

CHAPTER 1

INTRODUCTION

1.1 Background

The recent occurrence of natural disasters makes peoples uneasy, natural disasters cause both material and non-material losses. The lack of rapid response information circulating in the community resulted in the community not being able to know when there would be a flood due to sudden arrival. Many ways can be done to anticipate and minimize losses, one of which is the implementation of an early warning system that provides information directly to the public.

Flooding is a problem of natural disasters that often occur in all regions in Indonesia. One of the causes of flooding is that high rainfall causes the water not to be accommodated in rivers so that water overflows to the mainland. Walkie-Talkie's communication that causes the information conveyed is not responsive.

In addition to the information delivered is fairly long and not efficient. For that, we need a water level measurement tool that can measure in real-time, which is then sent through a long-distance communication system so that information about the water level can be obtained at any time.

Given the importance of monitoring when rainfall is high so that it is easy for land areas that are lower than sea level to flood, the authors would like to contribute by making an early warning system that is efficient and easy to use. The design is to first analyse the 3 sensors namely SRF08, VL530X, and IR Infra red, with the results obtained on the three sensors, the sensor will be selected for use.

Research [1] developed VoIP for telemetry flood early warning system. In the warning system flood early there are two stations, namely monitoring stations and warning stations that are not in one location, by because of that by utilizing VoIP that functions for telephones can function as telemetry, so as to provide early warning of disasters flood. Similar research utilizes a database from various sources of internet sites.

Each sensor is seen from the ability to measure which measurements are effective, then which are easy to use. There are several method to measure identify the water level, including the automatic water level estimation using mobile phone and then the arduino using sensor capacitive[2].

Previous research is using the principle of modulation of the laser pad sensor

Fiber Bragg Grating (FBG). Optical methods are considered more resistant to environments that are conductive and explosive compared to other methods. In addition, the optical method is also resistant to magnetic wave interference. Several optical fiber-based liquid level sensors have been developed in recent years [3] In addition, the study developed VoIP for telemetry flood warning systems. In the early warning system floods detect moving objects by using the background subtraction method and the Kalman filter. The results obtained are the background subtraction method can detect object motion on the video and the Kalman filter can estimate the movement of the object. Other than that other research [4] Using background subtraction and frame differencing techniques to detect motion. The results obtained are able to detect the movement that occurs, this method is also sensitive to threshold values and changes in light are considered moving objects. It's just a drawback in this study is that the tracking test only shows water conditions in normal conditions and hazard conditions only. This study aims to develop a water level level tracking system by utilizing a sensor by utilizing a sound that is a sensor that functions to convert physical quantities (sounds) into electrical quantities and vice versa. How this sensor works is based on the principle of reflection of a sound wave so that it can be used to interpret the existence (distance) of an object with a certain frequency. In addition this study also uses a remote sensor technology using scattered light properties to find the distance and information of an object from the intended target. The method for determining the distance of an object is to use a laser pulse.

1.2 Problem Formulation

In the undergraduate thesis, the solution presented was the analysis of 3 sensors in the measurement of water elevation, processing of sensor data and monitoring of changes in water elevation so that systems and sensors could be used to serve as early warning systems for flood hazards.

1.3 Limitation of Problem

This undergraduate thesis has the following issues:

- The microcontroller used in this undergraduate thesis is ARDUINO UNO R3.
- Analysing 3 Types of sensors used in this final project are VL53LOX, SRF08, IR infrared sensors.

- The maximum limit for measuring the height of the water be measured in no more than 6 meters.
- Measurement only use in cylindrical media.
- Do the analysis in clear water and mud water.
- Frequency and amplitude used fabrication.
- Get sample in specific time
- In experiment, temperature and condition in fird ignored

1.4 Objective and Benefit

The final goal of this final project is to analyse 3 sensors that are used to monitor water levels in real-time

1.5 Method of Research

The method that will be used to complete this undergraduate thesis is:

- Study of literature
At this stage, the identification of existing problems is carried out such as learning the basic theories about the sensors used, microcontroller and C programming language.
- Planning
System design is done by designing a network based on the function of each working system block and software design, in this case, the C programming language design.
- System Testing and Analysis
At this stage, the system testing has been made and then continued by taking data from the results of testing the system and analysing the system. The data obtained in this process will be verified in advance so that it is by the parameters and the desired experimental scenario.

1.6 Writing Systematics

Systematic of this thesis is organized as follows:

- CHAPTER 1 INTRODUCTION

This chapter explains the introduction, problem formulation, research objectives, problem boundaries, research methodology and systematic writing for this thesis research.

- CHAPTER 2 BASIC CONCEPT

This chapter contains theories that support this thesis research such as an explanation of how it works and the components used.

- CHAPTER 3 SYSTEM DESIGN

This chapter describes the system design that will be used and the system analysis process that will be used.

- CHAPTER 4 RESULT AND ANALYSIS

This chapter explains the results of the testing tools that have been carried out as well as analysing the results obtained from the tests.

- CHAPTER 5 CONCLUSION AND SUGGESTION

This chapter contains conclusions from the results of system tests that have been carried out as well as suggestions for subsequent system development.