

**SMART CLASSROOM BY USING WIFI AND ANDROID
APPLICATION WITH ARDUINO MICRO CONTROLLER**

MUHAMMAD ZIKRUL 'AZEEM BIN ZAKARIA



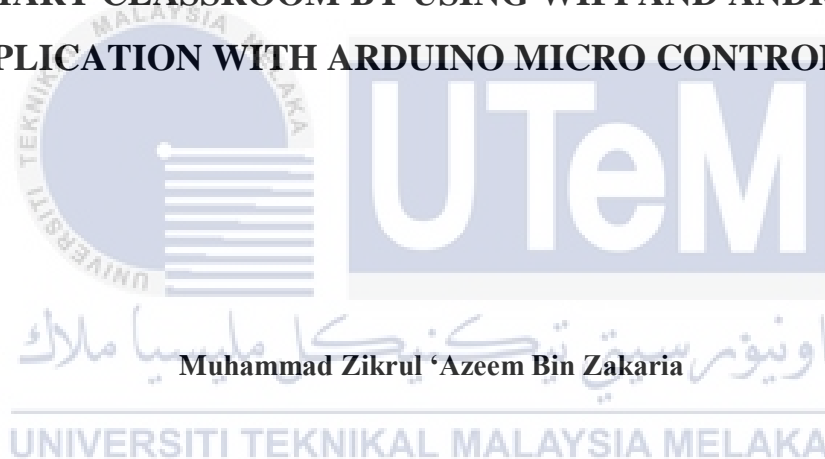
BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY
(Industrial Automation & Robotics) WITH HONOURS

2020



Faculty of Electrical and Electronic Engineering Technology

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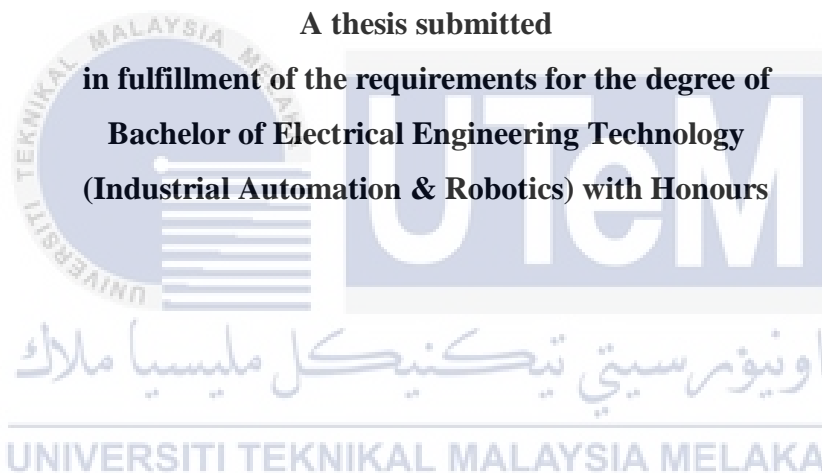
Muhammad Zikrul 'Azeem Bin Zakaria

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**SMART CLASSROOM BY USING WIFI AND ANDROID
APPLICATION WITH ARDUINO MICRO
CONTROLLER**

MUHAMMAD ZIKRUL 'AZEEM BIN ZAKARIA



**A thesis submitted
in fulfillment of the requirements for the degree of
Bachelor of Electrical Engineering Technology
(Industrial Automation & Robotics) with Honours**

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Faculty of Electrical and Electronic Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2020

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WITH ARDUINO MICRO CONTROLLER

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DEDICATION

I acknowledge my sincere dedication, honors and gratitude to both of my parents for their love, encouragement, supports, and sacrifices throughout whole of my life. Without their sacrifices and encouragement, I cannot possibly reach this stage. Special gratitude also dedicated to my brother and my sisters which always support and advise me in whatever I do in my life. Special thanks to all of lecturers especially my supervisor Encik Muhammad Fareq Bin Ibrahim, my co-supervisor Puan Nurul Kausar Binti Ab Majid and also my academic advisor Ts Puan Rosnaini binti Ramli who had taught and guided me throughout my studies and during this Bachelor Final Project 2. I would like to thank all my friends who always been with me throughout this challenging semester and help me during movement control order (MCO). An endless thank you for my friend Muhammad Mu'iz Bin Nor Azam that's help me in hardware configuration and wiring. I hope all of their supports and encourage will help me make this project a success.



ABSTRAK

Bilik darjah moden dengan menggunakan aplikasi Wi-Fi dan Android dengan Pengawal Mikro Arduino diciptakan untuk pengguna menghidupkan dan mematikan semua peralatan elektrik di bangunan besar atau kecil tanpa wayar. Sistem ini dirancang untuk memenuhi kesusahan yang dihadapi oleh pelanggan kerana di bangunan besar banyak alat elektrik mesti dihidupkan atau dimatikan. Memantau kesukaran atas peralatan elektrik yang tidak berfungsi, tenaga manusia yang terbuang dan masa untuk menghidupkan atau mematikan peralatan elektrik di bangunan besar adalah masalah utama yang dihadapi oleh pengguna yang bekerja atau tinggal di bangunan besar. Oleh hal yang demikian, sistem automasi kelas tanpa wayar untuk mengawal semua peralatan elektrik dengan sistem pemantauan dibina. Projek ini memfokuskan pada pengembangan sistem automasi bilik darjah tanpa wayar antara android, mod jambatan tanpa wayar dan modul Wi-Fi ESP8266 yang dikendalikan oleh pengawal antara muka yang dapat diprogramkan dengan ARDUINO UNO 2560. Secara keseluruhan, projek ini terbahagi kepada tiga bahagian. Bahagian pertama adalah mengenai komunikasi tanpa wayar menggunakan pemancar dan penerima penghala Wi-Fi ESP8266 dengan jambatan tanpa wayar dalam sambungan Ethernet. Bahagian kedua adalah merancang Antaramuka Pengguna Grafik (GUI) untuk aplikasi yang dikendalikan pengguna di mana telefon pintar android peribadi adalah komponen input. Ini juga digunakan sebagai sistem pemantauan untuk peralatan elektrik yang tidak berfungsi. Bahagian terakhir adalah mengenai pembangunan perkakasan di mana semua komponen elektronik disambungkan pada satu papan yang mengawal perkakas elektrik..

