

UNIVERSITI TEKNOLOGI MARA

**INTERNET OF THINGS (IoT) DEVICE FOR
WEB BASED RIVER'S VELOCITY
MONITORING**

MOHD RADZUAN BIN OTHMAN

**FINAL YEAR PROJECT (CSP650)
BACHELOR OF COMPUTER SCIENCE (HONS.)
DATA COMMUNICATION & NETWORKING
FACULTY OF COMPUTER AND MATHEMATICAL
SCIENCES**

JANUARY 2020

STUDENT DECLARATION

I certify that this thesis and the project to which it refers is the product of my own work and that any idea or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

.....

MOHD RADZUAN BIN OTHMAN

2017913801

JANUARY 2020

ABSTRACT

An estimated of 372,000 people died of drowning in 2012, making it the third-largest unintentional injury killer in the world. In Malaysia, the death rate due to drowning has steadily increased. Every year, approximately 700 cases of drowning are reported, or about two people die every day in bodies of water. The primary location of drowning in Malaysia is the river, beach and waterfall. However currently, the reality in Malaysia is that there are no channels or sources of real-time information that can be accessed by the general public or rescue teams about information on the rivers velocity. Malaysians observe these areas to decide whether the place is safe or dangerous. The warning system of the river velocity stream is using improper a warning notices and red flags at specific locations. Hence, this project proposes to develop a prototype system that can measure the river velocity, determine the danger of the river and publish the information online. The prototype developed was tested with sensitivity and functionalities test. Prototype developed using water flow sensor to measure water flow and using Arduino Nodemcu to calculate the velocity and sent it to ThingSpeak and a web site through internet The results show that this prototype is able to measure the velocity, determine whether the velocity is dangerous and provide this information to be stored in ThingSpeak database. The system is able to display that information on website. The usability results shows that the 100% of responsiveness is agree this project is implemented and able to prevent drowning. Indirectly reduces the drowning index.

TABLE OF CONTENTS

CONTENT	PAGE
SUPERVISOR APPROVAL	ii
STUDENT DECLARATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF FIGURE.....	ix
LIST OF LISTING.....	xii
CHAPTER 1: INTRODUCTION	1
1.1. Background of Study	1
1.2. Problem Statement.....	2
1.3. Research Objective.....	3
1.4. Research Scope.....	3
1.5. Research Significance	4
CHAPTER 2: LITERATURE REVIEW	5
2.1. The River Velocity Is A Threat.....	5
2.2. River Velocity Measurement.....	5
2.3. Internet of Things (IoT).....	6
2.4. Arduino Microcontroller	8
2.5. WiFi Module	9
2.6. The Water Measurement Tool.....	9
2.6.1. Water Flow Sensor	10
2.6.2. PH Sensor	10
2.6.3. Turbidity Sensor	11
2.7. Web-Based Development.....	11
2.8. Performance Evaluation.....	12
2.8.1. Functionality Test	13
2.8.2. Sensitivity Test	13
2.9. Related Work.....	13
2.9.1. The Monitoring of Water Quality in an IoT Environment using MQTT Protocol.....	14

4.6. Summary	46
CHAPTER 5: RESULT AND ANALYSIS	47
5.1. Hardware Component Testing.....	47
5.1.1. Arduino Nodemcu.....	47
5.1.2. Water Flow Sensor	47
5.1.3. LED and Buzzer Testing	48
5.1.4. ThingSpeak Testing	49
5.1.5. Website Testing	51
5.2. Functionality Testing	52
5.2.1. Connection Testing (Prototype Connection to Network)	52
5.2.2. Prototype Testing.....	54
A. Batu Pahat Analysis	55
B. Bukit Air Analysis	56
5.2.3. Water Volume Testing	61
5.2.4. Warning System Testing	63
5.3. Usability Testing.....	64
5.3.1. Respondent Background	64
5.3.2. Analysis of the Web Site.....	66
5.4. Summary	68
CHAPTER 6: CONCLUSION AND RECOMMENDATION	69
6.1. Project Accomplishment.....	69
6.2. Project Contributions	70
6.3. Problems and Limitations	70
6.4. Recommendation for Future Research	71
REFERENCES	72
APPENDICES	75
Questionnaire.....	75
Code Sketch.....	79