UNIVERSITI TEKNIKAL MALAYSIA MELAKA

WIRELESS CONTROL HOME AUTOMATION SYSTEM

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

by

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Tajuk: WIRELESS CONTROL HOME AUTOMATION SYSTEM

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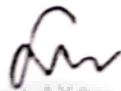
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DECLARATION

I hereby, declared this report entitled WIRELESS CONTROL HOME AUTOMATION SYSTEM is the results of my own research except as cited in references.

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APPROVAL

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

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ABSTRAK

Sistem automasi rumah semakin popular kerana kemajuan teknologi. Sistem automasi rumah tanpa wayar adalah salah satu aplikasi Internet of Things (IoT) yang membolehkan kawalan dan pemantauan perkakas rumah melalui Internet dalam masa nyata. Salah satu sebab utama kehilangan tenaga adalah kegagalan mengawal peralatan dari jauh. Sebilangan besar sistem yang ada tidak berpatutan untuk kebanyakan pengguna kerana kos yang tinggi dan kesukaran dalam penyelenggaraan. Projek ini mencadangkan sistem automasi rumah yang berpatutan dan berasaskan IoT yang memantau dan mengawal perkakas rumah dengan mudah dan cekap. Objektif projek ini adalah untuk memudahkan warga tua dan orang kurang upaya fizikal menjalankan rutin harian mereka dan mengawal peralatan rumah tangga dari jauh. Telefon pintar adalah antara muka yang mesra pengguna yang digunakan oleh pengguna untuk memberi arahan agar sistem berfungsi. NodeMCU berfungsi sebagai mikrokontroler dan WIFI bertindak sebagai kaedah komunikasi. Status yang dihantar oleh kerangka terkawal mikrokontroler yang dihubungkan dengan WIFI dapat diakses oleh pengguna dari jarak jauh pada telefon pintar, tanpa mengira sama ada peranti elektronik disambungkan ke Internet. Sistem yang dicadangkan akan mudah digunakan dan memastikan penggunaan elektrik rendah.

ABSTRACT

The home automation system is gaining popularity due to the advancement of technology. The wireless home automation system is one of the applications of the Internet of Things (IoT) that allows the control and monitoring of home appliances over the Internet in real time. One of the major reasons for energy loss is the failure to control the appliances remotely. Most existing systems are not affordable for most users because of high cost and difficulty in maintenance. This project proposes an affordable and IoT-based home automation system which easily and efficiently monitors and control home appliances. This project objective is to ease elderly and physically disabled people perform their daily routines and control the household devices remotely. A smartphone is a user-friendly interface utilized by users to give instructions for the system functioning. NodeMCU function as a microcontroller and WIFI act as a communication method. The status sent by the controlled framework of the WIFI linked microcontroller can be accessed by the user from any distance on a smart phone, regardless of whether the electronic devices are connected to the Internet. The proposed system will be an easy to use and ensures low electricity usage.

DEDICATION

I am grateful and thankful to my beloved parents, my family, my supervisor, my lectures, my friends and all who directly or indirectly helped me during this project. Thank you for the support, guidance and encouragement given to complete this project.

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LIST OF SYMBOLS

V   -   Voltage

LIST OF ABBREVIATIONS

DC   Direct Current

GSM   Global system for mobile

IOT   Internet of things

LDR   Light dependent resistor

GUI   Graphical user interface

OS   Operating system

IC   Integrated circuit

CHAPTER 1

INTRODUCTION

1.1   Background

The fast advancement of innovation has unquestionably changed the living rules of society. Nowadays, we have to stay updated with current technologies and make use of it in a better way. The home automation system is gaining popularity due to the advancement of technology. Home automation system is one of the most needed among society for these days. Wireless home automation system is one of the applications of the Internet of Things (IoT) that allows the control and monitoring of home appliances over the Internet in real time. It will be useful and make life easier.

The Internet of Things (IoT) makes everything possible where a system which has the ability to transfer data over the network without requiring human-to-human or human-to-computer interaction. A wireless home automation system using IoT is an advancement that makes us to control and monitor home appliances from anywhere in the world over the internet. Home automation system using IoT is a platform that makes easier for people to use this system.

These days, we have remote controls for controlling our electronic devices such as television sets and others, which have made our lives genuine simpler. Home automation system grants to control home appliances like light, fan, door, flame detection and more. By using a smartphone, we can remotely control and monitor the household devices as we want. This type of device has the capacity to work with flexibility and constancy. Wireless system has more advantages over Bluetooth system and GSM

system. A wireless home automation system has less drawback compared to Bluetooth system and GSM system.

