POLITEKNIK UNGKU OMAR

DRAIN SMART SENSOR

MOHAMAD ZULFIKRY BIN ZAINAL

(01DKA21F1123)

`MUHAMAD NAZMI REZZA BIN AHMAD HAFIDZ

(01DKA21F1124)

CHARULATA A/P N ARASU

(01DKA21F1152)

NOR NADIA AINA BINTI NIZARUDDIN

(01DKA21F1158)

DIPLOMA IN CIVIL ENGINEERIN

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ABSTRACT

A flash flood is a flood that occurs immediately or unexpectedly. Flash floods are among the natural disasters that often occur in our country. Flooding will cause serious damage to homes, roads, businesses, and public facilities and even kill people. Although many measures have been taken by the government to prevent this incident, it seems that it has not been resolved. Therefore, the Drain Smart Sensor project was created to control personal safety from flash floods. This project can measure the water level and the public can be warned early so that residents who are near the area to be careful. Furthermore, there is a research scope that has been set in this project, that is, this project is located in the main location which is in Taman Cempaka Sari 7 because in that area there are very frequent incidents of flooding in residential areas. The materials used to create this project also need to have special characteristics that are not easy to bend, the reservoir is not hot, and have the strength to withstand rain and high heat. This is based on a literature review. While for the component formation process, methodological studies are used to plan the project production process by using flow charts as a guide for production planning and project testing.

ABSTRAK

Banjir kilat ialah banjir yang berlaku dengan serta-merta atau dengan tidak disangka-sangka. Banjir kilat adalah antara bencana alam yang kerap berlaku di negara kita. Banjir akan menyebabkan kerosakan serius kepada rumah, jalan raya, perniagaan, dan kemudahan awam malah membunuh orang. Walaupun banyak langkah telah diambil oleh kerajaan untuk mengelakkan kejadian ini, nampaknya belum diselesaikan. Oleh itu, projek Drain Smart Sensor ini diciptakan untuk mengawal keselamatan diri daripada banjir kilat. Projek ini dapat mengukur paras air serta orang ramai dapat diberi amaran awal supaya penduduk yang berada berhampiran kawasan itu untuk berhati-hati. Tambahan pula, terdapat skop kajian yang telah ditetapkan dalam projek ini iaitu, projek ini ditempatkan di lokasi utama iaitu di Taman Cempaka Sari 7 kerana di kawasan itu sangat kerap berlaku kejadian banjir di kawasan perumahan. Bahan-bahan yang digunakan untuk mencipta projek ini juga perlu mempunyai ciri-ciri khas iaitu tidak mudah lentur, takungan tidak panas, dan mempunyai kekuatan menahan hujan serta panas yang tinggi. Hal ini berdasarkan kajian literatur yang dijalankan. Manakala bagi proses pembentukkan komponen, kajian metodologi digunakan bagi merancang proses penghasilan projek dengan menggunakan carta alir sebagai panduan untuk perancangan penghasilan dan pengujian projek.

CONTENT

CHAPTER 1 – INTRODUCTION

1.1 INTRODUCTION

Floods are a regular natural disaster in Malaysia, occurring almost every year. They cause economic damage such as capital assets and infrastructure such as housing, schools, factories, roads, dams, bridges, and skilled workers. The economic damage caused by floods is huge.

This smart drain sensor is a device that is used to measure the water level when there is a flood and warn people around it to prepare when a flood is about to happen. It consists of a smart water sensor flood detector, wires, transistors, LED lights, 2pin switches, resistors and a 12-volt buzzer. Each material has its own function to form a complete device, with a ruler used to measure the water level, the LED light turns on when the set water level rises. In addition, to make sure residents know there is a device and a 12-volt buzzer to make a sound to warn residents.

1.2 PROBLEM STATEMENT

Flash floods are caused by numerous things. The intensity and duration of the rainfall are the two main elements. The rate of the rain is its intensity, and its length is its duration. In addition, Obstruction of water flow in the main drain in addition to continuous heavy rain is the cause of flash floods.

Therefore, the obstruction of the water flow in the main drain in addition to the continuous heavy rain was the cause of flash floods in the area which caused several roads in the neighbourhood to be flooded. In addition, flash floods often occur with water levels reaching as high as 0.6 meters. Therefore, this smart drain sensor can detect the set water level and there is an alarm that will sound to warn the surrounding area.

Figure 1.1: Flash flood in Taman Cempaka

1.3 OBJECTIVE

The objective of this project is to give early warning to the population against the occurrence of floods. This project is to build an efficient Smart Drain Sensor system to facilitate users in the future. The specific objectives of this project are as follows:

i. To design a smart flash flood sensor using an AutoCAD.
ii. To develop a sensor that can be used to remind residents and be more alert about flash floods.
iii. To test the effectiveness of the Flood Sensor Apps and alarm in term of functionality.

1.4 SCOPE OF PROJECT

Scope of this project is for install a monitoring tool called a drain sensor into the drain hole. The sensor sounds an alarm to alert people to the rising water level and provides an early warning of the water level in the drain. Located at Persiaran Cempaka Sari 7, Taman Cempaka, 31400, Ipoh, Perak. The problem is, heavy rain caused a flash flood within six hours, and frequently within three. The drain is clogged due to a large amount of trash. The water level rose to 0.6 metres due to a flash flood. So, we want to develop a sensor that can use to alarm resident about flash flood. Next, to evaluate the sensor's and alarm's performance in terms of functionality and reaction time under flash floods.

