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CAR FLOOD SAFETY SYSTEM

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I declare that this research submission is my own work contains no plagiarism materials written by another person except where due references are made.

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ABSTRACT

Flood has become one of the big problem that occur in our country, Malaysia every year. According to a media statement on the Malaysia 2021 flood impact special report, Selangor lost RM855.0 million in vehicle losses, Pahang lost RM78.2 million, and Negeri Sembilan lost RM18.3 million. Flood is not something that could be solved in day, especially in this technology race era. As citizen that faced this problem, what we could do is by avoiding the flood from effecting our vehicle.

Floods are an old disaster that has claimed many lives and property. A woman in Shah Alam was forced to go blind after losing her newly purchased car with her husband due to flooding. However, with this project, Car Flood Safety System, such incidents can be avoided. This project can forecast a flood at a specific time and location. In comparison to a standard weather forecast, it is unable to issue a warning for a specific location, such as this tool, which can detect flooding in the area of the car. Furthermore, he can inform the car driver about the condition of their vehicle and advise them to move their vehicle if a flood occurs via SMS. It is critical because flash floods can occur unexpectedly. As a result, the warning system can instruct the driver to move his vehicle.

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CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

In this era, human beings are getting faster in the pursuit of progress. Progress involves in terms of economy, health, transportation, social and others. This progress is crucial in improving the quality of life of mankind around the world. For example, humans in the past to move to a place by road was a huge challenge. Have to deal with bad roads, wild animals and maybe even no direct road facilities. But now with the help of technology, humans can explore the forest to build roads or highways to facilitate one's affairs. An example that can also be taken in our own country, the longer we see cities start to grow like mushrooms after rain due to economic growth. We see as in Kuala Lumpur itself, more and more skyscrapers are being built every day such as Merdeka 118 which will be the second tallest tower in the world . But behind the mask of progress, its own ugliness is revealed. Among the most obvious disadvantages of its physical impact is logging activity. We can see an example in the state of Pahang where the forested area from 2016 to 2020, has been reduced by 40742 hectares. Based on these figures, we can see the impact on the floods that occurred in the state in 2020 is 70 as compared to the previous year, 2019 is
28. Of the 70, 69 floods are flash floods, 1 monsoon flood and 0 coastal floods. These data show a parallel increase in line with the logging activities that took place. More importantly this trend not only happening in Pahang but across our country.

However, as ordinary citizens we can only continue to accept the current of progress and become victims of its effects. The old disaster of floods has claimed many lives and property. There was an incident that happened to a woman in Shah Alam who had to go blind to lose her newly bought car with her husband due to flooding . But such incidents can be avoided with this project, Car flood safety System. This project can predict the flood in a certain time at car location. Compared to a normal weather forecast, it is unable to issue a warning for a specific place like this tool where it can detect flooding in the area of the car. In addition he can also inform the car driver about their car condition to move their car if flood is happening through SMS. It is important because flash floods can happen suddenly. So through the warning system it can tell the car driver to move

his car.

1.2 BACKGROUND OF PROJECT

A flood is an overflow of water that submerges land that is usually dry. Floods are an area of study in the discipline of hydrology. They are the most common and widespread natural severe weather event. There are five types of floods. They include: River Flood, River Flood, Storm Surge, Inland Flooding and Flash Flood. A river flood occurs when water levels rise over the top of river banks. This f looding can happen in all river and stream channels. This includes everything from small streams to the world's largest rivers. A coastal flood is the inundation of normally dry land areas along the coast with seawater. Storm surge is an abnormal rise in water level in coastal areas over and above the regular astronomical tide. The next type of flood is an inland flood. An inland flood is flooding that occurs inland or not in a coastal area. Therefore, coastal flooding and storm surge are not inland f loods. Finally the focus of this project, the most well-known and deadly type of f lood is a flash flood. A flash flood is flooding that begins within 6 hours, and of ten within 3 hours, of heavy rainfall (or other cause). Numerous factors can cause flash floods.

The majority of flash floods occur after brief periods of time-limited, extremely strong rainfall from severe thunderstorms (normally 6 hours or less). Rainfall rate and rainfall duration are the two main factors that determine whether flash f looding is likely to occur. Flash floods can also occur when levees fail, dams collapse, or ice jams discharge a lot of water .

In Malaysia, the risk and exposure of humans to the dangers of flash floods, especially in large urban areas with dense population distribution and high construction rates, has increased significantly in recent years. This is proven by the occurrences of serious flash floods around the country's main cities such as Kuala Lumpur, Georgetown, Ipoh, Kota Bharu and others (Chan, 1996a).

