UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF SMART INTELLIGENT LIGHT SYSTEM AT HOME

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

By

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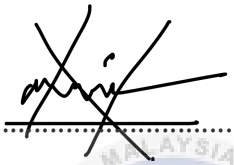

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I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the bachelor of Electrical Engineering Technology (Power Industry) with Honours.

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Supervisor Name : ENCIK ADAM BIN SAMSUDIN

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DEDICATION

To my beloved parents, which is my father is Noor Hamidy Bin Shairi, my mother is Norian Binti Jamaluddin, my sibling Nurul Atiqah Binti Noor Hamidy and also Nurul Aqilah Binti Noor Hamidy. First of all, I would like to thank you for understanding and help me to complete this project with more idea and advise. Praise to Allah SWT this project complete on time and work properl

ABSTRACT

This project is developed for controlling the lighting system at home through the internet in real time and also to operate them in different modes from any remote places. My main focus is to operate the lighting system in our desired modes and easily control them. I have developed an android based application for controlling appliances and operate them in different modes like ON, OFF, and timer for lighting at home, also all the appliances can be controlled individually. Actually, more than lighting can be control for example fan or anything with a power supply. Based on display on smartphone my algorithm will operate all the appliances according to modes. So by operating them in different modes it will save power as well as make our life easier and comfortable.

ABSTRAK

Projek ini dibangunkan untuk mengawal sistem pencahayaan di rumah melalui internet dalam masa nyata dan juga untuk mengendalikannya dalam mod yang berbeza dari mana-mana tempat terpencil. Fokus utama saya adalah untuk mengendalikan sistem pencahayaan dalam mod yang diingini dan mudah mengawal mereka. Saya telah membangunkan aplikasi berasaskan android untuk mengawal peralatan dan mengendalikannya dalam mod yang berbeza seperti ON, OFF, dan pemasa untuk pencahayaan di rumah, juga semua perkakas boleh dikawal secara individu. Sebenarnya, lebih daripada pencahayaan boleh dikawal contohnya kipas atau apa-apa dengan bekalan kuasa. Berdasarkan paparan pada telefon pintar algoritma saya akan mengendalikan semua peralatan mengikut mod. Jadi dengan mengendalikan mereka dalam mod yang berbeza ia akan menjimatkan kuasa serta menjadikan hidup kita lebih mudah dan selesa.

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LIST OF SYMBOLS AND ABBREVIATIONS

v	-	Voltage
A	-	Ampere
AC	-	Alternate current
DC	-	Direct current
wifi	-	Wireless Fidelity
IOT	-	Internet Of Thing

CHAPTER 1

INTRODUCTION

1.1 Background

Nowadays people are living in the 21st century where everything can be controlled using a smartphone. In this new technology era, automation plays an important role in human life. For example, in a household system the automation is used to control light, fan, the temperature of the room, gate and also security. Sometimes this automation system can be used as an emergency alert system to the owner of the house. These automation systems will be controlled employing a lot of techniques like using an android application, web pages, and GSM when the user is far from home. as an example, this method can control the lighting in the whole area of the house by using a smartphone. The device also facilitates old people by using controlling domestic appliances with the assist of their mobile phones as they are doing not want to go to distinctive locations for turning the appliance ON or OFF.

The Internet-of-Things (IoT) is a vision for an internetwork of smart, interacting objects such as domestic appliances, cars, devices for manufacturing facilities, wearable gadgets and various sensor kinds. The convergence of technology such as wireless communication, computer learning, real-time analytics and embedded architectures has allowed a multitude of new IoT applications. A combination of commercial pursuits and authorities projects have made smart homes, clever healthcare, smart cities, and smart transport number one area of recognition for IoT application development.