A survey of the targeted customers will be conducted to identify the problems already indicated. An interview and a Google form as platform. To gather feedback on the subject of drain difficulties, social media sites such as Instagram, WhatsApp, and a link to a Google form will be disseminated. During the interview, there will be a question and answer session to solicit comments from the community. The act of collecting, analysing, and comprehending consumer feedback ensures that their demands are met.

The smart drain sensor is a circuit designed to ensure that it can warn people in the surrounding area about the occurrence of flash floods. Therefore, people around the area can prevent before it is too late. This smart drain sensor is placed in the main location which is in Taman Cempaka Sari 7 because there are frequent flooding incidents in the residential area. A problem that often occurs when it rains heavily within 6 hours and often within 3 hours.

This smart drain sensor is mainly used at a specific area. This device will be installed in the street storm drain. In this device there are few materials is used such as smart water sensor flood detector, wires, transistors, LED lights, 2pin switches, resistors and a 12-volt buzzer. All the material that used in it has its own function to form a complete device. The functions of each material are for the ruler used to measure the level of water, LED light to turns on when the set water level rises. Lastly, the Buzzer 12-volt is used to make sound that can alert the residents.

This device main role is to alert the resident if the water inside the drain rise to 0.6 meter. Once, the device started the make sound the resident should find the reason why drain water increases. The resident need to notify the MBI (Majlis Bandaraya Ipoh) if waste is present due to the drain water increasing. By using this device, it will help the resident to not face frequent flash flood.

1.5 CONCLUSION

Although flash floods can be quite frightening, people can control them so that they don't interfere with our regular life. It is necessary to maintain water storage sites including ponds, drains, lakes, and other water reservoirs. Flooding can be avoided by enhancing soil properties, which facilitate simple water absorption. To ensure to controlled floods, proper planning and control systems for meteorology and geography must be in place.

CHAPTER 2 – LITERATURE REVIEW

2.1 INTRODUCTION

A flash flood is a flood that occurs immediately or unexpectedly. Flash floods are among the natural disasters that often occur in our country. There are several factors that cause flash floods. Among them is the result of continuous rain. Continuous rain without stopping for several hours will cause flooding. In low-lying areas, rainwater will be drained into rivers. The water that fills the river will overflow and cause the lowlands to be filled with water.

The problem of flash floods that often-hit urban areas is due to the lack of a perfect drainage system. The ditches that were built were too small and shallow and often clogged. When it rains heavily, the ditch cannot hold a large amount of water. Then the overflowing water from the ditch causes flash floods to occur. Rain and floods are natural phenomena that occur naturally and bring blessings to humans, but if we do not take steps to preserve the continuity of nature and do not carry out planned development activities, then the problem of flash floods will continuous.

The intensity of the rainfall, the location and distribution of the rainfall, the land use and topography, vegetation types and growth/density, soil type, and soil water-content all determine just how quickly the Flash Flooding may occur, and influence where it may occur.

In addition, flash floods bring various negative effects to the environment, damage to property, lives and so on. The dangerous effects of flash floods include structural damage and erosion, loss of property and life, food and water pollution, disruption of socio-economic activities including transport and communication.

2.2 RIVER WIDENING PROJECT TO MITIGATE FLASH FLOODS IN TAMAN CEMPAKA

Figure 2.2: Sungai Pinji

Based on the article on The Stars by Ivan Loh it has been decide to widen parts of Sungai Pinji order to alleviate flash floods in Taman Cempaka, Ipoh Perak because of rains. During z recent meeting Jenny Choy confirmed that she had noticed the drainage and irrigation Department that work on the widening of the river will begin on May 9th. The spokesperson had also explained to the media that three stretches of the river will de widened near Taman Cempaka, Ampang and Pekan Razaki on July 4th. Resident in Taman Cempaka had experienced flash floods since last year.

According to Jenny Choy, heavy rainfall causes the river to swell, resulting in water spinning and creating backflow in culverts. Water level some-times reach chest-level and residents often get anxious when the sky darkens. Choy had suggest the Ipoh City Council to construct a retention pond near the housing area and she believe such a pond can help to prevent flash floods in the future should the river swell again.

2.3 ULTRASONIC LEVEL SENSORS

Ultrasonic pulse to determine the water level by using ultrasonic waves. The sensor head emits ultrasonic waves and receives the waves reflected back from the target. Ultrasonic sensor to the target by measuring the time between emission and reception. Ultrasonic sensors can pass through any type of material, including solids, liquids, and gases. This study is only focused on water level detection and early warning systems that warn relevant agencies and individuals about possible flood events.

