“I hereby declare that I have read through this report entitled “Develop A Graphical User Interface For Home Lighting System Using Android SDK” and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Electrical Engineering (Control, Instrumentation and Automation)”

Signature : …………………………………………………………………………

Supervisor’s Name : MR. AHMAD FAIRUZ BIN MUHAMMAD AMIN

Date : 24th JUNE 2015
DEVELOP A GRAPHICAL USER INTERFACE FOR HOME LIGHTING SYSTEM USING ANDROID SDK

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A report submitted in partial fulfillment of the requirements for the degree of Bachelor of Electrical Engineering (Control, Instrumentation and Automation) with Honours

Faculty of Electrical Engineering

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2015
I declare that this report entitle “Develop A Graphical User Interface For Home Lighting System Using Android SDK” is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Name : SITI NORSUHAILA BT MOHAMED YUSOFF

Date : 24th JUNE 2015
To my beloved parents and family
ACKNOWLEDGEMENT

This research project is not the work of one individual. The successful completion of this assignment is the result of the contribution of ideas and the help of many people who come from different educational backgrounds and have different ways. I would like to take this opportunity to express my thanks and gratitude especially to the following individuals who have helped and encouraged me to complete this project.

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ABSTRACT

The purpose of this project is to create an android application system which works to control home automation systems such as fans, lights, air conditioners and other devices in the house. Automation system is one of the best systems which can save time and provide energy efficiency. It also can reduce human energy. Today, Smartphone are becoming the most popular phones among the community especially teenagers. Look into the matter, the concept of this project is deeply compatible with the current world situation. Android has a complete software package and it is the most popular because of the technology. This project design for home automation system using Android SDK (System Development Kit). This project will be focusing on controlling home lighting system using the android application. The flow of this project is when the switches on the android Smartphone is pressed, the data will be send to the arduino board using router. It presents a design for automation system that can controls lighting system at home using a Smartphone. At last of this project, it will achieve the stated objectives which is to control home lighting system using android application and also to improve the home lighting system using android application for energy saving. Besides, it cause use to facilitate handicapped people, patient’s poeple and an elder people who are not able to control home devices manually. Hopefully that this project will give a little contribution to the community, in particular to reduce wastage of electricity and help their users.
ABSTRAK

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CHAPTER 1

INTRODUCTION

1.0 Overview

This section will give a brief introduction about the project. A few explanations about Home Lighting System (HLS) will be considered to acknowledge the performance to control system. The research background, problem statement, objectives, scope of work, and expected project outcome are explained in this chapter.

1.1 Introduction

Lighting system is an important thing that used by human to help us move or do something in the dark place. It must be have in any places including houses, offices, factories, playgrounds, roads or public places. Although the main purpose of lighting system is to provide a good lighting, it also serves to increase the attractiveness of a place and will enhance the safety.

Before lighting system was introduced, users need to control every appliance in the home manually to the purpose of electrical energy cost savings. Nowadays, the cost of the lighting system wastage can be avoided or reduce by applying the lighting system at home.

There are many types of lighting which is developed by following the latest technology. Each of the type has a different function or has its own specialty depends on the place that user need to apply it. For example, there are differences between the light that installed in the toilet with the light in an entertainment room. Figure 1.1 shows type of lighting system that normally used.
1.2 Research Background

Home automation is an interconnected device’s that can be controlled automatically. Home automation includes many appliances such as light control, air conditioning, heating, ventilation, locks, security and home entertainment. Apart from to control straight forward function such as to turn on and off the lamps, the system also provides other functions such as energy efficiency, provide better facilities and comfort. It’s also known as “Intelligent Home” or “Smart Home” [7].

HLS was designed to be user friendly and provides an appropriate level of light for users. A home lighting system can reduce human efforts, provides energy saving, manage time efficiency and also will help the users who are far away from the switches. It also will be help handicapped people, patient people and old aged people who are not able to control home appliances physically. This system is suitable for effectively reducing power consumption by the appropriate use of natural light and energy conservation.

Nowadays, Smartphone was become an exciting technology because it has a larger storage capacity, functioning like entertainment and communication methods. Android is a mobile operating system (OS) designed with touch screen mobile device. Android has a complete software package consists of an operating system, middleware and key application layer. This technology brought an easier way of life to many people around the world.
This system will produce a programming code to control the hardware which is shown in a simulation system. There are several different of popular wireless connection used like Bluetooth, GSM, ZIGBEE and WIFI. Each of this connection has their own specification and applications. For this system, a wireless network will be the ways to control the home devices by develop a graphical user interface (GUI). The wireless sensor network (WSN) technology can be a better solution to control application and function of the system automation. This system also can reduce the implementation costs compared to ordinary wired networking.

