

DEVELOPMENT OF ANDROID BASED SMART HOME AUTOMATION FOR PHYSICALLY CHALLENGED



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2020



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**DEVELOPMENT OF ANDROID BASED SMART HOME
AUTOMATION FOR PHYSICALLY CHALLENGED**

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



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I hereby, declared this report entitled Development of Andoid Based Smart Home Automation for Physically Challenged is the results of my own research except as cited in references.

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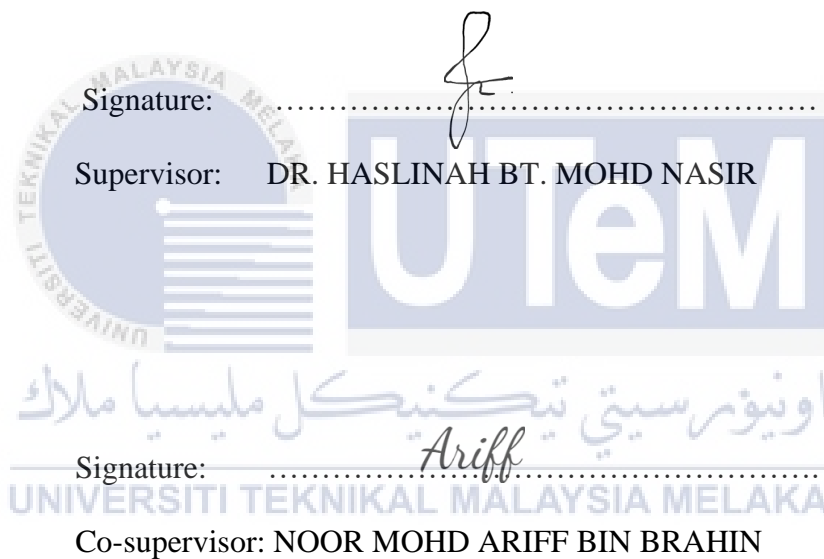


APPROVAL

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

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Supervisor: DR. HASLINAH BT. MOHD NASIR

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Co-supervisor: NOOR MOHD ARIFF BIN BRAHIN

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ABSTRAK

Projek ini menyajikan Pembangunan Automasi Rumah Pintar Berasaskan Android Untuk Bermasalah Pisik, kerana masih kemudahan untuk orang kurang upaya tidak mencukupi di seluruh dunia. Banyak penyelidik mengembangkan teknologi yang berbeza dengan mempertimbangkan Teknologi Bluetooth, sistem ZigBee, dan teknologi Wi-Fi. Walau bagaimanapun, topologi ini kekurangan sokongan yang cekap untuk orang kurang upaya. Oleh itu, untuk melibatkan orang kurang upaya dengan yang teknologi moden dan menjadikan hidup mereka mudah dan selesa, pengarang telah memperkenalkan Node MCU dengan Blynk aplikasi yang dapat mengawal suis hidup / mati di rumah bagi orang kurang upaya tanpa perlu menukar suis secara manual dengan menggunakan telefon pintar android seperti kipas angin, lampu, penghawa dingin dan televisyen. Dalam penyelidikan ini, pengesahan eksperimental model yang dicadangkan menyiratkan bahawa proses ini lebih mudah digunakan untuk orang kurang upaya dan sistem automasi perumahan mampu milik dibandingkan dengan yang lain yang ada teknologi. Oleh itu, sumbangan utama penyelidikan ini adalah dengan menggunakan Aplikasi ini di telefon bimbit, pengguna dapat memantau peralihan hanya dengan akses Wi-Fi yang akan membolehkan orang kurang upaya untuk mengawal perkakas rumah dan dengan itu dapat mengatasi batasan teknologi yang ada.

ABSTRACT

This project presents the Development of Android Based Smart Home Automation for Physically Challenged, since still now facilities for disabled people are insufficient around the world. Numerous researchers developed different technologies considering Bluetooth technology, ZigBee system, and Wi-Fi technology. However, these topologies lack efficient support for disabled people. Therefore, to engage disabled people with modern technology and make their life easy and comfortable, authors have introduced the Node MCU with Blynk an application which can control the on / off switch at home for people with disabilities without having to switch switches manually by using smart android phones such as fans, lamps, air-conditioner, and television. The method proposed is practical, economical and simple. In this research, Experimental validation of the proposed model implies that this process is easier to use for people with disabilities and an affordable housing automation system compare to other existing technology. Therefore, the main contribution of this research is using these Apps on mobile, users can monitor the switch with only Wi-Fi access which will enable the disabled people to control the home appliances and thus overcome the limitation of the existing technology.