Usually, the main causes of flash floods are rapid surface flow due to changes in land use (from covered surfaces such as forests to non-covered surfaces such as concrete, cement and asphalt), blocked river channels and drains, reduced river capacity through silt deposition and rainfall events. storms such as heavy convective storms. Typically, flash floods occur rapidly (i.e. a few minutes to half an hour after the rain occurs) but also end quickly (i.e. their life span is from half an hour to a day).

The September 1995 floods in Penang and the December 1995 floods in Shah Alam and Kuala Lumpur are notable examples (Chan and Goh, 1995a). In Georgetown, especially around Jalan P. Ramlee and Jalan Perak, flash floods often occur in most places whenever heavy rains occur for several hours. This situation also happened in Kuala Lumpur around Jalan Kelang Lama, Kampung Baru, Pantai Dalam and Kampung Haji Hukum Abdullah. In those cities, flash floods have become so frequent that the parties' excuse that the floods are caused by an 'act of God' can no longer be accepted.

In Malaysia, the deaths caused by flash floods are not as large as those experienced by Bangladesh, which means that hundreds of thousands of lives are often lost. However, damage to property, destruction of infrastructure, loss of business and loss of lif e are significant (Chan, 1995). For example, although no careful study was conducted, the total losses in the 1971 flood in Kuala Lumpur, the June 1991 flood and the September 1995 flood in Penang, and the December 1995 flood in Shah Alam, Selangor were estimated to be millions of ringgit. The annual cost spent by the Malaysian government in handling flood disaster relief operations (preparation, rescue, evacuation, temporary settlement, supply of food and clothing, as well as conservation of flood victims) is huge. In terms of loss of life, almost every year everywhere in Malaysia there are casualties.

However, this technology, Car Flood Safety System, can help prevent such occurrences. This project has the ability to foretell a flood at a certain location and

time. In contrast to a typical weather prediction, which may identify f loods around a car, this technology is unable to offer a warning for a specific location. Additionally, he can use SMS to alert the driver of a car about the condition of their vehicle and instruct them to move it if flooding is in progress. Because flash floods can occur rapidly, it is crucial. So the warning system can instruct the driver to reposition the vehicle.

1.3 PROBLEM STATEMENT

Figures 1. 1

We always see the problem of flash floods on the front page of the news every day. This problem is increasing day by day due to various factors. Among the f actors are high rainfall intensity, dense development areas, poorly maintained drainage systems as well as drain and drainage pollution problems. With frequent floods, it will also increase the occurrence of cases of property damage such as cars to our people. Most flash floods only take 3–6 hours for it to occur . As ordinary citizens we can only afford to take measures to reduce the loss of property especially cars. Most of the cars involved in this accident were because the floods happened in the city center like Kuala Lumpur they went to work and got caught in the flash floods, did not have time to save their cars not knowing when the floods happened.

According to a media statement on the Malaysia 2021 flood impact special report, the top three states with vehicle losses were Selangor RM855.0 million, Pahang RM78.2 million, and Negeri Sembilan RM18.3 million. This loss should not be taken lightly because of its importance in our lives. Therefore the presence of technology to

reduce the problem is very important. We can see effect of flood on latest event. According to a media statement on the Malaysia 2021 flood impact special report, the top three states with vehicle losses were Selangor RM855.0 million, Pahang RM78 .2 million, and Negeri Sembilan RM18.3 million. This loss should not be taken lightly because of its importance in our lives. Therefore the presence of technology to reduce the problem is very important.

1.4 PROJECT OBJECTIVES

- To predict the flood in certain time at car location
- To detect flood that happen at car location
- To inform the car driver about their car condition
-

1.5 PROJECT QUESTIONS

- How to design and develop Q-bin for environment safety and well-being.
- How to implement and evaluate the usage of the q-bin among community in Polytechnic Sultan Salahuddin Abdul Aziz Shah.

1.6 SCOPE OF PROJECT

A system that can inform the car owner about the status of their car during a flood is a tool that helps to keep the car owner informed about the safety and condition of their car during a flood event. This system can provide updates and notifications to the car owner through direct messages sent to the car owner's phone The system can use sensors to detect the presence of floodwater height, and can provide updates on the car's status and any potential dangers. By using this system, car owners can stay informed about the status of their car during a flood and take appropriate precautions to protect their vehicle and themselves.

