CHAPTER I

INTRODUCTION

1.1. Background

In today's digital era there are many conveniences that people can enjoy and almost seem to take for granted. Everyday products nowadays often have the capability to connect to the Internet. The concept of the Internet of Things is something that's increasing in current trends; this can be seen from the amount of products available in today's markets that readily use this concept. For example, a refrigerator that can monitor items stored within it and could notify its user when things run out, along with other products and their variants for everyday items. Or, for example, in an industrial level, there are things like SCADA or Supervisory Control and Data Acquisition which is now starting to adapt to the concept of cloud computing. Behind all these devices and systems that provide convenience, there are technologies and concepts that support it such as TCP, IoT platforms, and others. With the conveniences provided by these devices, and the technologies available as of now in mind, the production or development of everyday devices that use the concept of IoT is something worth consideration.

In an age where everything happens quickly, there are a few things that become a nuisance for most people, one of which is the time needed to operate ordinary devices. For this problem, there are usually tradeoffs regarding ease of access and operating the device, with the complexity of

the device itself. For example, a device not connected to a network won't have the same level of complexity to one that could execute a command after receiving orders from a network. It is therefore beneficiary to consider a system in which these concepts of interconnectedness and convenience are put to everyday use.

1.2. Formulation

This research would seek to provide the following functions:

1. Detecting a user's presence based on sensor readings.
2. Finding the right protocol in order to connect the microcontroller to the user's interfaces e.g., web browser, mobile browser.
3. Simulating a condition in which devices are activated or deactivated based on the user's presence.
4. Designing a sort of control panel that's available locally for manual activation/deactivation of devices.

1.3. Purpose

The purpose of this research is to design a small scale, economic, smart power outlet, in which electronic devices can be activated or deactivated automatically using a microntroller that receives the command from a simple sensor. For this project, that capability will be provided by an ultrasonic sensor will detect a user's presence, a temperature sensor that

will detect the current temperature in the room, and an LDR sensor module that will detect the level of ambient light.

To this end, it will aim to set up a simple, low-cost system of human recognition in order to automatically power devices, and also the ability to activate electronic home appliances such as lights, HVAC units, among other things with the added benefit of having a simple control panel to access it manually. Furthermore, the microcontroller will be able to activate certain devices according to the readings sent by the DHT11 and LDR sensors.

1.4. Scope of Problem

To ensure the accuracy and the proof of concept nature of this project, the author will set certain boundaries in order to limit the problem to a scope that makes it manageable. The limitations are as follows:

1. The testing of this system will be limited to using a relay module with 4 channels, two channels simulating lighting fixtures of different rooms within a house, one channel to simulate an AC unit, and one channel to simulate an exhaust fan.
2. This system is limited to, for example, a studio apartment or a small house, in keeping with the low cost aspect brought forth earlier.

3. Three sensors are used in this project, one HC-SR04 ultrasonic sensor for detecting users, a DHT11 temperature and humidity sensor, and an LDR sensor to detect changes in light.
4. As of now the feature is limited to activating/deactivating the devices. The controller cannot be used to operate specific instances, i.e., changing the temperature of the AC.

1.5. Research Systematics

This report is divided into five sections which are:

CHAPTER I. INTRODUCTION

This section will discuss backround, formulation, purpose, and the scope of the research, along with the research systematics.

CHAPTER II. THEORETICAL BASIS

This chapter will discuss the theoretical basis for this research. This includes the electronic components that comprise the system, along with the relevant concepts and theories that support the system.

CHAPTER III. SYSTEM DESIGN

The third section will discuss about how the relevant concepts, theories, and components are connected in order to create the system. This includes the block diagram for system connectivity and a flowchart for how the system in general will run.

CHAPTER IV. IMPLEMENTATION AND SYSTEM TESTING

This chapter will discuss how the system design will be put into practice and will also include system tests and the results of said tests.

CHAPTER V. CONCLUSION AND SUGGESTIONS

The final section will contain the conclusion and further suggestions on how the project can be further developed.