The aim of this project is features of a design a low-cost home automation system which can solve daily life problems, especially elderly and physically disabled people and an easy system to use. Home automation system also decreases the human effort as well saves time, energy and electricity. The use of the internet in this modern world makes everything simpler. The IoT is an internet connection via wireless fidelity, Wi-Fi connection. IoT makes each device is connected with internet connection via Wi-Fi connection and makes that device to control loads easily. IoT based home automation system can be actualized with affordable and it is simple to present in an existing household. A wireless system is better than Bluetooth and GSM systems. Figure 1.1 below shows concept of IoT based home automation system using smartphone.

Figure 1.1: Concept of IoT based home automation system using smartphone

A smartphone is a user-friendly interface utilized by users to give instructions for the system functioning. NodeMCU function as a microcontroller and WIFI act as a communication method. The status sent by the controlled framework of the WIFI linked microcontroller can be accessed by the user from any distance on a smart phone, regardless of whether the electronic devices are connected to the Internet. Blynk application acts as a platform for controlling and monitoring the home appliances using android phone. Google assistant also used and acts as a platform for controlling home appliances via voice command using android phone.

1.2   Problem Statement

In the current era, home automation need start to be put into implementation. Because there are some prior issues that make home automation going to be necessary. Nowadays, everyone is getting busy with their types of lifestyles. Some are spending more time in the workplace where they cannot control and monitor their home appliances. So, by implementing home automation is advertising to control and monitor our home appliances from anywhere and anytime we want. We all had faced this kind of problem where we were not around home for a long time, but we keep our lights on until we back to home. So, we can save the electricity usage if get to control our whole house using a smartphone from anywhere in the world.

Besides that, we all have elder people and physically disabled people in our house. They will face problem like depending on others to turn on/off home appliances such lights and fans. Home automation system offers ease to elder and physically disabled people in our house where they can control and monitor home appliances as they want by using smartphones. Moreover, we had faced a problem like we forgot to switch off the

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lights when we were in a hurry to somewhere. Home automation offers ease of giving notification to our smartphone. So, we will get notified and can turn off the lights immediately.

1.3   Objective

The objectives of this project are stated as below:

    i.   To plan a simple system mainly to help the elderly and physically disabled people.

    ii.   To develop an affordable system which successfully controls and monitors home appliances.

    iii.   To carry out a system that ensure low electricity usage and makes effective conservation.
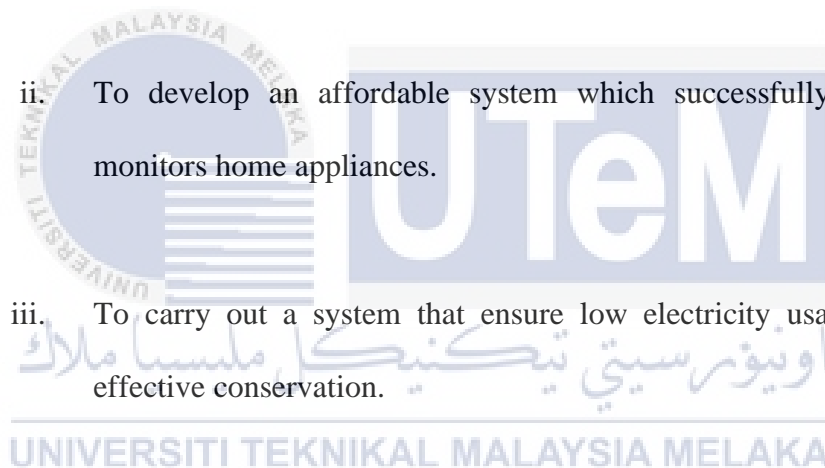
1.4   Scope of Project

The main focus of this project is to plan a wireless control home automation system that low-cost, effective, easy to use and reasonable. This project is invented for real time controlling and monitoring home appliances from anywhere in the world. NodeMCU is the main central for transferring the data to Blynk application. Blynk application acts as a platform for controlling and monitoring the home appliances using android phone. Google assistant also used and acts as a platform for controlling home

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appliances via voice command using android phone. Both Blynk and google assistant interact with each other using an android phone.

1.5   Organization of Report

Basically, final report consists of 5 chapters contains an Introduction, Literature Review, Methodology, Results, Discussion and the end of the chapter is Conclusion. Chapter 1 covered five subtopics which are the background of study, problem statement of the project, objective of the project, the scope of the project and the organization of the report. In Chapter 2, all the theory that is related will be explained in this chapter. The comparison for each research for hardware and advantage or disadvantages from each research has been done. Chapter 3, the methods, techniques and project planning that was carried out in this project will be discussed. The conceptual model will be developed. In this chapter, simulation, coding, expected results of the project will be presented. Chapter 4 that is results and discussions. Overall of the study in this project are recorded in this chapter. Moreover, the result data based on the satisfaction of the project to be illustrated in this chapter. Finally, the last chapter 5 is conclusion. In this chapter, we will discuss overall of our project and the achievement of the objective.