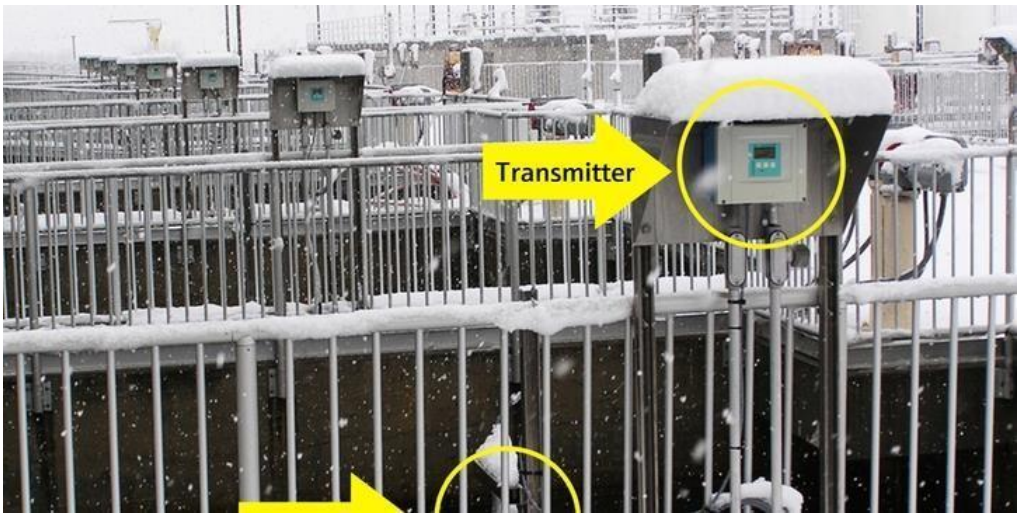

Figure 2.3: Ultrasonic sensors

Ultrasonic pulse is widely used in the water and wastewater industries and have advantages over other technologies when a continuous level monitoring is required. Piezo crystals are used in ultrasonic sensors (Figure 2.3) to create a mechanical pulse that is launched from the sensor membrane. Due to a difference in density between the process medium and the air, this sound wave bounces off its surface. The sensor membrane then receives the pulse that was reflected. The distance between the sensor membrane and the medium's surface is directly related to the time it takes for the reflected pulse (echo) to travel between its transmission and reception. Since the instrument has been programmed with an empty calibration distance which is the distance between the sensor membrane and the vessel's bottom, the instrument can report the actual level by deducting the measured distance from the empty calibration distance.

Figure 2.4: Ultrasonic sensor

An ultrasonic pulse produced mechanical sound wave which requires air as a transmission medium, and ultrasonic instruments operate based on the speed of sound in air. This is because level measuring with ultrasonic sensors is not possible in a vacuum. If the space between the sensor membrane and the surface of the process contains additional gases, such as nitrogen, methane or carbon dioxide, the velocity of sound is different and will result in considerable measuring errors.

2.4 AUDIBLE AND VISUAL ALARM

Natural disasters such as strong rainfall and flash floods can all cause flooding. They can also be caused by man-made events such as plumbing problems, broken appliances, and pipelines exploding. All of these scenarios can occur at any time and without warning, necessitating adequate planning. Having such a device is similar to having an insurance policy that provides you with peace of mind and advance notice if something goes wrong with your home's water supply. A passive water alarm can help detect the leaks and growing water levels in the room, and warn the owners before the matter gets critical. Flood alarms comprise specific electrical or electronic circuits composed of sensors and alarms. They are built in such a way that when water comes into touch with a single or several sensors, the electrical circuit completes, activating the alarm, which subsequently produces an audible sound. Today's technology permits the alert to take different forms besides sound. This includes a blinking light, email notification, or text message to your phone. They can be linked into smart home platforms which have varied characteristics.

Figure 2.5: Watchdog Sensor and Alarm

When the sensor at the end of the wire strip comes into contact with water, this product emits an alarm. To silence the alarm, remove the sensor from the water. The alarm comes with an 11-inch sensor strip, but a longer strip can be ordered if necessary. To install the product, you will need a screwdriver and a 9v battery.

The advantages and disadvantages include Alarm tone: Depending on one's hearing acuity, the loud alarm, similar to a smoke alarm, makes it easier to hear from another room. Easy-to-install: A screwdriver and a battery are required. You can install it within the cabinet door because it has a flexible wire. The flood alarm comes with a battery, but it may only last a few minutes (like ours did during product testing), so carry a backup in case you need it. Once the battery is fitted, it is always turned on. The disadvantages are this device does not turn off the water, and the sound level may be too low for persons who wear hearing aids.

2.5 FLOOD ALARM USAGE

The use of the alarm is flood alarm detects water leaks and overflows in areas where such a crisis could go unreported for some time, allowing action to be performed early to prevent further property damage. It can be employed anyplace there is a risk of flooding or where water is abundant. This not only gives you peace of mind, but it also contributes to the safety and health of everyone who uses the property.

Flood alarms come in 2 types, active and passive alarms. Active alarms are built into the water system, such as water pipelines and pumps. When the sensor is triggered, the signal not only produces a sound, but it also cuts off the water supply to the water system. Passive alarms, on the other hand, are positioned near appliances, equipment, or in sections of the house where flooding is more likely. They include flooding sensors that detect water contact. When the sensors become wet, a signal is delivered to the alarm system, which sounds the alert. The disadvantage of this sort of alarm is that you must physically close the water system and turn off the alarm. Many passive alarms are powered by a battery, which must be maintained on a regular basis to ensure that they are always operational.

2.6 LED LIGHT SENSORS

Based on articles developed for the first time in 1962, commercial LED lighting has been around since 1980, when it started to be produced. However, only infrared electroluminescent diodes were available at that time. Other colours came in the 1990s when blue saltpetre was developed in Japan. The boor of white bulbs, the most used and sought-for ones, came when the blue saltpetre was combined with yellow luminophore to produce long wavelengths. The result of this combination is the light that the human eye perceives as white.

Due to the high efficiency of LED sensor systems, they are highly sought-after for multiple applications. One application for LEDs is their use as photodiodes for light detection. While acting as photodiodes, LEDs are very sensitive to wavelengths that are equal to or shorter than the predominant wavelength they emit. For instance, a green LED is sensitive to blue light and some green light, but not to red or yellow light.

