Prosiding EWS FLOOD TEMPERATURE RAIL 2015

by Alimuddin Alimuddin

Submission date: 29-May-2022 10:53PM (UTC+0700)
Submission ID: 1846460363
File name: Prosiding_EWS_Temperature_THE_TRAIL_2015.pdf (110.24K)
Word count: 2557
Character count: 13177

EARLY WARNING SYSTEM ANALYSIS OF ACCIDENT DUE TO WEATHER CONDITIONS FLOOD PARAMETERS OF TEMPERATURE ON THE RAIL SCALE LABORATORY

Fatah Suleman[1], Alimuddin[2] Rahman Abdullah[3],Mardiono Lumbanraja[2], Teguh Firmansyah[2], MS Syarif[4]
[1]Department of Chemical Engineering, Faculty of Engineering UNTIRTA
[2]Department of Electrical Engineering, Faculty of Engineering UNTIRTA
[3]Department of Civil Engineering Faculty of Engineering UNTIRTA
[4]PT Six Initiatives Jaya Mandiri
Email:ayah_tami@yahoo.com,alimuddineeuntirta@yahoo.co.id[2],rahmanabdullahaja@gmail.com[3],
nainggolandion@gmail.com[1],teguhfirmansyah@untirta.ac.id[3], mssyarif@yahoo.com
[1,2,3]Jln. Jenderal Sudirman Km 3 Cilegon, Kampus II Fakultas Teknik UNTIRTA, Banten
[4]Jl.Jombang Raya Bintaro Jaya Sektor 9 Tangerang Selatan, Banten

Abstract

The problems of railways in Indonesia is even more alarming. Especially in the capital area which is prone to accidents as a result of many factors. One of the challenges of mobility train journey itself is the inhibition caused by floods inundate rail, or even worse if the accident due to the stagnant water on the train tracks. In a necessary condition in early alerts system (early warning system) abbreviated EWS. This research aims is to detect the temperature environments flood early warning system that is easy to operate and effective for detecting flooded. System testing laboratory scale using ATmega328 microcontroller and arduino programming language with ultrasonic sensors as sensors detecting water levels and temperature sensors for weather forecasting, equipped with flood and weather data transmission using the Short Message Service (SMS). Results of the study early warning system works digitally, realtime and effective response to the reading of less than 1 second, the average error ultrasonic sensor reading is 0 to 1.14% and the average error in the moisture readings daily morning, afternoon 4.06 pm %, 2.24% temperature, average speed - average delivery of messages to mobile phones, namely, Telkomsel and XL Axiata 5:57 seconds 5.8 seconds.

Keywords: EWS flooding, temperature, ATmega328 microcontroller arduino, laboratory scale

I. INTRODUCTION

The train is one type of ground transportation are quite interested in Indonesian society with a high enough number of passengers. Train in Indonesia has existed since 138 years ago. Railway network in Indonesia is largely a relic of the Netherlands covering the path along the 6482 km spread across Java and Sumatra (Yulianto T, 2010). One of the challenges of mobility train itself is the inhibition of the trip due latticework flooded railway tracks, or even worse if the accident due to the stagnant water in the railroad, if not warned early then train the majority of electric train and diesel electric imposed floods hit can result in a short circuit at the bottom of the electrical traction, or even worse can lead to accidents that can swallow a lot of casualties. The current level of security and safety of rail travel is still lacking. Still frequent railway accidents either collision with train Collision with train or train collision with public transport. Such events can certainly be life-threatening users of rail transport. This indicates weak safety assurance in using rail transport so that the necessary wireless sensor network in realtime (Maneesha VR 2009). Area of the capital and other areas pretty much discovered flood-prone areas, has become a tradition when heavy rainfall will cause flooding in flood-prone point. Therefore it is very necessary early warning system either manually or automatically in order to reduce the occurrence of delay, delays or accidents on the railways. Given the importance of the smooth and timely mobilization of the absolute need to use the train, needed a security device or notice early (early warning) flooded in order to minimize delays or even accidents that claimed many casualties. Another benefit of early notification is the train can quickly respond to what is to be done in order to avoid delay in departure, either by replacing power train or diesel-electric locomotives with diesel hydraulic locomotive.

There are some studies relate these are the The first, detection and early warning systems for natural disaster flood 8535-based microcontroller and sms gateway dialirain code river to discuss the length of sms messages to mobile phones is relatively fast receiver that is under 7 seconds, the flood response to the rapid alarm (Hanund Putranto, et al; 2010). The second Flood Early Warning System Based Microcontroller Atmega 16 With Buzzer And Short Message Service discusses early warning system run properly using the buzzer indicator lights and SMS (Sumarno, et al; 2013), The third, water level monitoring and early warning flood hazard based sms discuss water level readings using ping sensor, has a good level of accuracy with an error of 0.23 cm. use sms (Frans Scifo,et al; 2013). The Fourth Sensor System Implementation For Flood Warning via SMS discuss the use of water as a conductor 2 conductor plate has successfully signaled water level (Nur Octarina, et al; 2013). The fifth, Design of Remote Monitoring System High Water Surface-Based SMS to discuss the system made capable of

transmitting data sensor accurately without being affected by distance and time to the receiving device as sensor data can be accessed at any time during the tool operates on the signal range of GSM operators are used (Alimuddin et al, 2014)

II.METHODS

In general, the design of an early warning system crash due to flooding on this train will observe, examine, analyze on several things, namely the performance of the sensor - the sensor, microcontroller performance, as well as interaction data delivery to the operator / engineer in the event of flooding. The design of the hardware in this study is divided into several component parts which have their respective functions. The parts include a series of resources or power supply, hardware design early warning system and the integration of hardware with a container of artificial floods.

