retrieve the data remotely (TelecomSpace, 2020). The RFID tag includes an integrated circuit and an antenna that transfers data to the RFID reader, and then this RFID reader transforms the radio waves into a more accessible form of data (Rouse, 2020). Demand for RFID equipment is rapidly increasing and applications that currently use barcode technology are good candidates for improving an RFID-using system (Future et al., 2020).

RFID is commonly uses around the world and it can shorten the time to record student's attendance compared to the existing method. An existing method that is commonly used in taking student's attendance requires the student to manually fill up the attendance form that is provided by invigilator (Karwan Jacksi et al., 2018). There are also other ways of recording student attendance by using the QR Code or the Quick Response Code. In this method, each student required a smartphone and scans the QR code given by their instructors (Masalha & Hirzallah, 2014)

1.1 Problem Statement

Currently student attendance is conducted using the manual procedure where candidates are required to manually write their matric number, student name, and subject details on the form. There are some disadvantages to this method where it can be tedious to record student attendance and it takes more time. Besides, there also can be a problem occurs before the examination for example there is a non-registered student or a student being bar from sitting the exam enter the examination hall without a permission. The best solution to this issues is to develop a program that automatically and systematically record the student's attendance. RFID system is utilized to monitor and record the student attendance automatically. Since manual method required more time for attendance, this project will use student RFID tags and RFID reader and integrate with software. This system is more efficient in trying to prevent the problem of getting students attendance.

1.2 Objective

The Examination Attendance System using RFID technology is developed to achieve these objectives:

(i) To develop a real time examination attendance system using RFID based on IoT.

(ii) To analyze the effectiveness of the system towards capturing student's attendance before the examination.

1.3 Project Scope

When student taps or touches the RFID tag on the RFID scanner, the system will check the data and search the card ID and fetch the student data from database. If the student data is authorized and allowed to take the examination, the student information will be updated in a database in real-time by connecting to a Wi-Fi by using NodeMCU ESP8266. This system is for a student to take attendance before entering the examination hall. Admin can access to the system to add student, update student and delete student data into and from the database. Besides, admin also able to display the attendance report. In this system, RFID reader with 13.65MHz frequency is used and a software of XAMPP will be used to run and test the system and the database connection.

1.4 Project Significant

The development of this system is applicable to university application as it intends to enhance the process of taking student attendance since it reduces time. This project would be an effective way in helping lecturers or instructors to take the attendance of the student before taking the examination.

1.5 Summary

This chapter described the background of the study and explains the problem that occur when using the current system. In addition, chapter 1 also explains the objective, project scope and project significant. Further discussion regarding previous research will be explained in Chapter 2

CHAPTER 2

LITERATURE REVIEW

This part will explains literature review of several journals that used Radio Frequency Identification (RFID) in recording and monitoring the attendance. Besides, it also provides examples of what others researchers have found in the last time.

2.1 Introduction

RFID is now commonly used in many services industries, manufacturing companies and security as it provides advantages for people, businesses and government as well. The purpose of this type of detection is to deliver in transit data on persons, animals, or product. Student examination attendance system using RFID is an automated recording of attendance, particularly for universities. This system is made up of an RFID module which has its own operation and special features. Besides, this system can monitor the attendance of student that entering the examination hall and verify either the student can sit for exam or not.

2.2 Overview of Internet of Things (IoT)

Internet of Things is a set of interconnected computing devices, digital or mechanical devices installed with identifiers and the needed to transmit information over such a system without involving human-computer contact. Besides, IoT system allow users to get deeper automation, analysis and integration into a system and also increasing the coverage and accuracy of these areas. Artificial intelligence, networking, sensors, active communication and limited device use are the most important features of IoT.

In this research, it focuses the importance of the Internet of Thing for people today. Their benefits cover both lifestyle and business domain, where it is technology optimization. It is the same tools and data that enhance consumer service also maximize the use of apps and lead to more efficient technology improvements. Moreover, it also can enhance data collection, as a modern data collection suffer from its limitations and its passive use nature. IoT takes it out of those spaces and puts it precisely where we really want our world to be analyse.

In the other hand, there is some example of application of IoT that is familiar with people today that were no end to the usage of IoT in technology, business and personal lives. The example of an application is Smart Home Applications where all devices suchs as fans, lights and air-conditioner can be monitored from far via internet access.

2.3 Overview of RFID

RFID network is known as the Radio Frequency Identification System, where it is a wireless communication identification device which enables data to be transmitted between men's RF tags, or connected to object and antenna or reader devices. The RFID devices have been used in various applications. RFID's main features are that it can read and write data without direct contact, since the RF tag contains several kilobytes of rich information.

All necessary data for each process can be stored easily without the use of direct contact.In addition, it requires RF tags, reader/writers and host device when configuring an RFID network. Here the RFID system writes data that is sent via reader / writer from the host device to the RF tag. The data is read via the reader / writer, and the data can then be rewritten inside the RF tag. Block diagram of RFID system are shown in Figure 2.

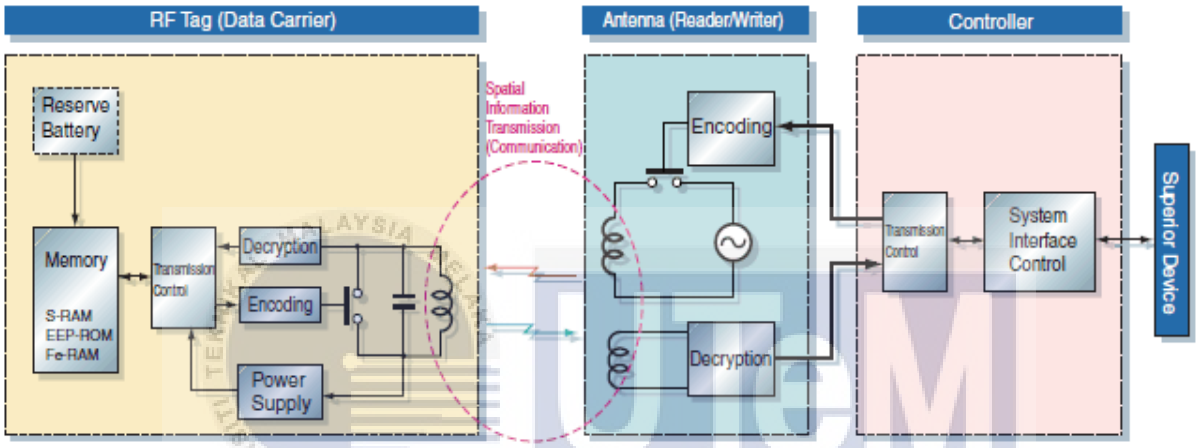

Figure 2.1: Block diagram of RFID system (OMRON Industrial Automation, 2020)