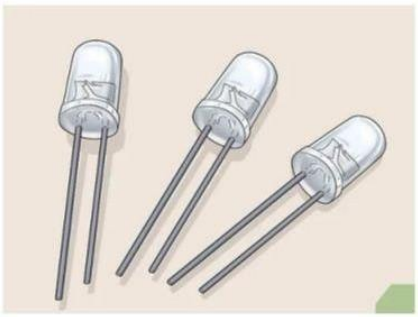

Figure 2.6: Led Light Sensors

2.6.1 Function of LEDs.

LEDs can be used as a light sensor by combining them with a microcontroller. Most of the modern microcontrollers consist of bidirectional I/O ports with configurable internal pull-ups or tri-state inputs. The circuit can provide a very accurate and precise measurement of the photocurrent with the help of a high-impedance input.

The LED charges to 5V in a detector mode, and this charge is sustained in the circuit by the inherent capacitance of the diode. The P1 section to the microcontroller is then converted to the high-impedance mode as a key step in the function of this sensor system. Under reverse bias conditions, the LED acts as a capacitor that is in parallel with a current source. This generates a leakage current through P1. The voltage across the microcontroller is monitored by a timer-counter. The amount of light detected is proportional to the decay time. With the increase in amount of light received, the diode discharges at a much faster rate. The benefits of LED sensors are becoming an ideal option for a light source as it is cost-effective to manufacture and apply, and it can also provide a digital measurement of a light source without the need to waste energy on amplifying the system. LED light detectors have excellent signal-to-noise characteristics owing to signal integration over the measurement. They also exhibit enhanced sensitivity, which makes this sensor system an ideal approach compared to conventional photodiode systems.

2.7 CONCLUSION

Applications or technologies for detecting flash floods have provided more options for enhancing and refining the systems now in use to monitor flash floods. Hardware and software components have been successfully integrated to create a system that can assess water levels and classify them into three different levels to alert the public and local authorities to flood conditions. If the water level rises above a specified level, the system can automatically issue a warning notice. The implementation of this system is greatly anticipated in light of recent significant advancements in information and communication technology.

CHAPTER 3 – METHODOLOGY

3.1 INTRODUCTION

The research's methodology will be covered in this chapter. This chapter will outline each step of the study process, including the population, the population framework, and the interview sampling methods. A thorough explanation of the chosen methods of analysis and data collecting is also provided in this chapter. The Research Methodology chapter for research covers in detail the research methodologies, approaches, and designs employed throughout the study. It then justifies the choice by outlining the benefits and drawbacks of each approach and design while taking into account how practically applicable each is to our research.

3.2 PROCESS FLOW

The flow chart below shows how this project process operates. This project will be tested and installed to determine the objective of this project whether or not it achieves its goal. When the water level rises in the set, it will sound an alarm and signal to alert everyone nearby, but when the water level is at a normal, it did not take any action.

