



Faculty of Electrical and Electronic Engineering Technology



**DEVELOPMENT OF IOT BASED SMART ROOM LOCKING AND
MONITORING SYSTEM FOR CLASSROOM USING NODEMCU
ESP8266 CONTROLLER AND MOBILE APPLICATION**

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

NOOR AINUN NABIHAH BINTI ABDUL MUTTALIB

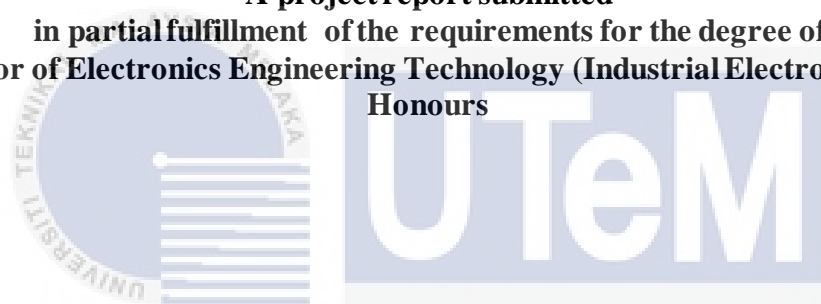
**Bachelor of Electronics Engineering Technology (Industrial Electronics) with
Honours**

2022

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MONITORING SYSTEM FOR CLASSROOM USING NODEMCU ESP8266
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NOOR AINUN NABIHAH BINTI ABDUL MUTTALIB

**A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology (Industrial Electronics) with
Honours**



اونيورسيتي تيكنيكل مليسيا ملاك

Faculty of Electrical and Electronic Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2022

**BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II**

Tajuk Projek : Development Of Iot Based Smart Room Locking And Monitoring System
For Classroom Using Nodemcu Esp8266 Controller And Mobile Application

Sesi Pengajian : 2022/2023

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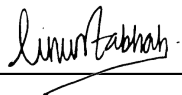
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TIDAK TERHAD

Disahkan oleh:



(Noor Ainun Nabihah Binti Abdul Muttalib)



(Raeihah Binti Mohd Zain)

Alamat Tetap:
No 34, Jalan Tawas Mewah 1,
Taman Tawas Mewah,
30010 Ipoh Perak.

RAEIHAH BINTI MUHD ZAIN
Jurutera Pengejar
Jabatan Teknologi Kejuruteraan
Elektronik dan Komputer
Fakulti Teknologi Kejuruteraan
Elektrik dan Elektronik
Universiti Teknikal Malaysia Melaka

Tarikh: 18/01/2023

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I declare that this project report entitled “Development of IoT Based Smart Room Locking and Monitoring System for classroom using NodeMCU ESP8266 controller and mobile application” is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature

:

Noor Ainhah

Student Name

:

NOOR AINUN NABIHAH BINTI ABDUL MUTTALIB

Date

:

18/01/2023



APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering Technology with Honours.

Signature :



Supervisor Name : RAEIHAH BINTI MOHD ZAIN

Date :

12/01/2023

Signature :



Co-Supervisor :

Name (if any)

Date :

DEDICATION

This thesis is dedicated to those who help me from the beginning until finish of the project's development,

To my beloved mother, father, and family

Also, my supervisor

My lecturer

and

All my fellow friends.

Thank you for all the guidance support and encouragement up to this point.



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ABSTRACT

Nowdays, locking door using a key may use a lot of time. The objective of this project system is we can relieve the staffs and lecturers of the pressure from wasting time and work in an unorganized manner. In the meantime, it can assist in reduce the problem of losing keys as well as the stress of keeping a bunch of keys together, which is a hardship that can be minimized. The problem of vandalism has also leading to a considerable number of people being unable to use the facility that are given by the insitute, which is an unfortunate side effect of the problem. In addition, this project also develop a smart monitoring system that observe the usage and the occupancy of the room. This study's main idea is to use IoT technology and smartphone communication technology to remotely open or close a door controlled by administration. In this study, a door lock is made so that it can be tracked using the Internet of Things (IOT). The Internet of Things (IoT) is a better way to keep an eye on door locks than other smart door systems. This system is an IoT system built with the NodeMCU ESP8266 microcontroller and the Blynk application for monitoring. The way this door lock works it can be monitored at any place and time.

ABSTRAK

Zaman kini, pintu menggunakan kunci mungkin menggunakan banyak masa. Objektif sistem projek ini adalah kami dapat melegakan kakitangan dan pensyarah tekanan daripada membuang masa dan bekerja secara tidak teratur. Dalam pada itu, ia boleh membantu dalam mengurangkan masalah kehilangan kunci serta tekanan untuk menyimpan sekumpulan kunci, yang merupakan kesusahan yang boleh diminimumkan. Masalah vandalisme juga telah menyebabkan sebilangan besar orang tidak dapat menggunakan kemudahan yang diberikan oleh institut, yang memberikan kesan sampingan daripada masalah tersebut. Di samping itu, projek ini juga untuk membangunkan sistem pemantauan pintar yang memerhatikan penggunaan dan penghunian bilik. Idea utama kajian ini adalah menggunakan teknologi IoT dan teknologi komunikasi telefon pintar untuk membuka atau menutup pintu dari jauh melalui pentadbiran. Dalam kajian ini, kunci pintu dibuat supaya ia boleh dikesan menggunakan Internet of Things (IOT). Internet Perkara (IoT) ialah cara yang lebih baik untuk mengawasi kunci pintu berbanding sistem pintu pintar yang lain. Sistem ini ialah sistem IoT yang dibina dengan mikropengawal NodeMCU ESP8266 dan aplikasi Blynk untuk pemantauan. Cara kunci pintu ini berfungsi ia boleh dipantau bila-bila masa dan di mana-mana sahaja.