1.7 SIGNIFICANCE OF STUDY

The Car Flood Safety System is an important project because it helps car owners to detect and respond to flood events that could potentially damage their car. Floods can be dangerous and destructive, and if a car is caught in a flood it can be seriously damaged or even totaled. The Car Flood Safety System can provide early warning to car owners about the risk of flooding, giving them the opportunity to take action to protect their car and themselves. The system can provide real-time updates on the status of the car and the flood risk, allowing car owners to stay informed and take appropriate action. Knowing that their car is protected can give car owners peace of mind and help them to feel more secure in the event of a flood. By detecting and responding to flood risks early, car owners can save money on repairs and avoid the cost of replacing their car altogether. Overall, the Car Flood Safety System is an important tool that can help car owners to protect their vehicles and themselves during a flood event.

1.8 CONCLUSION

In conclusion, the Car Flood Safety System is a useful tool that can assist car owners in identifying and responding to flood situations that could potentially harm their vehicle. The device can assist automobile owners in taking the necessary precauti ons to secure their vehicle and lower the likelihood of damage or loss by providing early warning and real-time updates. Knowing that the car is being watched and safeguarded during a flood event can bring comfort and peace of mind thanks to the system. Th e Automobile Flood Safety System is an important initiative that can assist car owners in safeguarding both their vehicles and themselves in the case of a flood.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

Flood has been a big problem in a long time for now. Floods can be a major risk to cars, and can cause significant damage or even total loss. Nowday, there has been countless of study that related in solving flood-related problem that involving reducing the total loss from incident. The purpose of the literature review is to examine the existing research on the Car Flood Safety System and related technologies, and to identify any gaps or areas for further study. The scope of the review should be defined, outlining which aspects of the study will be covered in the review. This might include a discussion of the technology used, the effectiveness of the system, and any potential limitations or challenges.

2.2 PREVIOUS STUDIES

The Early Flood Detection System Using Arduino is a prototype designed to detect water levels in a specific location, such as a pond, dam, or reservoir. The system uses an Arduino UNO, ultrasonic sensor, buzzer, LCD, and connecting wires to detect when the water level reaches a certain point and send an alert to the user. When the distance between the water level and the ultrasonic sensor becomes 40cm or less, the buzzer is set to HIGH to give an alert and the LCD displays a flood alert message.

One advantage of this system is that it is relatively easy to build, as it uses a limited number of components. However, it has a number of limitations. For example, it can only be used in certain locations, such as ponds, dams, and reservoirs, and may not be suitable for detecting floods in other types of environments. Additionally, the system may not be able to detect smaller changes in water levels, as it is triggered when the water level reaches a specific threshold of 40cm. Finally, the system relies on the ultrasonic sensor to detect the water level, which may not be as accurate as other types of sensors.

The Rain Detection System using Arduino and Rain Sensor is a system designed to detect rainfall and trigger an alarm or other actions in response. It consists of an Arduino board, a rain sensor, and a buzzer. When rain falls on the sensor, it acts as a trigger and switches on the buzzer. The Arduino board is programmed to sense this trigger and perform any required actions, such as activating an alarm or sending a notification.

This type of system has a number of potential applications, including in the agriculture and automobile fields. For example, it could be used to alert farmers to start irrigation or to alert drivers to turn on their windshield wipers.

One advantage of the Rain Detection System is that it can be precise in detecting rain, as the sensor is specifically designed to detect the presence of water. However, there are also some limitations to consider. For example, the alarm system may annoy people if it is activated frequently, and it may not be effective at alerting people to other types of flood events, such as flash floods or river floods. Additionally, the system may not be able to detect small or intermittent rain events, as it is triggered by a specific threshold of rain falling on the sensor.

DIY Rain Prediction Using Arduino, Python, and Keras is a project that involves creating a system to predict rain based on data. The system uses Arduino, Python, and Keras, which are tools and technologies that can be used to build machine learning models and analyze data.

To create a DIY Rain Prediction system, you would need to collect data on weather conditions, such as temperature, humidity, and barometric pressure, as well as data on past rain events. This data would be used to train a machine learning model using Keras, a deep learning library for Python. The model would then be able to make predictions about the likelihood of rain based on the input data.

The Arduino board could be used to collect data from sensors and transmit it to the

machine learning model for analysis. The model could then send a notification to the user through the Arduino board if it predicts that rain is likely to occur.

One advantage of using a DIY Rain Prediction system like this is that it can provide more accurate and timely rain forecasts than traditional methods, as it is based on data and machine learning algorithms. However, it may require some technical expertise to build and maintain the system, and it may be limited by the quality and quantity of the data used to train the model.