Smart domestic is a segment of the IoT paradigm that seeks to integrate domestic automation and security. Enabling objects to be linked to the Internet in a typical household enables the home to track and control them remotely. From lamps that are set on timers to be switched off at a particular time of day, to smart thermostats to regulate the temperature of the residence and to produce detailed reviews of the use of power, smart homes have placed their niche inside the purchaser's market. The availability of low-cost smartphones, microcontrollers and different open-source hardware alongside the growing use of cloud services has made it possible to develop low-value smart home protection systems. With families living busier than ever before, smart home automation and safety systems can also cater to family members with limited mobility along with the disabled and the elderly. The main purpose of home automation is to save electricity. With this technology, everyone can automatically control their home or office equipment using their own smartphone. Other than that, for the safety of the owner when coming home at late night, the owner can turn ON the light and fan to make the home ready.

1.2 Objective

- To study the smart home lighting system in real life
- To develop the smart home lighting system by implement microcontroller Arduino as a controller
- To monitor and control the lighting system in the whole area of the home

1.3 Problem Statement

Today, some people leave their homes without switching off household appliances such as fans and lights due to busy lifestyles. Such careless behaviour is not only a waste of time but also a potential danger to the home. Other than that, when a girl comes home from work late at night when the light is not turn ON they do not know what happens inside the house. This problem usually happens when the house is empty, so this project of automated home control

and monitoring system is needed to keep the wastage and danger to the very minimum. This project can be monitoring the lighting for the whole house using only with a smartphone in an application. When the house has more than one level the owner can monitor the lighting with a smartphone without going to each level to turn OFF the lighting. This also can save electricity and the energy of the owner.

1.4 Scope of Research

This project focus on the development of the lighting controller using microcontroller Arduino which is connected to the smartphone apps.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter is contributing to a literature review that is related to previous researches and related to development for the switching light. This chapter also provides history, software, and also the hardware for this project. Other than that, theoretical research for the impact and feature for this project. The information for every component in this project will be provided. This project mostly using low-cost component but have a good quality of the product. The study materials are taken from journals, articles, books, articles and internet resources. Moreover, the material in this project is taken base on observation and according to the latest development.

2.2 History of smart intelligent lighting system at home

Advanced innovation has revamped the methods we will in general live and remote lighting the board isn't any special case. In the present time of cell phones, remote correspondence and fast web, the methods we keep an eye on the board lights are experiencing an upset. Here we will in general plot the key achievements inside the advancement of reasonable lighting controls, from the essential lightweight change to the age of the net of things. Digital technology has reworked the means we tend to live and wireless lighting management is not any exception. In today's age of smartphones, wireless communication and high-speed internet give a revolution from the engineers to create lighting systems in the form

of wireless. Here we tend to plot the key milestones within the development of sensible lighting controls, from the primary lightweight switch to the age of the net of things.

Table 2.2.1 : History of light switch

Years	**History**
1884	The modern light switch is invented
1959	The dimmer switch is invented
1989	The short -link radio technology that later becomes Bluetooth is invented
1992	Shuji Nakamura invents the blue LED, kickstarting the digital lighting revolution
1998	DALI - the most widely used digital lighting control protocol is codified
1999	The term “internet of things” is coined, by a Procter & Gamble executive discussing the use of RFID in the supply chain
2006	Nokia launches the revolutionary Wibree communication technology, which later becomes Bluetooth Low Energy
2007	Apple launches the first iPhone, beginning the smartphone revolution
2010	Next comes the iPad, which sees tablets go mainstream
2011	Casambi is founded, with the aim of using Bluetooth Low Energy to change how we interact with objects around us
2011- 12	The first mobile devices featuring Bluetooth Low Energy come on the market
2015	The number of people in Western Europe with a smartphone passes

2016	The number of connected devices in the world exceeds five billion (not counting phones and tablets

2.2.1 Traditional lighting control

Lighting controls have returned an extended way inside the previous scarcely any decades. In any case, the vast majority of the present frameworks are as yet upheld past measures. The Dali ordinary was arranged twenty years ago in a world once figuring power was limited, the web as we as a whole realize it scarcely existed, and cell phones were as yet 10 years Dali has served the USA well, anyway to absolutely see the capability of the present innovation, a fresh out of the box new methodology is required.