1.3 Home Lighting System (HLS)

HLS is an application of the technology that has been designed to assist human in controlling the switches of electrical devices. This application has been develop regarding to the ability of human to control the switches in their house especially for them who live in a big house. This application was designed to be user friendly and provides an appropriate level of light for users.

By having this HLS application, it can help human in term of reducing their efforts. It also can provide energy saving which are all people can take the responsibility to turn OFF the switch by using their Smartphone. Besides that, it will help users to manage time efficiency especially if they are very busy with their work. It also can help handicapped people patient people and old aged people who are not able to control home devices.

Figure 1.2: Example of home lighting system

Figure 1.2 above shows the example of home lighting system. Based on observation, there are many positive feedbacks that given by the customers who are using
the HLS application. Other than to help the users to enjoy their easy life, it indirectly will be a burner spirit to the inventors to produce a better product.

## 1.4 Motivation

The main motivation to develop this project is to facilitate handicapped person, elder age people and also patient who has difficulties in their daily life compared to other healthy people. For example, person who sits in wheelchair can’t press the device’s switch manually. If we are not going to propose the solution for them, they may let the waste of electrical energy while waiting for other people to come and help them. Other than that, it also can help disable users to access the home device’s switch physically from far area.

![Figure 1.3: Handicapped person and elder aged people](image)

Figure 1.3 shows the handicapped person and elder aged people who are not able to control home automation system physically. Besides that, safety issues are a priority in this project because many criminal cases happened in a dark places. Lighting system is one of the crucial and important thing in daily life. For sure users can’t do their work in a dark situation which is without a lamp.

However, dark place is the best place for the thugs to do their illegal activities such as theft, robbery and more. Therefore, the lighting system will help to reduce these activities. Users can turn ON the lights in any part of the house immediately for the purpose of frightening villain before contacting the authorities. At the same time, criminals are likely to be surprised that the lamp was lights suddenly. With the help of technology,
related project can be developing in order to overcome their difficulties. The system can allow the user to control many devices.

1.5 Problem Statements

There are several problem statements as listed below:

i. Users are not able to access the home devices physically from a far distance.
ii. Handicapped and elder age people not able to control home devices manually.
iii. Waste electrical energy will be happened if left it always ON without using it.
iv. Patients cannot control the home devices manually when they are not feeling well.

1.6 Objectives

Following are the objectives on this project, which are:

i. To design a graphical user interface to control home lighting system by using android application via SDK.
ii. To facilitate the users and assist handicapped people, elder age people and also patients who are not able to control home devices manually.
iii. To improve home lighting system using android application for energy saving.

1.7 Scopes

The scopes on this project stated as below:

i. Use Eclipse software to develop Android application for Smartphone.
ii. Control home devices remotely via android application.
iii. Control devices at anytime and anywhere when users are not able to access them physically.
iv. Using android application to control home lighting system through wireless router.
1.8 Report Outlines

The report outlines are as listed below:

**Chapter 1** is a brief introduction regarding the application of HLS in daily life. The motivation, problem statements, objectives and scopes of the project are clearly stated in the report.

**Chapter 2** is an explanation about HLS which consists of discussion of several papers about HLS and HAS approach. Other than that, the discussion on the wireless connection also stated in this chapter.

**Chapter 3** is about the methodology of the whole project. In this chapter, the process of transferring data was explained. The software development also stated in this chapter.

**Chapter 4** States the result and discussion which consists of design and execution of the project. Results are divided into GUI development, Emulator display and Android application on Smartphone.

**Chapter 5** consists of conclusion of the overall work and recommendation for future works.
CHAPTER 2

LITERATURE REVIEW

2.0 Overview

This chapter will discuss about the research on the revolution of the HLS such as the field of study and the types of wireless connection which has been implemented in HLS. In order to develop a graphical user interface for HLS, the method of communication within users and home devices also has been researched.

2.1 Introduction

There are various types of wireless connection that have been developed in communication between HLS with the users which is GSM, WIFI, ZIGBEE and Bluetooth. One of the famous connections that often implement is by using Bluetooth technology. Regarding to this connection, it can link a digital devices within a range of 10m to 100m with up to 3Mbps’s speed at frequency of 2.4GHz. But, it also is depending on the Bluetooth devices itself.

2.2 Theory and Basic Principle

Automation was used for much equipment such as machinery, switching in telephone network, processes in factories and other applications with minimal human intervention. It is a mechanism which depends on machines to execute manual functions. It can reduce the numbers of labor and operator by doing an observation for machine operations and provide a troubleshooting.