2.3 SUMMARY

In conclusion, Early Flood Detection System Using Arduino, Rain Detection System using Arduino and Rain Sensor, and DIY Rain Prediction Using Arduino, Python, and Keras are all projects that involve using technology to detect and respond to flood events. The Early Flood Detection System is a prototype designed to detect water levels in specific locations, such as ponds, dams, and reservoirs. The Rain Detection System is designed to detect rainfall and trigger an alarm or other actions in response. And the DIY Rain Prediction system is a machine learning model that uses data to predict the likelihood of rain. Each of
these projects has its own advantages and limitations. The Early Flood Detection System is relatively easy to build, but it can only be used in certain locations and may not be able to detect smaller changes in water levels. The Rain Detection System can be precise in detecting rain, but it may annoy people if it is activated frequently and may not be effective at alerting people to other types of flood events. The DIY Rain Prediction system can provide more accurate and timely rain forecasts than traditional methods, but it may require technical expertise to build and maintain and may be limited by the quality and quantity of the data used to train the model.

In terms of methodology, these three projects differ in the way they detect and respond to flood events. The Early Flood Detection System uses an ultrasonic sensor to detect water levels, while the Rain Detection System uses an Arduino board, a rain sensor, and a buzzer. The DIY Rain Prediction system using Arduino, Python, and Keras is unique among these three projects in that it uses machine learning

algorithms and data analysis to make predictions about the likelihood of rain. This approach allows the system to be more accurate and timely than traditional methods, as it is able to learn from data and adapt to changing weather conditions. However, this approach also requires more technical expertise and resources to build and maintain, as it involves programming and data analysis skills. Additionally, the accuracy of the predictions may be limited by the quality and quantity of the data used to train the model. Each of these approaches has its own strengths and limitations, and may be more or less suitable for different types of flood events and environments. Overall, it is important to carefully consider the methodology and technology used in these types of projects in order to maximize their effectiveness and reliability.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 INTRODUCTION

In order to realize this project as a product that ready to use with safety characteristic, a very comprehensive plan is undertaking. A step by step procedure is done so that the project can be completed in time. This include collecting data, design the project, circuit design testing and verification.

3.2 PROJECT DESIGN AND OVERVIEW

The project is using Arduino Nano as the main unit of all the parts. Here is the other components that included in the design to complete the project.

3.3 BLOCK DIAGRAM

The block diagram of CAR FLOOD SAFETY SYSTEM in FIGURE 3.3.