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LIST OF SYMBOLS



LIST OF ABBREVIATIONS



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CHAPTER 1

INTRODUCTION

1.1 Background

In our daily lives, the Internet has become a very important part of what we do. It has become a common way that many electronic devices have been used to make things easier for people. The internet is a powerful tool that lets people search for, store, and manage their own information. Development of IoT Based Smart Room Locking and Monitoring System for classroom using NodeMCU ESP8266 controller and mobile application will be controlled by the administrative. This project will increase the level of security in the classroom by lowering the likelihood of vandalism and robbery, particularly during weekends, holidays or even after the class session.

1.2 Problem Statement

It is the goal of this project management system to free the lecturers and staff from the burden of wasting time and working in a disorganized manner. Meanwhile, it can help eliminate the problem of losing keys as well as the burden of keeping a bunch of keys together. The problem of vandalism has also resulted in a significant number of person being unable to use the facilities that are provided by the institution. According to the available data, the police department documented almost 65,623 cases in year 2020. In addition to that, robbery cases also recorded with 7,326 cases in 2020 based on the statistics.

1.3 Project Objective

The main objectives of this project are:

- a) To develop a system that can control and reduce manpower and improve efficiency in room locking.
- b) To develop a security system to prevent intruders from unlocking the door and prevent vandalism from occurring.
- c) To develop smart monitoring system that observes the usage and the occupancy of the room.

1.4 Scope of Project

This project focuses on using the Internet of Thing or Wi-Fi module through the smartphone to monitor doors in the classroom. This project can be able to lock and unlock the classroom's door at scheduled time that have been set for classroom usage. Other than that, users that do not have schedule to use the classroom also can open the door lock by inserting the password given by the administrative through booking system. The NodeMCU ESP8266 will receive input from keypad and the Arduino Uno then transmit to solenoid lock, light, fan and buzzer.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Literature review is involving a description based on the theory or writing of the project undertaken. To summarise, this report includes every detail and stage involved in carrying out a project. The project's goals and objectives, as well as the raw materials needed to complete the project, are all considered at this phase of the project planning process. This study focuses on increasing the room security.

2.2 Past Related Project Research

2.2.1 Development of IoT Automated Door Lock System Using Blynk Application

This study uses IoT technology and the application of smartphone communication technology to a conventional device (a door lock) to open or close a door remotely. This system is made up of an Internet of Things (IoT) system that was built with the Arduino Wemos D1, ESP8266 as the microcontroller, and the Blynk monitoring app. The way this door lock works can be watched from anywhere and at any time. Three key hardware components will be used in the system: an Arduino microcontroller, a Servo motor, and a smartphone device. The servo motor and sensor are controlled by an IoT-controlled Arduino. The Arduino will then go into standby mode, waiting for the user to initiate the monitoring procedure. The information obtained through the phone will always appear in the phone apps, whether locked or unlocked. The block diagram is shown in Figure 1.



Figure 2.1 Block Diagram

The first step of the system is to make sure the door is open or closed. If someone opens the door, the user's phone will let them know. Then, the person can use the phone to lock the door. On the other hand, the user only needs to use their phone to lock or unlock the door, even if they are far away from it. The user will get a message when the door is locked or unlocked. Then, the user can use the Blynk app on their phone to lock or unlock the door.

In this project, the FRITZING software is used to develop the hardware and design and simulate the circuit. After the simulation of the circuit is done, all of the parts used in this project were put in place and put together. Both the automatic door closer and the deadbolt were built into the hardware. For this study, users must install the IoT Door Lock system on their door with a deadbolt lock. Other types of door locks can't be used and can't be installed. Aside from that, an automatic door closer and the other mechanical part were put in at the door.

The door lock was kept inside the door. The servo motor, which was powered by a 9V battery, was used to show how the door lock works. The smartphone connects the Arduino WeMos to the internet. When you push the button, this system works and locks the door. The condition of durability is divided by 5 conditions. It's because each type of servo motor can carry a different amount of weight. When the user clicks the button in the Blynk app, the servo motor will react by locking or unlocking the door.[1]

2.2.2 Development of IoT Automated Door Lock System Using Blynk Application

This proposed system has a clear reaction to this issue, Digital Door Lock. It also can be called as a blend entryway bolt and it enables you to enter and leave a working without the requirement for a key. Users can enter the Pin using a keypad and a security system is installed to verify the PIN. This system also can solve the issues of keys. The door automatically opens with a motor without any human physical efforts after the PIN is entered.