DEDICATION

I am dedicating this project to both my parents, Baharudin Bin Mohd Din and Kamariah Binti Samsudin. This also applies to my overseer, Dr. Haslinah Binti Mohd Nasir, and my co-supervisor, Sir. Noor Mohd Ariff Bin Brahin.



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LIST OF ABBREVIATIONS

PCA	Principal Component Analysis
GSM	Global System for Mobile Communications
IR	Infrared
TV	Television
CCTV	Close Circuit Television
GHz	Giga Hertz
MHz	Mega Hertz
LAN	Local Area Network
PC	Personal Computer
USB	Universal Serial Bus
SMS	Short Message Service
I / O	Input / Output
NO / NC	Normally Open / Normally Close
SOC	System On Chip
TCP	Transmission Control Protocol
APSD	Automatic Power Save Delivery
RF	Radio Frequency
USART	Universal Synchronous/Asynchronous Receiver/Transmitter
GPRS	General Packet Radio Services
AC	Air Conditioner
IC	Intergreted Circuit

LED Light Emitting Diode

APP Application

DC Direct Current



CHAPTER 1

INTRODUCTION

1.1 Background

Today we move toward smart, great reasoning and secure paths to deal with continue with live. Android telephone and automation assume a significant job to live smartly and safely. Throughout the entire existence of innovation, android telephone is a creation that has gotten surprising unrest the world. The exponential increment in the agreeable client highlights and arrangement while diminishing expense of the android telephones, they have made our life simple as well as filled appeal in it. Home robotization is a remotely controlled framework to which of the lights, mechanical assemblies, electric power outlets, warming and cooling systems are related to this. It has conveyed advancement to our fingertips. It pulls in numerous engineers, as it an open source. Furthermore, android permits simple access to equipment parts. Now, the automation system needed to control the AC machines and retrieve the current status of devices such as On and Off remotely over noteworthy separation on an android application.

Automation at Home is an advanced innovation that changes home to a degree that it can perform different courses of action of assignments thusly. This advancement is continually overhauling its flexibility by organizing modernized features to fulfill the growing solicitations of people. Primary motivation behind home robotization framework is to spare the power. Home mechanization encourages client open to living and vitality the executives includes just as included advantages for impaired people.

Home automation system have differing level of insight and automation. It can run from straightforward remote controlled of lighting to complex micro-controller based systems. The principle normal for home automation system is remote observing and access of home apparatuses and system. It also monitors the internal condition and the activities being attempted while the house is being engaged. As a result of these technology advances, a smart home will now be able to screen a main house inhabitant activities, autonomously function gadgets in predefined designs, or freely, as requested by the client. Some of the system give arrangements that are not exceptionally helpful for family filing software. In this venture, the techniques used for home automation are Bluetooth, IR remote, and GSM.

For the most part, disabled person population would need to experience an enormous bit of the day in a bed or seat in light of the fact that their cannot stand up and switch on-off the light or fan unfailingly. Reality of home automation office is likewise remembered for the proposed system. They can turn on-off home machines like light, fan, T.V and can reach out up to 8 gadgets. Old or cripple individual likes to engage themselves by viewing T.V. This simple to utilize contraption encourages them to change the channels and its volume by just giving voice order or by squeezing the channel/volume demonstrating symbol on the android telephone. The system can be accessible requiring little to no effort with the goal that increasingly number of disable persons can get benefits.

Existing Smart Home Technologies.

Smart home applications or undertaking automation in a general family unit can be assembled by their principle capacities, for example,

- i) Alert and sensors – Heat / smoking sensors, temperature sensors
- ii) Monitoring – Regular feed of sensor information, e.g. heat, CCTV monitoring
- iii) Control – Turning on and off machines, e.g. lighting, sprinklers
- iv) Logic and Intelligence – Movement of security machines, for example
- v) Telecare or Telehealth – trouble sensor, pulse control

Nowadays, for larger applications, smart home devices are normally a modified cross breed of at least one of those requests. Access to such applications can generally be granted assembled into 4 types of access that are the type designed to use busline or powerline-based innovation, just as radio innovation is the remote type using infrared or Bluetooth. Future digital home systems are heading towards the remote state and thus the Bluetooth and radio sets are commonly used. It is a fairly new innovation to date that should be further demonstrated in terms of stability and safety.