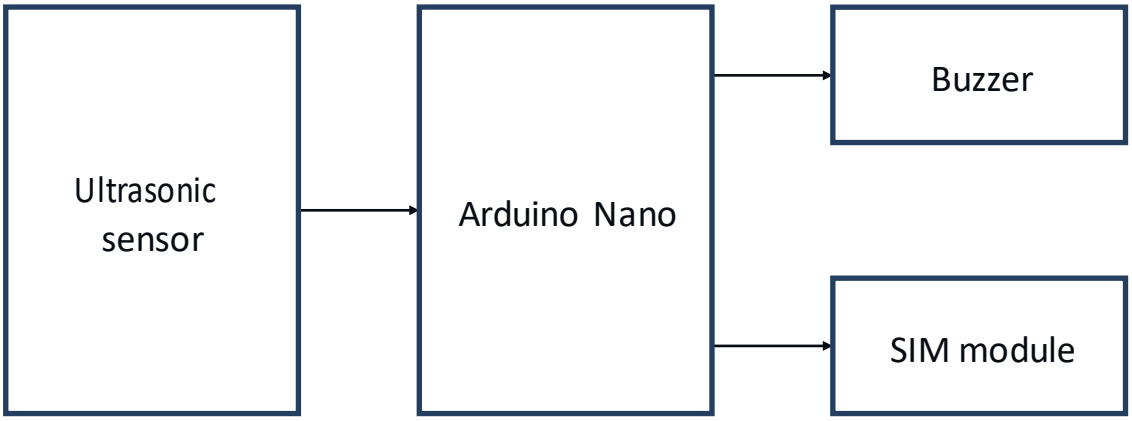


FIGURE 3.3

3.4 FLOW CHART

The flow chart of CAR FLOOD SAFETY SYSTEM in FIGURE 3.4

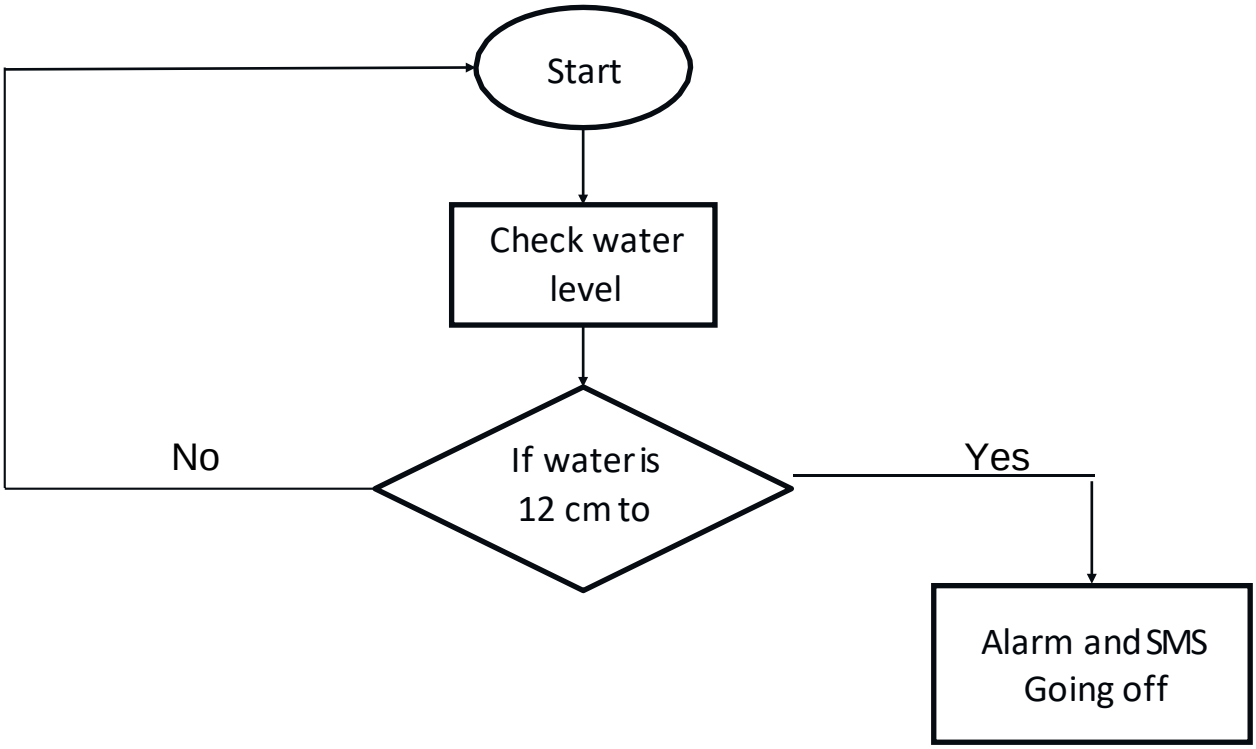


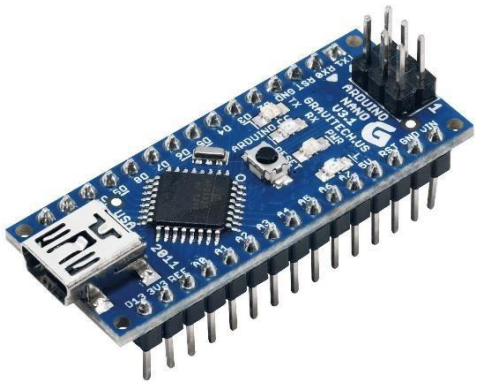
FIGURE 3.4

3.5 PROJECT HARDWARE

ITEM	PRICE
HC-SR04 Ultrasonic Sensor	RM 4.90
Arduino Nano	RM 30.00
Buzzer	RM 1.20
Breadboard	RM 8.90
Jumper wire	RM 4.50
SIM module	RM 35.90
Total	RM100.59

Table 3. 5

- ARDUINO NANO



The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

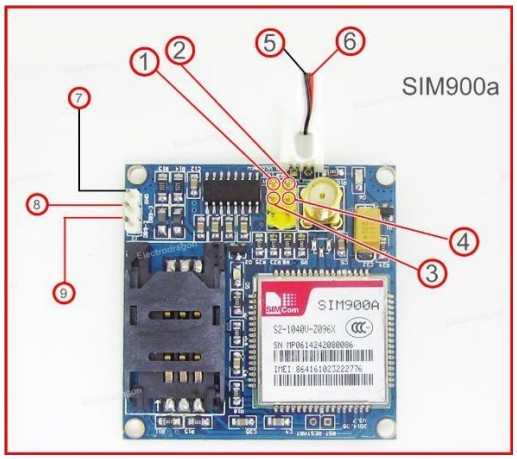
- HC-SR04

HC-SR04 is an ultrasonic sensor mainly used to determine the distance of the target object. It measures accurate distance using a non-contact technology - A technology that involves no physical contact between sensor and object. Transmitter and receiver are two main parts of the sensor where former converts an electrical signal to ultrasonic waves while later converts that ultrasonic signals back to electrical signals.