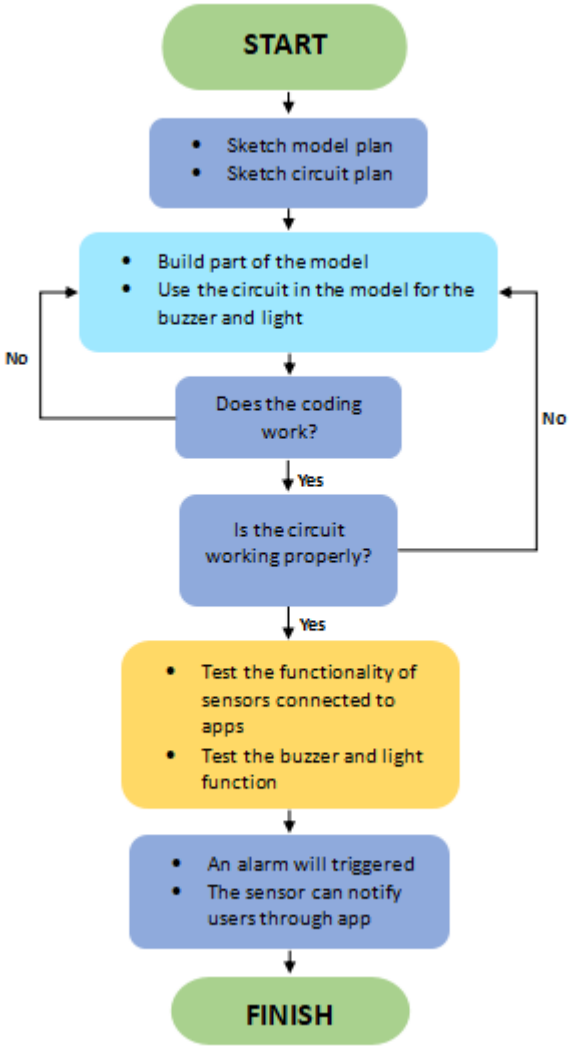

Figure 3.1: Flow chart

3.3 DESIGN AND DEVELOPEMENT

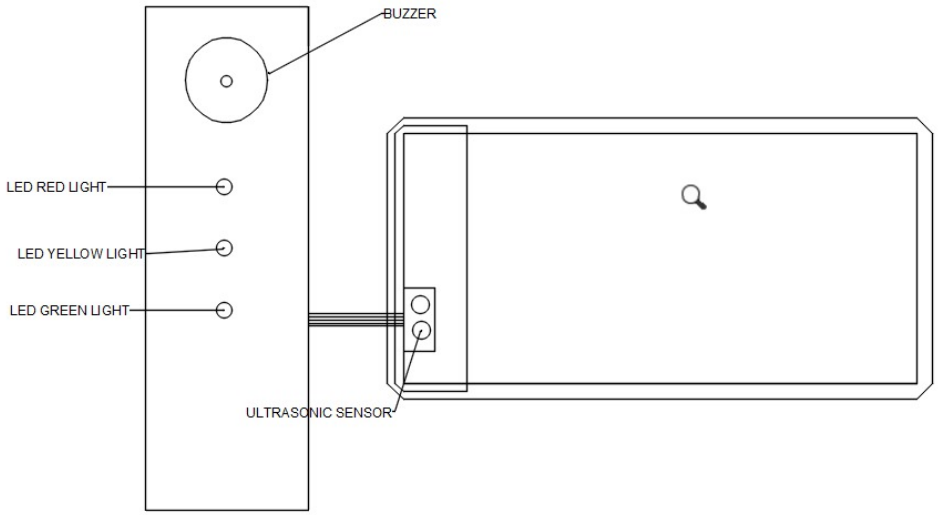

Figure 3.2: Sketch project

Before beginning the project, this concept design is completed using only a rough sketch. The goal of this concept design is to provide an overview of the project. It also intends to enhance previous sketches. This design is done to the greatest extent feasible to bring out all of the concepts and improvements. Sketches are created during the design selection process to separate the benefits and drawbacks of each project idea. According to the observations, most water sensors are not user friendly. This makes it tough for people to maintain and use.

Water sensors measure the current flowing through the circuit as a result of water entering the sensor. Water is a good conductor of electricity, so when it comes into contact with the sensor portion, it permits a small electrical current to flow where there was none previously. When water forms this circuit, your sensor recognizes that it has been exposed to water. A high-tech alarm system will immediately ring to alert you of a standing water problem.

3.4 ANALYSIS METHOD

The analysis methods used were split into two parts. The first part was development of software and the second part was hardware development.

Software development means a coding framework is introduced in the software development, which is Arduino IDE. The Arduino IDE or Arduino Integrated Development Environment or Arduino Software (IDE) included a text editing software for code composition, a message region, a product field, a toolbar with simple functionality catches and menu progression. The transfer of programs and interface with them was associated with the Arduino and Genuine equipment. It was used in this project to create programming codes to work with the micro controller. The software generated for this project must be compatible with the framework. This software was used for IoT where the code in C language was written. Because of its ability to integrate and link with wireless fidelity devices, such as Cytron WiFi Shield consisting of ESP8266. The application is ideal for this project.

Figure 3.3: Arduino IDE

Hardware development is the device consisted of several variations of major components and machine circuit architecture for the hardware development portion. These main components consisted of several electrical and electronic elements being mixed. The suitable hardware components are chosen based on best performance and well-calibrated to reduce any errors found in the next section when analyzing data for the test.

As in this implement model, this project used several hardware developments such as water sensors. These water sensors are used to measure and detect the level of water danger when floods occur. Besides that, water level sensor can help to provide an early warning system by providing advance warning of any likely flooding situation, providing valuable time to protect assets, move valuables and protect property.

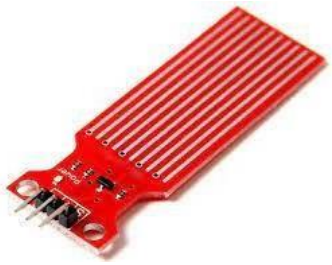

Figure 3.4: Water level sensor

Then, I2C LCD. Although LCD and some other displays greatly increase the interaction between man machine, they share a common weakness. Once the controller is attached to a device, it has many IOs with not so many internal ports. It also restricts the other features of the system. The LCD1602 is equipped with an I2C bus to solve the problem. I2C bus is a serial bus system built by Philips. This is a serial bus with high performance and multiple host systems with bus control and network synchronization function. Only the serial data line and the serial clock line (SCL) I2C bus have two bidirectional parts. The Blue Potentiometer I2C LCD1602 is used for switching the backlight so that the I2C LCD1602 becomes easier to view.

Figure 3.5: 12C LCD

3.5 CONCLUSION

In this project, the problem was resolved and sensors that attempt to detect floods and provide local residents with early warnings were created. Floods are natural disasters that cannot be easily predicted to water level in the drainage flood gauge. Flood warning systems powered by Arduino are intriguing because they may be able to prevent significant loss of life or property. This project can aid in informing authorities and the remaining victims who are close to flood zones. This approach can also be used to track flash floods. In locations that have experienced flooding, this method has not been tried.

CHAPTER 4 – RESULT AND ANALYSIS

4.1 INTRODUCTION

Various measurements must be taken from the beginning of the project until it is completed. To obtain a satisfactory result, studies on the project must be conducted prior to the start of the design, problem, and operating system. A systematic approach should be developed for this project to achieve the desired result. It begins with the idea and ends with the operating system. Usually, methodology is used as a guide to create the device as planned. A project's results and discussion section are where the research or investigation's findings are presented and analyzed. This section usually follows the project's methodology and data analysis section.

This chapter will provide the results and feedback from the Smart Drain Sensor device that has been conducted. The device is tested in rectangular plastic container Tupperware to determine its effectiveness and the objective of the final presentation.

Once the device is tested, the expected result must be identified and checked. To know and prove the expected results, some methods should be used to collect the results. The method normally used to collect the results is the Q&A section, which comes out with questions that can help achieve the objectives of the project.