2.2.2 Bluetooth low energy

Bluetooth Low Energy (which started life in 2006 as Wibree) was initially evolved by Nokia and later coordinated with the present Bluetooth ordinary. Today, Bluetooth Low Energy is built into each cell phone, tablet, PC and reasonable watch making it the evident choice for applications taking after truth be told, Casambi's authors, World Health Organization wont to work Nokia, saw the capability of Bluetooth Low Energy from the earliest starting point, and are working with it since before there has been any perfect device available.

2.2.3 Casambi

Casambi was situated in 2011 by Tiino Pakkala and Elena Lehtimiiki, past of Nokia focus. Timo and Elena accepted that cell phones and remote innovation may revamp anyway we will in general move with the articles around North American country. especially, they accepted that Bluetooth Low Energy a shiny new innovation that started life at Nokia was the

way to making the associated device extremely reasonable. at present the Casambi application assists with putting truly "keen" the board inside the hands of lighting clients. (casambi, 2018)

Figure 2.2 (a) 1890’S switch light

Figure 2.2 (b) 1920’s switch light

Figure 2.2 (c) 2000’s switch light

Figure 2.2 : History of light switch

The main reasonable homes were thoughts, not genuine structure. For some years, fantasy has investigated the idea of home mechanization. Productive authors, comparing to essayist, notional a future any place homes were intelligent, and by all accounts ran themselves. In Bradbury's preventative story, "There can return Soft Rains" he portrays a programmed home that proceeds with parcel perform even once people have vanished. 11's all well and appalling, till you consider the specific edges of home computerization, so the idea turns into extra encouraging than chilling. (Hendricks, n.d.)

2.2.4 The Problem of Smart Lighting Home System

Today, it's rarely been simpler or less expensive to purchase and introduce reasonable gadgets and private mechanization frameworks. This is frequently a not too bad factor. The inconvenience, nonetheless, is that frameworks are often being placed in gradually while not a focal administration reason which will bring about home mechanization issues. Without partner comprehension of anyway, reasonable gadgets convey, home mortgage holders habitually introduce units that may exclusively be constrained by the maker's application. This infers once placing in numerous gadgets, the house proprietor's cell phone will be overwhelmed with various applications, all prevailing totally various gadgets and everybody committed to controlling the house underneath conventional everyday environments. A superior methodology is to be placed in a captivated, across the board reason. The client can get through this by asking your home computerization authority concerning building up a program before purchasing your underlying gadget or framework or by talking about adjustments to your current framework.

One of the most baffling home robotization issues is the event of long postponements during the underlying development of your new savvy home task. The development technique

for placing in great gadgets and private computerization innovation has a few sections. also, everybody these parts got the chance to shut in an exceedingly firm gratitude to modify the time affordable finishing of a venture. while not this, postpones will and do happen.

What happens when you move? It might respect end up beginning from the starting point, since you will have to:

- Remove and supplant all your shrewd bulbs with ordinary bulbs.
- Recalibrate your next home to utilize the bulbs.
- Wire in any keen highlights that you have coordinated with the bulbs.

That implies that a great deal of your work will be recreated if you move. The entirety of this shouldn't deter you from including shrewd lighting, it essentially implies that you should be sensible about what you're doing. A lighting review can assist you in figuring out what your objectives are.

2.3 Hardware component

Researches on hardware components used to develop smart intelligent light system at home. The components included are Esp32, relay, AC to DC converter.

2.3.1 Microcontroller

This means the microcontroller is an implanted controller that goes about as a little PC on a single incorporated circuit structure. It is a blend of two sub-terms which are small scale and controller. Miniaturized scale implies the gadget is the actual little size and the controller portrays that the gadget will be utilized to deal with the framework, article, or procedure.