- BUZZER

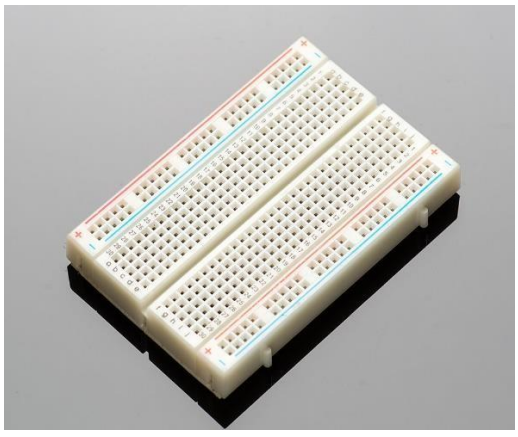
A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.

- GSM 900A



SIM900A GSM Module is the smallest and cheapest module for GPRS/GSM communication. It is common with Arduino and microcontroller in most of embedded application. The module offers GPRS/GSM technology for communication with the uses of a mobile sim. It uses a 900 and 1800MHz frequency band and allows users to receive/send mobile calls and SMS. The keypad and display interface allows the developers to make the customize application with it. Furthermore, it also has modes, command mode and data mode. In every country the GPRS/GSM and different protocols/frequencies to operate. Command mode helps the developers to change the default setting according to their requirements.

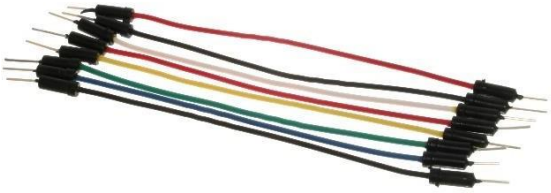
- BREADBOARD



A Breadboard is simply a board for prototyping or building circuits on. It allows you to place components and connections on the board to make circuits without soldering. The holes in the breadboard take care of your connections

by physically holding onto parts or wires where you put them and electrically connecting them inside the board. The ease of use and speed are great for learning and quick prototyping of simple circuits. More complex circuits and high frequency circuits are less suited to breadboarding. Breadboard circuits are also not ideal for long term use like circuits built on perfboard (protoboard) or PCB (printed circuit board), but they also don't have the soldering (protoboard), or design and manufacturing costs (PCBs).

- JUMPER WIRE



Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed.

3.6 COLLECTING DATA METHOD

The information will be obtained via a Google Form from PSA community responders to determine whether or not the product attained its aim and purpose. This strategy allows us to collect data and utilize it to determine whether or not this project serves any value.

3.7 DATA ANALYSIS METHOD

Based on our method of collecting data, it is best to describe it as a random sampling. In this method, the respondent is randomly selected. All the respondent has an equal chance of getting selected. This method is the simple way of data collection method. It helps to lower the risk of making an error during analysis of the data as the sample that we got is random, so it is easy for it to provide an accurate data.

3.8 SUSTAINABILITY ELEMENT IN THE DESIGN CONCEPT

The green aspect in this project is that I reuse an old container that used as the case for the project.

3.9 SUMMARY

The Car Flood Safety System is a project that uses Arduino Nano, ultrasonic sensor, GSM900A, buzzer, breadboard, and jumper wire as its components. The purpose of this system is to detect flood events and alert the car owner to take action to protect their car. The Arduino Nano is a microcontroller that is used to control the various components of the system, such as the ultrasonic sensor, which is used to measure the distance to the water level, and the GSM900A, which is a wireless communication module that can be used to send alerts to the car owner. The buzzer and breadboard are used to create an audible alarm and to connect the various components of the system, and the jumper wire is used to connect the different components on the breadboard. Overall, this system is designed to provide a practical and effective way for car owners to protect their cars from flood damage.

CHAPTER 4 RESULT FINDINGS AND DISCUSSION

4.1 INTRODUCTION

To provide a detailed understanding of the performance of the Car Flood Safety System, a number of tests were conducted. These tests were designed to evaluate the accuracy and reliability of the system in detecting flood events and alerting the car owner. The results of these tests were analyzed to identify any issues or areas for improvement in the system.

