CHAPTER 1
INTRODUCTION

1.1 Background

Air quality levels are constantly changing. Vehicle emissions and climate change [1]. The current air quality measurement system is deemed unreliable because it only measures specific points on the ground, resulting in an inaccurate result that is influenced by a variety of factors. Certain regions are in accessible when measuring on the ground, and only a limited range of area can be measured, Because of this ground access is usually hampered and obstructed, the most practical way is to implement a mobile air quality monitoring robot such as Unmanned Aerial Vehicles (UAV) [2]. The UAV, also known as a "drone," is a vehicle that does not have a human pilot aboard it. [3].

Many drones are required for mapping air quality in a location in order to control air quality. Drones must be able to communicate with one another in order to collect accurate data on air quality. The Hypertext Transfer-Transfer Protocol is being used in the development of existing technology to facilitate communication between drones (HTTP). The drone will be able to communicate via HTTP, allowing the data collected to be directly stored using the Internet of Things. However, in its use, HTTP has several drawbacks such as the bandwidth usage is quite large and the packet size is large, so it is not reliable to run on systems that have low bandwidth or high latency.

As a result, an innovative idea is made in this thesis by adding a MQTT system to the Drone of Things to facilitate communication and data storage. MQTT is a communication protocol that works on top of the Transport Control Protocol. IBM developed the protocol as a very lightweight means for machines to communicate with one another. MQTT employs a "publish-subscribe" communication model, which eliminates the need for clients to update themselves. MQTT is a very simple and lightweight communication protocol, it consumes fewer resources, making this model ideal for low bandwidth environments. The MQTT Protocol is also designed for devices with limited capabilities, low bandwidth, high latency, and less reliable networks. Previous research, namely the MQTT-based Secured Home Automation System, strengthens the case for using the MQTT protocol as the network's application protocol and performance evaluation of MQTT and CoAP via common

middleware. According to the two studies above, the MQTT protocol consumes very little energy when compared to other protocols and can function well in low-bandwidth and high-latency environments [4].

1.2 Problem Formulation

The problem with this thesis is that the more drones communicate, the heavier the communication network. This thesis requires lightweight communication The protocol.

1.3 Objectives

From the problems that have been described, the purpose of this final project is to create a WiFi network that was built with a swarm drone using the MQTT protocol in the field of data transmission.

1.4 Scope of Works

Related to the problem formulation, the scope of the problem can be identified as follows:

1. There was a flight test done outside.
2. for 2 drones to communicate using the MQTT protocol.
3. A WiFi network that was built with a swarm of drones
4. Three to five meters above the ground, the flight test is done.
5. Wind speed, air pressure, temperature, and gravity level are all thought to be the same for each flight test.
6. During the flight mission, the quadcopter didn't run into any other things.
7. During the flight, the quadcopter did not crash.

1.5 Research Method

The research methods used in this thesis are as follow:

1. Literature Study, get data from jurnals, papers, and other thesis related to MQTT, HTTP, IoT, Subscribe and Publish

2. This creates a built-in WiFi network using MQTT for mosquitos from 2 drones.

3. Hardware and software design for the use of a WiFi network built with a swarm drone using the MQTT protocol and an MQTT broker in the form of mosquitto.

4. collecting QoS data using the Wireshark application and creating the IoT platform using Antares.

5. A flight test will be carried out.

1.6 Undergraduate Thesis Organization

The rest of this thesis is organized as follows:

- Chapter II BASIC CONCEPT
  This chapter contains the basic theory, tools, and applications used for the sending of data method using MQTT.

- Chapter III SYSTEM METHOD
  This chapter contains workflows, experimental model diagrams, and methods for sending data using MQTT.

- Chapter IV RESULT AND ANALYSIS
  This chapter describes the simulation steps and tests that were carried out, as well as the test results and their analysis.

- Chapter V CONCLUSION AND SUGGESTION This chapter contains the thesis conclusions as well as future research suggestions.