



DEVELOPMENT OF A RIVER WATER LEVEL MONITORING SYSTEM IN BONELEMO VILLAGE BASED ON ARDUINO MICROCONTROLLER USING ULTRASONIC SENSORS AND SMS GATEWAY

Alfhian Makmur¹, Siaulhak²

¹Informatika, Universitas
Cokroaminoto Palopo

²Informatika, Universitas
Cokroaminoto Palopo

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Corresponding author

Email : alon.ftkom@gmail.com

Abstract

In this development to design and make a prototype of the Bonelemo Village River Water Level Monitoring System Based on an Arduino Microcontroller Using Ultrasonic Sensors and SMS Gateway. The type of research used is Research and Development (R&D) which develops a monitoring system for river water levels using a prototype development method. The components used in making this prototype are arduino uno, ultrasonic sensor, buzzer, Bluetooth HC-06, and breadboard, Arduino IDE 1.8.5 software to create programs and MIT App Inventor applications to create android applications as a tool for sending messages. The development of this research is a tool that is used for monitoring and monitoring water levels in the form of an ultrasonic sensor to read the status of the water level connected to bluetooth and the Android application as a medium for sending sms to the user. The results of the research carried out can be concluded that the prototype of the river water level monitoring system has been tested using black box testing and all components of the tools and applications used have functioned properly.

Keywords: prototype; ultrasonic sensor; SMS gateway; Bluetooth; android.

INTRODUCTION

Currently, by using microcontroller technology, human work becomes easier, such as monitoring river water levels. To monitor the water level of the river, people have to come directly to the location to see and check for themselves manually or conventionally, while using microcontroller technology can make the work easier, namely by installing a tool that is

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made and then users can monitor the water level of the river anywhere and anytime.

To monitor the water level of the river, people have to come directly to the location to take measurements manually using makeshift tools such as meters and others. This is certainly very inconvenient to do because the water discharge in the river can not be predicted, so it must always or often to visit the location just in case. So we need a tool that can make it easier to

monitor the level of river water levels. To monitor the water level of the river, people have to come directly to the location to take measurements manually using makeshift tools such as meters and others. This is certainly very inconvenient to do because the water discharge in the river can not be predicted, so it must always or often to visit the location just in case. So we need a tool that can make it easier to monitor the level of river water levels.

Alawiah and Rafi Al Tahtawi's research (2017), entitled *Water Level Control and Monitoring System in Tanks Based on Ultrasonic Sensors*. The control system is designed to use a relay as a switch regulated by a microcontroller using the hysteresis control method. The test results show that the ultrasonic sensor used is capable of measuring water levels from 5 cm to 25 cm with an average measurement error of 4.93%. The designed hysteresis control system is able to produce a system output response according to a given reference value without producing a fast switching effect on the relay. In addition, the water level monitoring system can be displayed in the form of an interactive processing software interface. research by Darmawan, Mogi, and Santiyasa (2017), entitled *Microcontroller-Based Computerized Home Water Installation System with SMS Commands*. The research method used includes needs analysis, preparation of tools and materials, design, implementation and testing. A computerized water installation system with a microcontroller using SMS commands can be built according to the specified functional requirements.

METHOD

The research method used in the study used the Research and Development (R&D) research method. The research was carried out in stages starting from potential and problems, data collection, product design, design validation, usage trials, product revisions, product trials, design revisions, product revisions and mass production. The author uses the Research and Development (R&D) research method only starting from stages 1 to 5, namely potential and problems, data collection, product design, design validation, trial

use because the author uses a development model in the form of a prototype.

RESULT AND DISCUSSION

To see the status of the river water level, it can be done by looking directly at the information on the LCD board available on the tool, the available information is the status of the height and distance of the water surface with ultrasonic sensors where level 1 is SAFE (23-30cm), level 2 is ALERT (22-8 cm).) and level 3 DANGER (1-7 cm). this information can also be viewed in the android application and the application will send an SMS notification of level 2 and 3 altitude (sound buzzer) to the destination number set in the application.

The methods and procedures used are, planning, collecting materials, making system miniatures, designing hardware, and making Arduino programs by combining the GSM Shield module and ultrasonic sensor. The results and discussion of the research obtained are that the ultrasonic sensor can read the water level and the GSM Shield module can send information on the water level data that has been read by the ultrasonic sensor, as well as miniature sluice gates that can open and close according to commands sent via short messages by the operator.

The final result that will be obtained in this research is a prototype. The system created is still a prototype but the components used in the system use real forms. However, it is possible that this system still requires improvements such as changing the shape or placing the components on the prototype.

System testing is carried out to determine the performance and capabilities of the system being built. Tests are carried out on the system from the device, so that it can be analyzed and concluded whether the system that has been designed is working well or not.

Tabel

The push button activates the tool	1	
informatis level 3 di LCD	1	
informatis level 2 di LCD	1	
informatis level 1 di LCD	1	
Buzzer Sound di level 3	1	
Knob Disconnect	1	
Knob choose Bluetooth	1	
messaging application	1	
Handphone mendeteksi Bluetooth HC-06	1	
Sensor ultrasonik membaca level 3	1	
Sensor ultrasonik membaca level 2	1	
Sensor ultrasonik membaca level 1	1	

Tabel 1. water level measurement

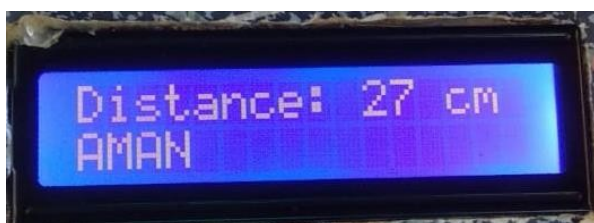
Based on the graph above, the score obtained from the calculation of the value given by 2 expert examiners. The answer "Yes" is given a score of 1, while the answer "No" is given a score of 0. The total score can be seen from the calculation below:

Persentase =

Persentase = 100 %

PICTURE

16X2 LCD testing is carried out to find out whether the 16X2 LCD is working according to the system that has been designed or not.



Gambar 1. Safe level LCD testing



Gambar 2. Alert level LCD testing



Gambar 3. Danger level LCD testing

CONCLUSION

The development of a river water level monitoring system based on an Arduino microcontroller combines several circuits such as Arduino Uno, Bluetooth HC-06, breadboard, ultrasonic sensor, buzzer, 16X2 LCD, 9v battery and push button and Arduino IDE 1.8.5 application. In addition, the river water level system is equipped with an android application created using the MIT App Inventor application.

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