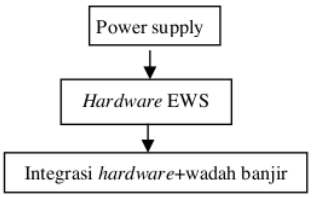

Figure 1. The Components Microcontroller

Generated by a 5 volt power adapter to the portable ultrasonic sensors where the tool path is determined by the amount of distance that is generated. Serves as the water level detection in a place that has been determined as the point of placement of EWS in this test is done in two places, namely laboratory and railroads. If the amount of the value of water level produced did not show an increased density of water, in these conditions the appliance will repeat the commands from the microcontroller to ultrasonic sensors in real time and repeatedly to obtain data or height values indicate that the possibility of increasing the volume of water is detected, the testing times this height divided into 3 parts: 10 cm, 20 cm and 24 cm distance sensor to the water for lab scale and 55 cm, 50 cm, 33 cm distance to the water sensor for real scale railroads. By detecting a height that allows the addition of water, the volume and height of the microcontroller will command the temperature sensors to work where the sensor will work in realtime to measure the temperature. At a certain temperature the microcontroller will instruct the GSM modem wavecom serial converter RS232 to send an SMS to the number that has been set, which processes occur repeatedly until the value of predetermined temperature microcontroller will instruct the GSM modem for sending SMS, while the height of the specified divided Standby into 3 categories: first, If height has reached 24 cm, the microcontroller will activate the temperature sensor as well as instruct the GSM modem to send SMS containing water height 24 cm (AWAS) to a defined number. If the data is read from the temperature sensor: T> = 300C, the weather is categorized as bright, if the data is read from the sensor temperature and humidity: T <= 300C, the weather was categorized as cloudy or rain, if the data is read from the temperature sensor: T > = 300C, the weather is classified as high temperature, high humidity, if the data is read from the temperature sensor: T <= 300C then categorized as low-temperature weather. Furthermore, the sensor will return realtime transmit data to the microcontroller heights up to a certain height. Secondly, If height has reached 20 cm, the microcontroller will activate the temperature sensor as well as instruct the GSM modem to send SMS containing water height of 20 cm (ALERT) to a defined number. If the data is read from the temperature sensor T> = 300C, the weather is categorized as bright, if the data is read from the temperature sensor: T <= 300C, the weather was categorized as cloudy or rain, if the data is read from the sensor temperature and humidity: t> = 300C and H> = 50%, then the weather is categorized as high temperature, high humidity, if the data is read from the temperature sensor: T <= 300C, the weather is categorized as a low temperature, low humidity. Furthermore, the sensor will return realtime transmit data to the microcontroller heights up to a certain height. Third, If height has reached 10 cm, the microcontroller will activate the temperature sensor as well as instruct the GSM modem to send SMS containing "FLOOD" to the number that has been specified. If the data is read from the temperature sensor: t <= 300C, the weather was categorized as cloudy or rain, if the data is read from the temperature sensor: T> = 300C, the weather is categorized as bright, if the data is read from the temperature sensor: T> = 300C, the weather is categorized as a high temperature, if the data is read from the temperature sensor: t <= 300C then categorized as low-temperature weather. Furthermore, the sensor will transmit data back realtime water level.

The process will continue when the ultrasonic sensors continuously transmit data of temperature and humidity that allows data to gain altitude to the microcontroller and the process will stop if the data of ultrasonic sensors transmit data to indicate there will be the addition of the water level.

III. RESULTS AND DISCUSSION

3.1.Temperature Sensor

Table 1. Temperature Sensor Testing

	Sensor DHT 11	Temperature (^{0}C)	Error (%)
Morning	28	27,9	0,35 %
Lunch	30	29	3,57 %
Afternoon	32	32,9	2,81 %

On testing the temperature sensor, producing a different value to the true value or the value of a digital thermometer, but the error value generated is not too large or are still below 5%, this is still below the general tolerance to the percentage value error should not be more than 5%. It can be concluded on the sensor temperature reading is stable and its effectiveness is still good.