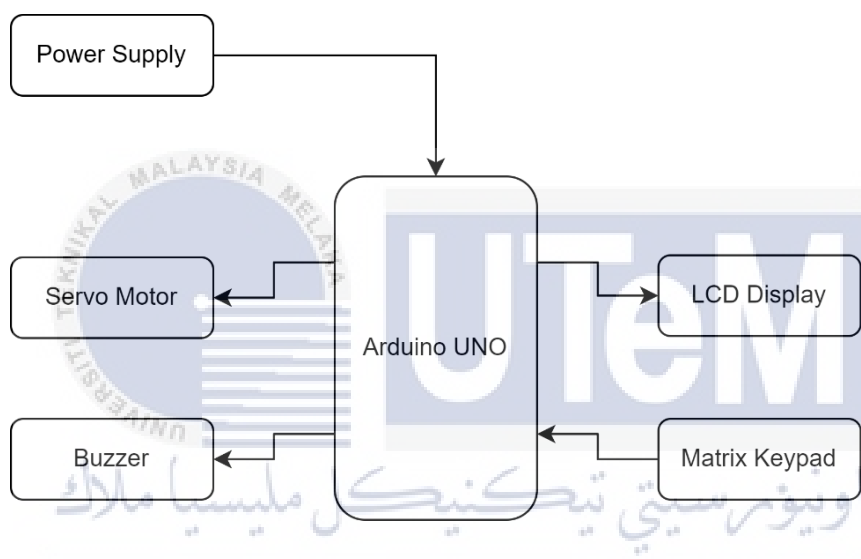


Figure 2.2 System Block Diagram

The advantage of this project is the system is efficient, highly accurate, fully automated, and automotive safety and convenience. The user can enter the PIN using a keypad and a security system is installed to verify the PIN. This can solve the issue of losing or duplicate keys. When the PIN is entered the door automatically opens with a motor without any human physical efforts. User is the person who runs the device, such as through making use of the services that the device provides. The Arduino is responsible for the mechanism, which involves it connecting all of the components and operating in accordance with the code that has been put into it.

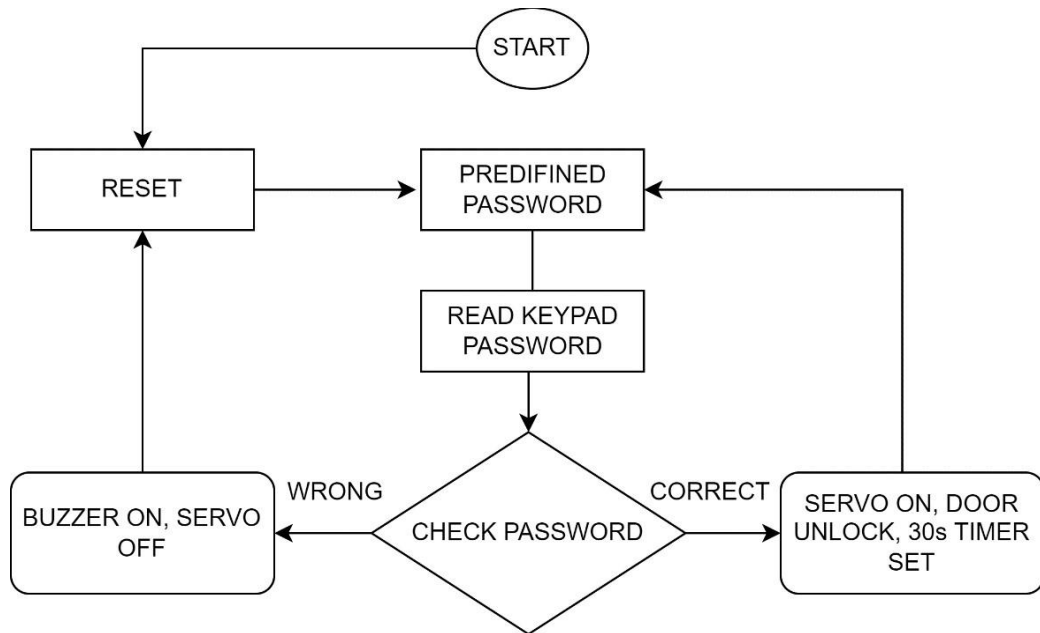


Figure 2.3 Flowchart

Figure 3 is explain the process of the project. The first process is to enter the password using the keypad. If the password is insert correctly the door will be opened. Otherwise, the buzzer will ringing.

First step that explains the process of the project is the initial step is to interface with every one of the parts to Arduino Uno. The second step is to connect the Arduino Uno and any other elements that go along with it to the Arduino compiler. When it has been connected to the Arduino compiler, you may start dumping the code into the Arduino Uno. After completing the initial setup of the Arduino, proceed to the third step. It is the least complicated to use, and it offers a large number of different activities. At the stage when Arduino begins to stack, a clump of lines of code will become visible. This will continue till the boot procedure has reached its conclusion and then proceed accordingly. After that point, the device automatically starts the engine using the code that was given, and it does the same thing using the secret key that was provided.[2]