To know the expected results, a Q&A section is carried out by creating a Google form, which includes a shop clip of video showing the function of that device. Moreover, some pictures also included in the google search increased the respondent's imagination.

4.2 STUDYING FINDINGS

A portion of questionnaire is presented in a Google form, which is divided into a section focusing on demographics. Here are the sections included: age, gender, and occupation status. Functionality and effectiveness of the device, and finally, the feedback section. The purpose of this Google form is to get people's opinions about the device.

4.2.1 DEMOGRAPHICS INFORMATION

i. Age

Age	Respond	Percentage
15-25	34	50%
26-30		26.8%
41-55		20.6
Above 56		2.9%

Table 4.1 Age

Table 4.1 visually depicts a different group of individuals highlighted in purple, representing the age group of 15 to 25 years. This segment of the population consists mostly of students or individuals holding diplomas. It should be noted that all questionnaire respondents belong to this age category, which represents 50% of the comprehensive representation. The next group is those aged 26-30, which is represents the color blue. Total percentage of people in the 26-30 age group is 28.5%. In this age group, people must be employed or degree holders. Then, those aged 41-55, is representing the color red which is as much as 20.6% represents the group that is already married. Finally, it is green which is as much as 0.9% to those over 56 years of age which are the elderly who live in the area.

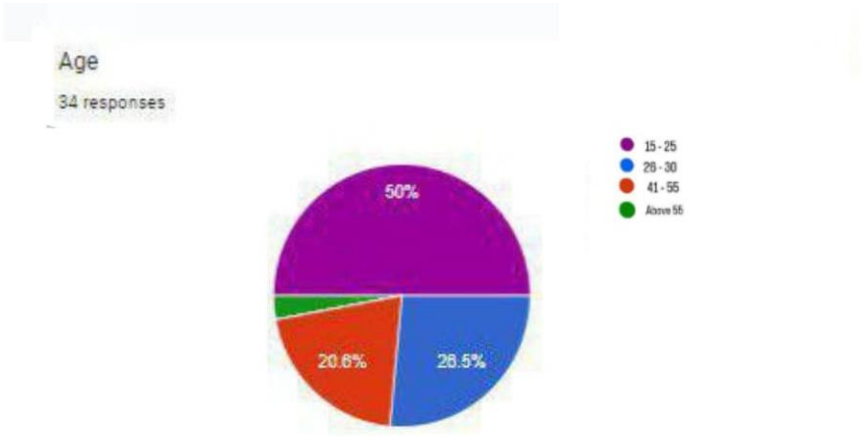

Figure 4.1: Age

ii. Gender

Gender	Respondent	Percentage
Male	34	61.8%
Female		38.2%

Table 4.2 Gender

Table 4.2, this project observe the demographics breakdown based on gender from the data collected through the Google form. Specifically, red indicates the female respondents, while blue signifies the male respondents. Interestingly, the female demographic exhibited a higher response rate in comparison to the male segment. Notably, 61.8% of the respondents were female, whereas 38.2% were male.

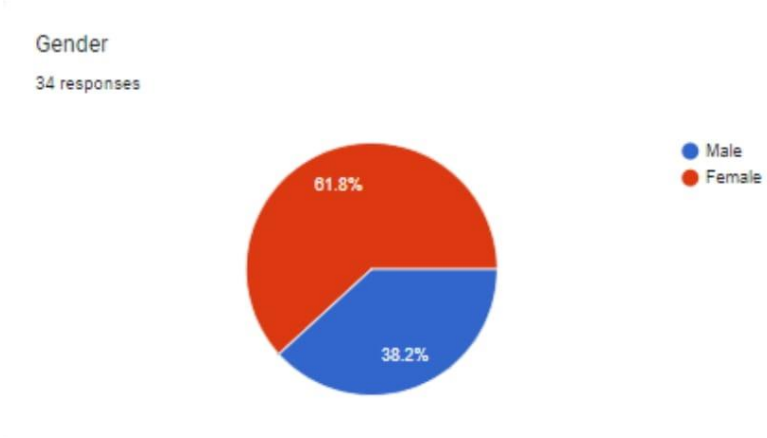

Figure 4.2: Gender

iii. Occupation

occupation	Respondent	Percentage
Student	34	79.4%
Workers		20.6%

Table 4.3 Occupation

In table 4.3, we can see the occupation of the respondents, all of whom are students. The data shows a homogeneous profession among the participants.

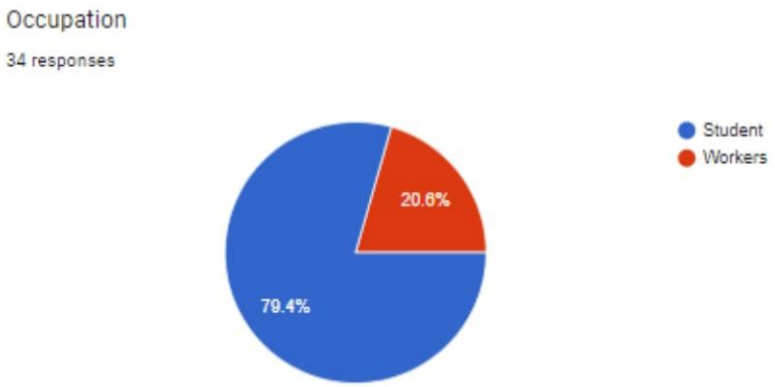

Figure 4.3: Occupation

4.4 FUNCTIONALITY AND EFFECTIVENESS

All the questions come out with 4 types of options which are Agree, strongly agree, Disagree, and strongly Disagree. The question was used to ask is:

