

# Chapter 1 Introduction

## 1.1 Research Background

Since Thomas Alpha Edison has invented the lamp on 1879. People all around the world has been using it for centuries. The lamp development from every aspects is still growing until now. It starts from carbon-thread incandescent lamp until light emitting diode (LED). The technology of its usage also changing from manual to automatic. People nowadays doesn't need to approach the switch to turn on/off the lamp, they can use smartphone, clap, heat, vibration or even their own voice instead.

In conjunction with the lamp development, the thing that has been using for measuring is also developing. The first thermometer which is used to measure the temperature was invented by Daniel Gabriel Fahrenheit on 1709. It has been developing since then. The first hygrometer which is used to measure the humidity was invented by Leonardo da Vinci on 1400s. Nowadays, people change their thermometer and hygrometer from analog to digital. The sensors (electric component) like DHT11 has also made to detect both temperature and humidity, so people now can look up those value from their smartphones or monitors in certain places. It's better to have a DHT11 to get two values instead of using LM35 to detect temperature and HIH-4000 to detect humidity separately.

Some related researches below will be used as references and comparisons:

1. Martin Lärka (2015) creating a smart home application for smartphones by using Apple Home Kit Accessory Simulator for iOS and Nest Developer Chrome extensions which runs in Chrome web browser so the user can add smart thermostats and smoke detectors.
2. Mohamed Abd El-Latif Mowad, Ahmed Fathy, Ahmed Hafez (2014) creating a smart home application for smartphones using Arduino microcontroller, PIR as human-motion detection, LM35 as a temperature sensor and Android smartphone.

3. Omar Talal Algoiare (2014) creating a smart home application for handphone using Arduino microcontroller, Android smartphone, LM35 as a temperature sensor, and two LEDs to be turned on/off, Rain sensor as a rain detector via GSM Network.
4. Prof C. H. Chavan, Mr.P. V.Karande (2014) creating a monitoring system using Zigbee, LM35 as a temperature sensor, AVR microcontroller, Humidity sensor, LCD Display.
5. Nabirul Islam, Kazi Tanjib Rizwan, Shahima Islam Nifa (2013) creating a smart home application using HSM-20G as a humidity sensor, LM35 as a temperature sensor, a PC to look up the status, and LED Bulbs.

This thesis will explain about creating a control and monitoring system application which can turn on/off the light either manually or automatically and monitoring the weather parameters; temperature, humidity, and rain rate. The lights can be controlled by using the app to turn on/off manually by pressing the buttons in the app or by using LDR which will depend on the light intensity around it turn on/off the light automatically. This app also uses speech recognizer in smartphone by linking it with Google Voice to be able for users to turn on/off the lights just by speaking the command, to look at the weather parameters, and to change the menu in the app.

The app runs on Android smartphone using Thunkable app builder to build the application and using Arduino microcontroller as its controller, DHT11 to monitor the temperature and humidity, LED as its light, LDR to enable the LED to be turned on/off automatically, Raindrop sensor to monitor the rain rate.

## 1.2 Problem Formulations

Based on the background of the problem that has been mentioned above. The formulation can be identified as follows:

1. How long does DHT11 take to report certain temperature?
2. How many percentage of the raindrop sensor to report it's raining outside while the water covering its board?
3. How's the DHT11 accuracy compare to Room Thermometer?

## 1.3 Problem Limitation

In making this paper, the author will set the problem limitation as follows:

1. Smartphone needs an Internet connection.
2. Application built using Thunkable App Builder.
3. The application is using Bluetooth as its connectivity.
4. Only DHT11, Raindrop sensor, and LDR are used.

## 1.4 Research Objectives

The objectives of this research is to produce a prototype application that has functions:

1. Turning on/off the lights manually from certain distance by pressing on/off button from Android OS smartphone.
2. Turning on/off the lights automatically by using LDR which depends to the light intensity.
3. Monitoring the weather parameters (temperature, humidity, and rain intensity) by using temperature, humidity and rain drop sensor.
4. Controlling the application with the user's voice by using Google Voice speech recognizer.

## **1.5 Research Methodology**

In writing a thesis entitled “Control and Monitoring System Application based on Android OS using Arduino microcontroller with Bluetooth connectivity”. Below are methods to solve the problems mentioned above:

1. Literature review is a critical analysis of a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles.
2. Waterfall model is a method to construct the system. This model has a systematic approach to software development.

## **1.6 Systematics**

This paper consists of five chapters are arranged by the systematic writing. A brief description of the structure of writing in each chapter are as follows:

1. Chapter I Introduction

Explaining Background, Problem Formulation, Problem Limitation, Research Objectives, Benefits of Research, Research Methodology, and Systematics Writing.

2. Chapter II Basic Theory

Provide the theories obtained from relevant sources to be used as a guide in the research and preparation of the thesis.

### 3. Chapter III Analysis and Design

Explaining the system overview and result descriptions by analyzing the system that will serve as a guide for the design. In designing the system as well as the components of the modelling system is used, including the design of a system using the UML and Interface Design.

### 4. Chapter IV Implementation and Testing

This chapter shows the implementation of the system, testing scenario, testing result, and analysis of the result.

### 5. Chapter V Conclusion and Recommendation

Summarize the whole chapter into some paragraphs, make some conclusions drawn from the research and the writing process of this paper, and give some suggestions for a better development in the future.

