WATER LEVEL DETECTION FOR POTENTIAL FLOODING

Mohan Panjerino Atori [1], Ghazy Zahran Ghalibi [2], Khalif Delvino Alamsyah Nassa [3], M. Rizkie Akbar [4], Axl Banyu Satria [5]

SMP Islam Cendekia Cianjur

mohan_atori@cendekia.sch.id, Ghazi_ghalibi@cendekia.sch.id,
Khalif_Nassa@cendekia.sch.id, rizkie_akbar@cendekia.sch.id, axl_satria@cendekia.sch.id

Abstract (English)

Flooding is a situation where an area is inundated with large amounts of water. Flooding is also a natural disaster due to the negative impact of scattered rubbish. About ⅓ of The river in Cianjur overflowed due to the large amount of rubbish in the river. From these problems, we conducted useful research to analyze the potential flood conditions that could happen. Cendekia Cianjur is often hit by heavy rain and frequent flooding occurs in the area surrounding area. The research we conducted aimed to find out, anticipate and Analyze potential water conditions that can cause flooding. Of course, this is also useful for us because we can prevent flooding by measuring potential water levels. From This problem, the idea emerged to make a tool automatic function to provide warnings there will be a flood in the hope of answering unpredictable flooding problems. This system is also equipped with a prototype and can provide information on alert status and potential flooding via SMS.

Introduction

In Indonesia, natural disasters are a problem that often occurs in various places. The geographical location of Indonesia is one of the factors. Indonesia is at the meeting point of two continental plates and on the equator, which makes Indonesia have a tropical climate with high rainfall, as a result Indonesia is very vulnerable to flood disasters. The rainfall that falls in western Indonesia is greater than in central and eastern Indonesia, causing floods to generally hit western Indonesia. Apart from that, other places in Indonesia that are in low-lying areas also have the potential for flooding (Mulyanto, 2008). Floods occur because the water capacity in rivers and water channels increases beyond their capacity so that the water in the area around the channels becomes flooded and causes flooding. Water capacity can increase at any time, so residents must always be alert. As a result of the flood, many losses were incurred both in terms of material and psychology. Even floods can cause fatalities due to minimal prevention of the consequences of flood disasters (Muzakky et al., 2018). In Indonesia, natural disasters are a problem that often occurs in various places. The geographical location of Indonesia is one of the factors. Indonesia is at the meeting point of two continental plates and on the equator, which makes Indonesia have a tropical climate with high rainfall, as a result, Indonesia is very vulnerable to flood disasters. The rainfall that falls in western Indonesia is greater than in central and eastern Indonesia, causing floods to generally hit western Indonesia. Apart from that, other places in Indonesia that are in low-lying areas also have the potential for flooding (Mulyanto, 2008). Floods occur because the water capacity in rivers and water channels increases beyond their capacity so that the water in the area around the channels becomes flooded and causes flooding. Water capacity can increase at any time, so residents must always be alert. As a result of the flood, many losses were incurred both in terms of material and psychology. Even floods can cause fatalities due to minimal prevention of the consequences of flood disasters (Muzakky et al., 2018).

Metodologi

The research method we use is a quantitative method so that we can research mathematically and based on hypotheses.

The research we are doing is by placing the sensor above a ditch or river at a certain height, then when the sensor reads that the water level has increased to a specified point, the sensor will send a signal in the form of a WhatsApp message to provide information about the potential. This observation is a method of collecting data by observing directly. At this stage, data collection will be carried out by taking evidence from several rivers at Cianjur Islamic Scholar Middle School.

1. MQTT

   Is a standards-based messaging protocol, or set of rules, used for machine-to-machine communications. Smart sensors, wearables, and other Internet of Things (IoT) devices typically must send and receive data over networks with limited resources and bandwidth. This IoT device uses MQTT for data transmission because it is easy to implement and can communicate IoT data efficiently. MQTT supports sending messages between the device to the cloud and the cloud to the device.

2. Sensor Water Level

   This research uses a transistor water level sensor to provide a signal to the automation panel that the water level has reached a certain level.

3. ESP2866

   for sending data from sensor readings to the database. Based on the tests that have been carried out, the system can work well and according to design.

4. Arduino IDE

   IDE It is an abbreviation for Integrated Development Environment, or in simple terms, an integrated environment used to carry out development. It is called an environment because it is through this software that Arduino is programmed to carry out the functions embedded in programming. After that, the LCD will continue to display the distance.

Tools and Materials:

1. Laptop
2. HP Android
3. ESP 8266
4. Breadboard
5. USB cable
6. jumper Cables
7. Adapter
8. Water Level Sensors
9. Buzzers
10. MQTT protocol software
    a) Arduino IDE
       11. Blynk
       12. LED lights

The following is data on the height of the water discharge.

Number Water Height status

1. 0-15 cm siaga
2. 16-30 cm siaga 2
3. 31-45 cm siaga 1

Hasil dan Pembahasan

The results of the research we conducted can measure water levels for potential flooding, so that people can be prepared for the possibility of flooding, with the method used, namely quantitative methods. With this method we can do it mathematically and hypothetically. The results of the tool we created can detect flooding automatically with the working principle of using a water level sensor. When the sensor is exposed to water, the sensor system will deliver voltage to a series of tools or systems. When the buzzer and LED lights come on, it indicates and provides a warning that the water level has reached flood alert conditions.

a) If the water continues to rise and hits the first sensor and it lights up blue, it indicates that the water is high but still safe
b) when it goes up to the second sensor the LED lights up yellow and is at alert level
c) When water hits the third sensor, the LED lights up red along with the buzzer, indicating the potential for flooding, and sending a message to residents that flooding will occur.

Kesimpulan

Based on the results of research and testing, it can be concluded that:

1. In making this sensor, tools and materials are required such as a laptop, Android cellphone, ESP 8266, Breadboard, USB cable, jumper cable, adapter, water level sensor, Buzzer, MQTT protocol, Blynk, LED lights.
2. This tool provides messages to citizens via WhatsApp
3. The research method we use is quantitative so that we can research mathematically and based on hypotheses.

Acknowledgment

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