Question	Respondent	Percentage
The device performs all its intended functions	34	100%
The device meets its design objectives	34	100%
the device is safe for operation and user	34	100%
The device is affordable and reasonable	34	100%

Table 4.4 Questionare

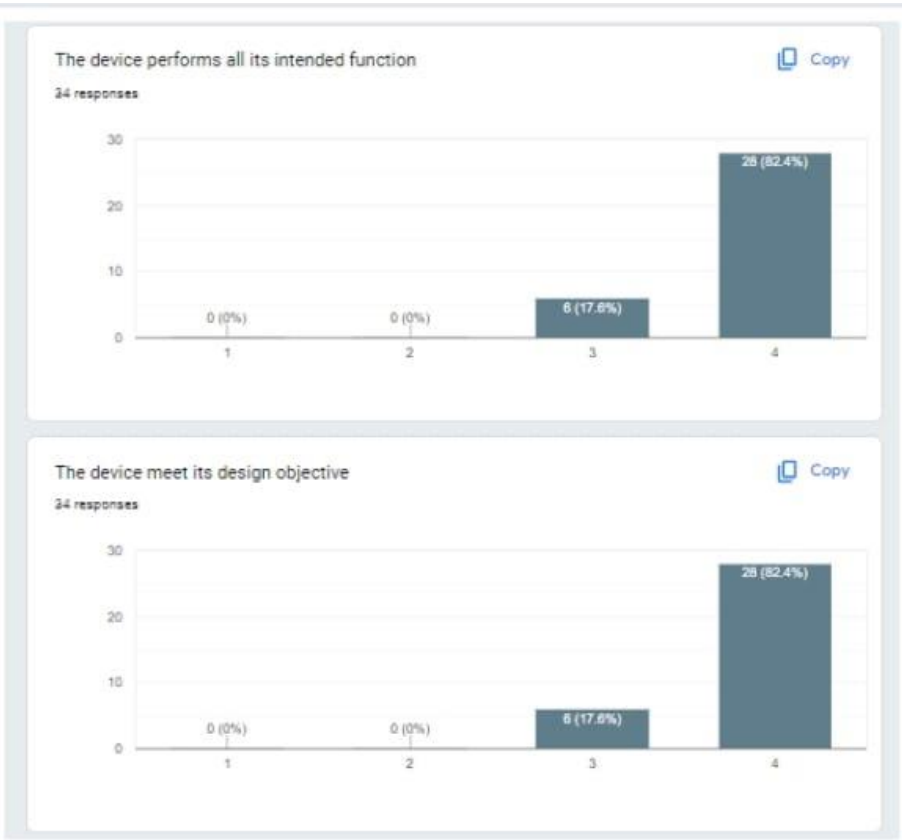

Figure 4.4: Responses for Q1 and Q2

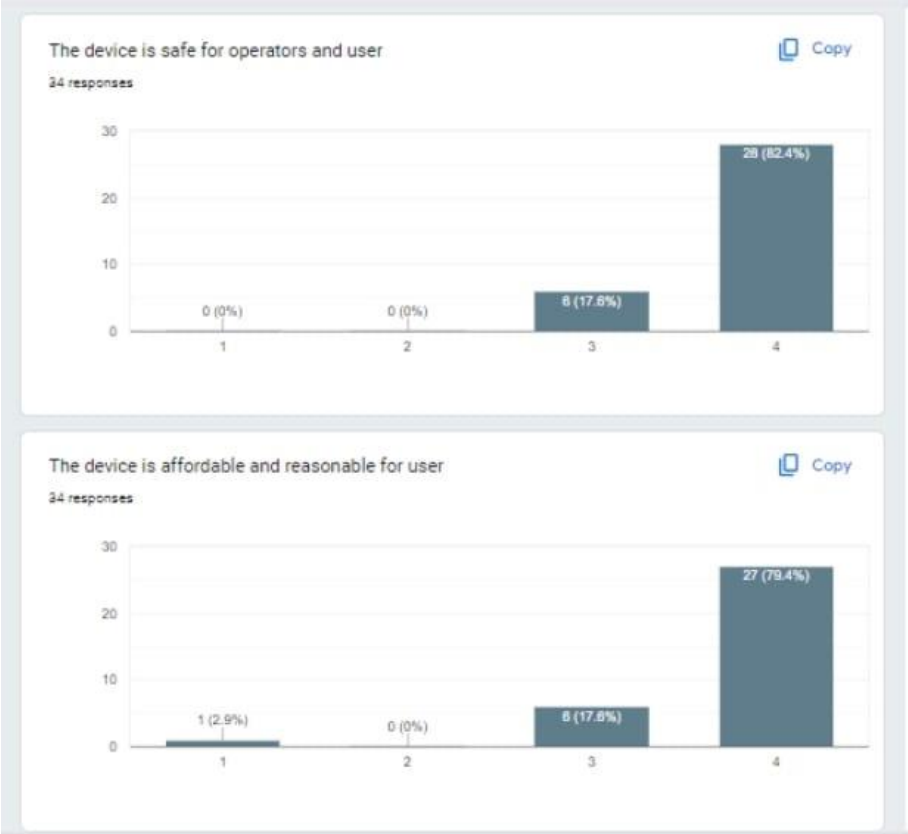

Figure 4.5: Responses for Q3 and Q4

4.3 FEEDBACK & SUGGESTION

A part of our Google Form was created specifically together feedback and suggestions from our respondents. Some shared insightful remarks, expressing the belief that it is safe for the environment. A handful also suggested we could make our device more visually appealing to attract more clients. These constructive suggestions are inspiring, as the power of attraction is a crucial aspect in any market.