3.2 Hardware Tests Early Warning System

Table 2. Testing Hardware Early warning system Accidents Caused by Flood At Railway mini Using Multiple Provider Different

TELKOMSEL				
Height	**Low Temperature**	**SMS**	**Travel time SMS**	**The contents of SMS messages**
24 Cm	✓	✓	5,93 Second	Status: CAUTION Water level: 24 cm Weather: Low temperature
20 Cm	✓	✓	5,46 second	Status: ALERT Water level: 20 cm Weather: Low temperature
10 Cm	✓	✓	5,59 second	Status: FLOOD Water level: 10 cm Weather: Low temperature

XL AXIATA				
Height	**Low Temperature**	**SMS**	**Travel time SMS**	**The contents of SMS messages**
24 Cm	✓	✓	6,22 Second	Status: CAUTION Water level: 24 cm Weather: Low temperature
20 Cm	✓	✓	5,78 second	Status: ALERT Water level: 20 cm Weather: Low temperature
10 Cm	✓	✓	5,99 second	Status: FLOOD Water level: 10 cm Weather: Low temperature

Based on test results flood early warning system, in Table 2, the system will first read the distance to the water level sensor ultrasonic sensor readings and then compare the results with the knowledge base that is embedded into the system. The next reading of the results can be known whether the water level in the container artificial flood in a state of alert, alert (flood alert) or the danger of flooding. Tests 1 to 3 flood early warning system, the distance to the object sensor reads 24, 20 and 10 cm corresponding knowledge base embedded in the program. So as to enable the modem umtuk send an SMS as confirmation of the state of artificial floods.

The average term of SMS delivery is highly dependent on the quality of the GSM network provider service companies as well as an outline of SMS delivery also depends on when the weather where the temperature is high, both in Telkomsel and XL Axiata texted faster than low temperature weather conditions. We can see an average delivery of SMS by Telkomsel in high temperature 5.31 seconds, XL Axiata Tekomsel 5.54 seconds compared to 5.66 seconds at low temperatures, XL Axiata 5.99 seconds. For overcast conditions - rain, Telkomsel and XL Axiata 5.55 seconds 5.93 seconds, for sunny conditions, Telkomsel and XL

IV.CONCLUSIONS AND SUGGESTIONS

4.1.Conclusion

Based on the analysis and testing of early warning system crash due to flooding arduino based microcontroller with ultrasonic sensors, temperature and SMS sending this it can be concluded:1). Hardware Early warning system crash due to flooding at the railroad use arduino microcontroller as brain the whole system to determine the ultrasonic sensor readings of the water level and temperature and humidity sensor readings for weather information in realtime successfully designed using SMS as an output or an early warning. 2). Early warning system crash due to flooding is progressing well and effective for use mainly in the railway in Indonesia. 3). System do the reading surface water conditions in real time and average speed of sending SMS all providers to the operator or machinist by an early warning system crash caused by flooding through a GSM modem under 7 seconds, both on the laboratory scale testing and real scale using the railway. system running quickly, accurately and efficiently. 4). The test results mean percentage error (error) on ultrasonic sensor reading range of 0 - 1.14% and the percentage of errors in the temperature sensor is below 5%.

4.2 SUGGESTIONS

To continue this study, researchers have some advice the development of research, namely: 1). This research could be developed by asking the water surface elevation information with a certain text format because this research has been using a special modem, 2. This study could be developed by integrating into fields that require the measurement of water level in realtime or into rivers early to know when the water flow increases in order to avoid flooding.

ACKNOWLEDGMENT

The authors would like to thank sponsor contribution in funding Excellent research university from the ministry of technology research and Higher Education Indonesia.

REFERENCES

Alimuddin, Anggoro Suryo Pramudyo, Eko Hadi Santoso 2014, Design Build in Flood Early Warning System, Proceedings of the National Seminar on Microwave Antennas and Propagation (SMAP), Department of Electrical Engineering University of Mercubuna Jakarta.

Yulianto Thomas (2010), the occurrence of Accident Cause Analysis of Railway Business And Preventive The Forum, .S1 Thesis, UAJY

Maneesha V Ramesh (2009), Real-time Wireless Sensor Network for Landslide Detection, in the Proceedings of the 2009 International Conference on Wireless Networks (ICWN'09), CSREA Press, India

Nur Octarina, (2013) Implementation System Sensor Simple For Flood Warning via SMS., S1, University of Al-Azhar Indonesia

Putranto, Hanung (2010) System Detection And Early Warning Flood Disaster 8535-Based Microcontroller and SMS Gateway Dialirain Code River., JTI, STMIK Amikom, Yogyakarta

Scifo, Frans (2013) Water Level Monitoring and Early Warning Flood Hazard Based Sms., S1., Diponegoro University

Prosiding EWS FLOOD TEMPERATURE RAIL 2015

ORIGINALITY REPORT

4%	3%	0%	1%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	aasec.conference.upi.edu Internet Source	3%
2	W Indrasari, B H Iswanto, M Andayani. "Early Warning System of Flood Disaster Based on Ultrasonic Sensors and Wireless Technology", IOP Conference Series: Materials Science and Engineering, 2018 Publication	<1%
3	eprints.untirta.ac.id Internet Source	<1%

Exclude quotes	On	Exclude matches	< 5 words
Exclude bibliography	On		

Prosiding EWS FLOOD TEMPERATURE RAIL 2015

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4