CHAPTER 1
INTRODUCTION

1.1 Background

Technology in this world is always evolving. The development of this technology is intended to facilitate human work and solve problems effectively and efficiently. We are now entering the Industrial Revolution Era 4.0 where one of the pillars of industrial development is the Internet of Things (IoT). IoT is a technology that can help us in controlling and monitoring remotely with the help of the internet. This technology was really developed in this day and age which makes it possible for this technology to become a daily food for the next few years [1].

In this era, the lifestyle of the majority of people in urban areas is different from decades ago. Many people are busy working outside the home all day. Many people need activities that can refresh their minds after working all day. Some of activities need to be considered and cared for on a regular basis while the majority of people are not at home from morning to evening. Therefore, we need a technology that can control and monitor remotely, namely IoT. Internet of things in recent times has been the driving power to the globe for its affordable and easily executable solutions [2].

Farming is a hobby that is quite popular with people in urban areas at this time. According to FAO (United Nations, Food and Agriculture Organization) we need to increase the productivity of agriculture by between 50 percent and 70 percent to be able to feed the world population in 2050 [3]. Some people grow in pots directly and some people use greenhouses. The IoT devices needed for controlling and monitoring can be installed in the greenhouse as well. The IoT device that has sensors and automation tools has connected to the internet (web server) so that the data taken can be uploaded to the database. In this way, the problem of plants at home can be resolved.

There has been much research and various attempts to apply new IoT technology to agricultural areas. However, IoT for the agriculture should be considered differently against the same areas such as industrial, logistics [4]. Plant growth has several factors that influence the speed and quality of that growth. These factors can be used as parameters or independent variables in this study which can later be analyzed to find which parameters have the most influence. Parameters in the form

of light intensity, air humidity, and soil humidity. This research is expected to help people who are unable to monitor and control their plants any time.

1.2 Problem Formulation

Based on the background of this research, there are several formulations as follows:

1. How to design and create a website to monitor and control the growth of vegetables?

2. How to connect the sensor database to website and the sensor data can be displayed on the website?

3. How to test the Quality of Service performance analysis between the website and the database, such as delay, throughput, and packet loss?

1.3 Objectives

The Objective of this research are as follows:

1. Design and create a website to monitor and control the growth of vegetables.

2. Connecting the data of sensor with the website so that the data stored in the realtime database can be displayed on the website.

3. Get result of Quality of Service ESP32 to Website, such as delay, throughput, and packet loss.

1.4 Scope of Problem

The scope of problems of this research are:

1. Design and create a website to monitor and control the growth of vegetables.

2. The data taken by the sensor is air humidity, intensity light, soil humidity, and temperature.

3. The programming language used is C which has been embedded in the ESP 32 for classification model.

4. The classification model using fuzzy logic classification threshold.

1.5 Research Methods

This research was carried out based on several methods carried out systematically, as follows:

1. Literature Study

   Collection of materials and references in the form of books, journals, articles, papers, slides of lecture material, and others related to this final research project.

2. Field Study

   Conduct discussions with supervisors and experts in IoT fields that can provide input for research assignments This end.

3. System Design and Realization

   Designing system framework then realizing automation tools for monitoring and controlling plants remotely with IoT.

4. System Implementation

   Implementing automation tools for monitoring and controlling the growth of vegetables plants based on the parameters already determined.

5. System Performance Analysis

   Analyze the performance of automation tools for monitoring and controlling plants remotely with IoT.

6. Conclusion

   Summarizing the final results of the research that has been done based on the growth of vegetable plants using automation for monitoring and controlling plants remotely with IoT.

1.6 Writing system

The rest of this thesis is organized as follows:

- Chapter 2 BASIC CONCEPT
  This chapter contains an explanation of the theory, tools, and equipment used in this research. Such as Internet of Things, Greenbox,QoS, Website.

- Chapter 3 PROPOSED TECHNIQUE

  This chapter contains the workflow and system design flow.

- Chapter 4 PERFORMANCE EVALUATION

  This chapter contains the steps of simulation and testing performed, test results, and analysis of the test results obtained.

- Chapter 5 CONCLUSIONS

  This chapter contains conclusions and suggestions for this final project.