ABSTRACT

Smart Classroom by Using Wi-Fi and Android Application with Arduino Micro Controller were created for user to turn on or off and monitoring all electrical appliances in large or small building wirelessly. The program is designed to meet challenges encountered by the customer because in big buildings multiple electrical devices must be turned on or off. Monitoring in difficulties for not functioning electrical equipment, the wasted human resources and time to turn on or off electrical appliances in large building was the major problems that faced by consumer who worked or stay in a big building. For that reason, a wireless class automation system to control all electrical appliances with monitoring system is built. This project concentrating on developing a wireless classroom automation system between android, wireless bridge mode and ESP8266 Wi-Fi module which is controlled by programmable interface controller with is ARDUINO UNO 2560. Overall, this project is divided into three parts. The first part is concern on the wireless communication using transmitter and receiver ESP8266 Wi-Fi router with wireless bridge in Ethernet connection. Network bridging is the step that network infrastructure performs to establish a network of two or more networks or two or more parts of the network. Bridging is distinct from routing, which allows for the independent communication of multiple different networks while remaining separate. The second part is to design the Graphic User Interface (GUI) for user-controlled applications where personal android smartphone is the input component. It is also used as a monitoring system for not functional electrical appliances. The final part concerns the development of hardware, where all electronic components are connected on a single board that controls electrical appliances.

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LIST OF SYMBOLS

mm - millimetre

cm - centimetre

m - metre

km - kilometre

inch - inches

kB - Kilobytes

MB - Megabytes

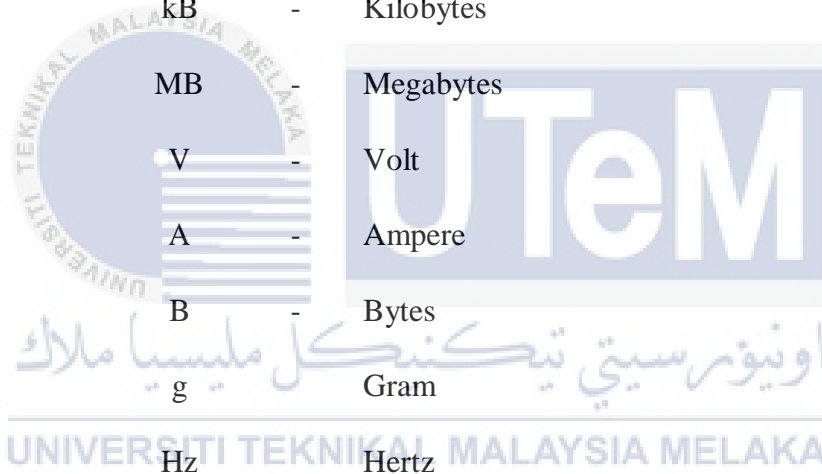
V - Volt

A - Ampere

B - Bytes

g - Gram

Hz - Hertz



LIST OF ABBREVIATIONS

UTeM	Universiti Teknikal Malaysia Melaka
BEEA	Bachelor Degree of Electrical Engineering Technology (Industrial Automation and Robotics)
DC	Direct Current
AC	Alternate Current
RCB	Residential Circuit Breaker
MCB	Miniature Circuit Breaker
OEM	Original Equipment Manufacturer
SUV	Sport Utility Vehicle
MPV	Multi-Purpose Vehicle
RAM	Random Access Memory
ROM	Read Only Memory
iOT	Internet Of Things
EEPROM	Electrically Erasable Programmable read-only memory
SRAM	Static Random Access Memory

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter introduced the general background of the smart classroom with application wireless bridge by using Android and Arduino microcontroller. Additionally, the inspiration of project to be developed is discussed along in the problem statement of this chapter. Others, such as two main objectives and scope or limitation also been reviewed. Besides, this chapter will be explained general background and view of the developed project based on Industrial Revolution 4.0 as known as IR 4.0.

1.2 Background

Nowadays most people used electrical appliances in this world. It was one of the important things needed for everyday human life. Nearly all the everyday human tasks are using technology to simplify the work. Using electrical supply to energize them through these technologies. Business typically uses more electrical appliances than normal homes, such as electronic scanning, lighting systems, air conditioners and others. The staff wanted electrical equipment to support them with their jobs or other things. Office appliances can be divided into three categories and are themselves the main appliances, minor appliances and consumer electronics. The most likely major appliances are office lighting system, fan and air conditioner.

There is a trend in home and office appliances networking together, combining the controls and key functions. Of starters, energy delivery should be handled more uniformly,