In addition to the performance tests, a questionnaire was distributed to user s of the Car Flood Safety System in order to gather their feedback and experiences with the product. This questionnaire included questions about the ease of use, reliability, and overall satisfaction with the system. The responses to the questionnaire were analyzed to identify any patterns or trends in the user experiences, and to identify any issues or areas for improvement in the product.

Overall, the results of the analysis provide valuable insights into the effectiveness and usability of the Car Flood Safety System. By identifying any issues or areas for improvement, the development team can make changes to the product in order to optimize its performance and improve the user experience. These findings can be used to inform future development and optimization of the product, and to ensure that it meets the needs and expectations of its users.

4.2 RESULTS AND ANALYSIS

A series of try and error had been conduct during the process of making the product. The process of creating the 'Car Flood Safety System' involved a number of steps and stages. First, I gathered and analyzed data on the types of flood events that car owners might encounter and the ways in which they could be impacted. This helped to inform the design and functionality of the system.

Next, I selected and sourced the necessary components, including the ultrasonic sensor, the Arduino Nano microcontroller, the buzzer, and the GSM 900A communication module. These components were then assembled and connected according to the project plan.

Once the physical components of the system were in place, I began the process of programming and testing. This involved writing and debugging code to ensure that the system was functioning properly and could accurately detect and respond to flood conditions.

As I worked on the 'Car Flood Safety System', I encountered a number of challenges and obstacles that required me to use try and error methods in order to find solutions. These challenges included technical issues and setbacks, such as problems with the coding and incorrect configurations.

To overcome these challenges, I experimented with different configurations and spent significant time debugging and testing the code to identify and resolve problems. Despite these efforts, however, I was ultimately unable to complete the project due to an error in the coding that I was unable to fix in time.

This experience taught me the importance of careful planning, testing, and troubleshooting in the development process. It also highlighted the need to be flexible and open to trying different approaches in order to find solutions to problems that may arise.

4.3 SUMMARY

The process of creating the 'Car Flood Safety System' began with gathering and analyzing data on flood events and their potential impacts on car owners. This information was used to inform the design and functionality of the system. I then sourced and assembled the necessary components, including an ultrasonic sensor, an Arduino Nano microcontroller, a buzzer, and a GSM 900A communication module. Once these components were in place, the team began programming and testing the system to ensure that it was functioning properly and could accurately detect and respond to flood conditions. Along the way, the thing that I encountered a number of challenges and obstacles, and used try and error methods to troubleshoot and resolve issues. Despite these efforts, I ultimately unable to complete the project due to an error in the coding used. This experience highlighted the importance of careful planning, testing, and troubleshooting in the development process.

CHAPTER 5 CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter will mention about 3 things which is conclusion, recommendation and limitation. On subtopic conclusion, we will conclude overall about the product and its function. In a part of recommendation, there will be list of suggestion on how to improve the product in the future. Lastly, we also will tell about what kind of limitation we facing on process making the product.

5.2 CONCLUSION

The "Car Flood Safety System" is a product designed to help car owners detect and respond to flood events that may affect their vehicles. The system is designed to provide early warning of flood conditions and enable car owners to take precautions to protect their vehicles.

In terms of design, the Car Flood Safety System makes use of several key components, including an ultrasonic sensor, an Arduino Nano microcontroller, a buzzer, and a GSM 900A communication module. The ultrasonic sensor is used to detect water levels and trigger an alert if the water level reaches a certain threshold. The Arduino Nano microcontroller is used to process data from the sensor and control the other components of the system. The buzzer is used to provide an audible alert to car owners, and the GSM 900A communication module is used to send text or voice messages to the car owner's mobile phone.

One notable feature of the Car Flood Safety System is its use of a reuse container as an environmentally friendly step. Reuse containers are containers that have been repurposed or redesigned for use in a different application, and they can help to reduce waste and minimize the environmental impact of the product.

In terms of function, the Car Flood Safety System is designed to detect flood conditions and provide early warning to car owners. It uses the ultrasonic sensor to monitor water levels, and if the water level reaches a certain threshold, the system will trigger the buzzer to provide an audible alert and send a message to the car owner's mobile phone. This allows car owners to be notified of potential flood conditions and

take appropriate precautions to protect their vehicles.