Suppliers of this innovation should take into accounts utilized recurrence groups for current machines, for example, Bluetooth, cordless telephones or Wi-Fi switches to guarantee gadgets are powerful from obstruction. The utilization of radio frequencies, for example, at 2.4 GHz for remote LAN and 8.643 MHz (Zwave UK) empower the frameworks to be intended for high transmission capacity information stream.

Right now, the current issues related to shrewd home applications are how an excessive number of remote controls or terminal observations will occur in a home with a wide range of mechanized applications if the customer introduces a scope of restrictive filing software from different suppliers. In addition, the way in which the entry range for remote control of these gadgets is restricted by either length of links or remote system inclusion in the arrangement of an individual region. A significant case of remote innovation application is the cell phone innovation. Portability is currently a way of life

embraced by all walks of the general public, where a United Nation overview has as of late uncovered that 60% of the total populace has a cell phone membership. Considering a portable telephone's need in most of our general public, this arrangement will Effort to move the functionality of a brilliant home gadget remote control to a cell phone, to get a truly remote accommodation. Empowering a solitary remote access to a solitary server that compares to a hot home family will also solve the 'too many control terminals' issue, as has already been mentioned.

1.2 Problem Statement

The issue proclamations that happened in current circumstance/existing system are:

- a) Media transfer from computer: patients find it difficult to use a computer to control a home system because it is impractical to the patient and not portable. It needs to be changed to a smartphone to facilitate remote control.
- b) Movement: people with disabilities such as paralysis of the legs will have difficulty moving to a place even in their own home.

1.3 Objective

The objective of this report is:

- Easy to use for people with disabilities and for affordable housing automation system.
- Works to facilitate the control of the on / off switch at home for people with disabilities without having to switch switches manually.
- Using Android Apps on mobile, users can monitor the switch with only Wi-Fi access.



1.4 Project Scope

The smart home automated system is an interactive device for elderly people to be fitted and disabled with an easy-to-use home automation system that can be fully controlled based on android application. This works project illustrates a device that can be incorporated as a single portable unit and allows one to wirelessly monitor lights, fans, air conditioners, television and much more. That can also turn any appliances on or off. The overall device is powered by Wi-Fi-connected android program.

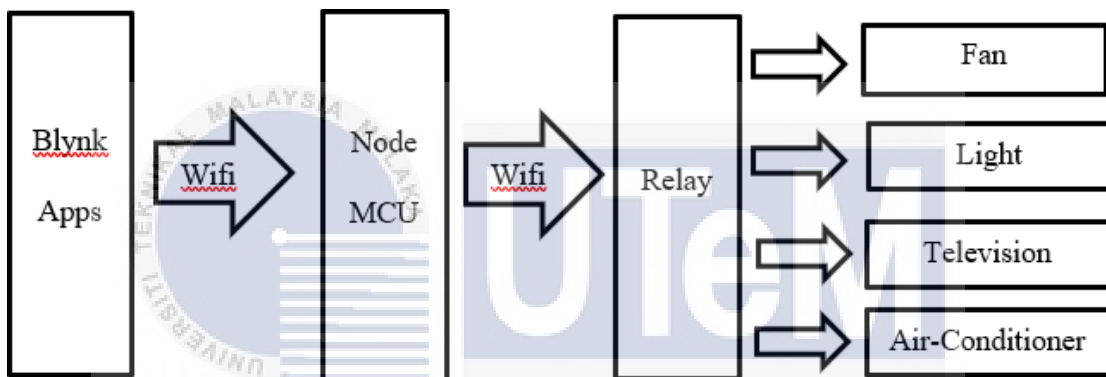


Fig. 1.1. Block diagram of control system.

Wireless	<ul style="list-style-type: none"> • Electromagnetic transmission of information between two or more points which are not bound by an electrical conductor. • Have no cables or wires directly.
Android	<ul style="list-style-type: none"> • Google has created a smartphone operating system. It is used by various smartphones and tablets. • Open source, which ensures that developers can change and configure the OS for each phone.
Prototype Development	<ul style="list-style-type: none"> • Test a new configuration to improve the accuracy of device analysts and customers. Prototyping is meant to include a specification for a true, working device rather than a theoretical one.

Table 1.1: Explanation of Device.