5.3 RECOMMENDATION

There are several potential strategies that could be considered to improve the Car Flood Safety System and enhance its ability to protect car owners in flood-prone areas. One possibility is to add additional sensors that can detect other types of environmental conditions or hazards, such as wind speed, temperature, or humidity. This would allow the system to provide more comprehensive protection for car owners and help them anticipate and respond to a wider range of potential threats. Another strategy could be to develop more sophisticated control systems that allow for greater flexibility and customization, enabling car owners to tailor the system to their specific needs and preferences. Enhancing the user interface of the system could also be beneficial, making it easier and more convenient for car owners to use, with f eatures such as a more intuitive layout, clearer instructions, or more visual aids. Finally, adding additional features to the system, such as a GPS tracker or a panic button, could provide even more convenience and protection for car owners. By implementing these strategies effectively, the Car Flood Safety System could be significantly improved and become an even more valuable tool for helping car owners protect their vehicles from flood damage.

Additionally, the system could be made more environmentally friendly by using sustainable materials and design strategies. For example, the use of reuse containers could be extended to other parts of the system, or the system could be designed to minimize energy consumption or waste generation. Furthermore, the system could be made more resilient and reliable by incorporating robust design principles and testing it thoroughly to ensure it can withstand extreme conditions. By addressing these issues, the Car Flood Safety System could be improved in terms of both its performance and its impact on the environment.

5.4 LIMITATION

There are a number of limitations that may impact the effectiveness of the Car Flood Safety System. For one, the system may be limited in its ability to detect or respond to certain types of flood events or conditions. For example, the system may not be able to accurately detect or respond to flash floods or rapidly rising water levels, as these events may occur too quickly for the system to react. Additionally, the system may not be able to detect or respond to other types of flood-related hazards, such as landslides or mudslides, which could pose a risk to car owners or their vehicles.

Another limitation of the Car Flood Safety System is that it may require regular maintenance or updates to ensure optimal performance. For example, the system may need to be calibrated or adjusted periodically to ensure that it is accurately detecting water levels or other conditions. Additionally, the system may need to be updated with new software or hardware to address any issues or bugs that are discovered over time.

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5.5 SUMMARY

Overall, the Car Flood Safety System is a product that has the potential to provide valuable protection for car owners in flood-prone areas. By providing early warning of flood conditions and enabling car owners to take appropriate precautions, the system can help to reduce the risk of damage or loss to vehicles. However, it is important to recognize that the system may have limitations and may not be suitable for all situations. It may be necessary to consider additional measures or strategies to ensure the safety and security of vehicles in flood-prone areas.

6.0 REFERENCES

- **https://www.forestry.gov.my/my/pusat-sumber/penerbitan/laporan-tahunan**
- *Merdeka 118 - Arup*. (n.d.). Www.arup.com. https://www.arup.com/projects/merdeka-118
- **http://h2o.water.gov.my/man_hp1/LBT2020.pdf**
- Jaafar, N. (2021, December 22). *Luluh hati lihat kereta baru beli tiga bulan hanyut banjir*. Sinar Harian. https://www.sinarharian.com.my/article/179305/BERITA/Semasa/Luluh-hati-lihat-kereta-baru-beli-tiga-bulan-hanyut-banjir
- Tarmiji, M. F. A. (2021, December 1). *Pembangunan pesat punca banjir kilat di bandar*. Kosmo Digital. https://www.kosmo.com.my/2021/12/01/pembangunan-pesat-punca-banjir-kilat-di-bandar/
- National Weather Service. (n.d.). *Flash Flooding Definition*. https://www.weather.gov/phi/FlashFloodingDefinition
- Hemmings, M. (n.d.). *What is a Jumper Wire?* https://blog.sparkfuneducation.com/what-is-jumper-wire
- FOV, S. (2022, November 23). *What is a Breadboard?* CircuitBread. https://www.circuitbread.com/ee-faq/what-is-a-breadboard
- Malik, T. (2020, May 28). *SIM900A GSM Module*. Microcontrollers Lab. https://microcontrollerslab.com/sim900a-gsm-module-pinout-examples-applications-datasheet/
- buzzer. (n.d.). In *TheFreeDictionary.com*. https://www.thefreedictionary.com/buzzer
- Aqeel, A. (2020, July 3). *Introduction to HC-SR04 (Ultrasonic Sensor)*. The Engineering Projects.

https://www.theengineeringprojects.com/2018/10/introduction-to-hc-sr04-ultrasonic-sensor.html

- *Arduino Nano*. (n.d.). Arduino Official Store. https://store.arduino.cc/products/arduino-nano