4.4 CONCLUSION

In this concluding section, we will delve into the outcomes and responses obtained through the utilization of a Google Form. Additionally, we will explore the positive feedback and reviews received from the participants, which have played a significant role in accomplishing a set of criteria and objectives. Moreover, this segment will touch on the study's limitations that may prove significant for future research. Through a detailed examination of the results and feedback gathered via the Google Form, we aim to provide a comprehensive understanding of the implications and implications of this study.

CHAPTER 5 – CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

In this chapter, the decisions made are based on all the results obtained from experiments and discussions in previous chapters. Matters related to the objectives of the study as well as research proposals implemented in this chapter. In addition, conclusions have been drawn for this experiment. Research was conducted in Taman Cempaka, Ipoh, Perak, to identify common problems experienced in residential areas that are often flooded, especially in the east coast states of Malaysia. Based on observations, one thing has happened which is that the most difficult difficulty for residents is staying safe during floods. Once the problem was identified, the Smart Drain Sensor was conceived and built. This prototype was created with a goal to provide early warning when a flood is about to occur.

As a result, the questionnaire was distributed to the residents of Taman Cempaka to measure their reaction to the prototypes produced to deal with the issues that arise. After distributing the questionnaire to the residents of Taman Cempaka, we found out that most respondents gave good responses. According to their answers from the people in Taman Cempaka agree that placing this Smart Drain Sensor near the house drain can help prevent flooding. Furthermore, this prototype is user-friendly and effective in urban housing.

5.2 DISCUSSION

Smart drain sensors offer several advantages in terms of efficiency and convenience to the public. As technology continues to evolve, these devices become more sophisticated and integrated into the smart home ecosystem. Here are the discussion from this objective about smart drain sensors:

i. To design a smart flash flood sensor using an AutoCAD.

Designing smart flash flood sensors using AutoCAD facilitates accurate and multi-dimensional modeling, ensuring seamless integration of components. The software supports an efficient iterative design process, enabling collaboration and documentation. AutoCAD's scalability and customization features contribute to the creation of cost-effective and reliable sensors for the detection of flash floods.

ii. To develop a sensor that can be used to remind residents and be more alert about flash floods.

Developing sensors to warn residents and increase vigilance about flash floods is an important step for public safety. Incorporating advanced technology, this sensor aims to provide timely warning, it will send an overflow notification to the owner via mobile phone or any other device. Sensor design should prioritize simplicity and user-friendliness to ensure widespread adoption. Through effective implementation and integration in smart home systems, these sensors have the potential to significantly improve public safety and reduce flood-related risks.

iii. To test the effectiveness of the Flood Sensor Apps and alarm in term of functionality.

Functionally testing the effectiveness of Flood Sensors and alarms is essential to assess their reliability and responsiveness in real-world flood scenarios. Through comprehensive evaluation, including simulation tests and user feedback, it became clear how well this tool can detect and communicate flood risk. The success of this test ensures that the app and alarms are not only accurate but also user-friendly, providing timely and effective warnings. This process helps refine its functionality, ultimately contributing to the development of a more robust and reliable flood sensor system that can significantly improve public safety and disaster preparedness. Finally, this Smart Drain sensor works well and is effective.

5.3 RECOMMENDATION

A smart drain sensor is a device that uses sensors and internet of things (IoT) technology to monitor and control drainage system and send alerts to the user and people surrounding. The system can also predict drainage clogging spots and help prevent environmental issues and urban flooding. The smart drain sensor uses various sensors such as water level, ultrasonic, temperature, and gas sensors to monitor the real-time scenario of the drainage system. The data collected by sensors is processed by the ultra-sensor and sent to use through smart gadgets with internet connectivity.

For this project proposal, it can help improve the project to a better one carried out in the future for more beneficial contributions. There are some suggestions that can improve this project to be better. First, this project is proposed to build a monitor that can check the status of the water level at any time and the level of risk of flooding. This is because users can find out what the water level is at that time.

Then, is that this project needs to build a simpler application to inform users about the early warning of flash floods that occur. This application allows users to easily log into the application to receive warnings and updated information about water levels that are of concern or have reached dangerous levels. In addition, putting on the application preparatory measures when facing floods and reducing the risk of danger that may occur during this natural disaster.

Finally, there is a suggestion for an addition to this project, which is to add a device that can trap garbage in the main drain to prevent garbage from entering waterways and rivers, which can cause the drain to become clogged and cause flash floods. These traps are intended to deal with the problem of garbage getting stuck in drains, preventing it from contaminating the watercourse, and reducing the risk of flash floods.

5.4 CONCLUSION

In conclusion, smart drain sensors offer a practical and efficient solution to flooding issues. The project's ability to detect problems early on flooding issues. By leveraging innovative technology and smart design principles, flood sensors offer a proactive and effective solution for early detection and alerting residents to potential flood risks. The integration of these sensors into comprehensive systems, including apps and alarms, demonstrates a commitment to providing timely and accurate warnings. As a part of the broader landscape of smart city initiatives, the flood sensor project exemplifies the potential of technology to create more resilient and adaptive urban environment.

Furthermore, this prototype which is Smart Drain Sensor can benefit everyone. It can inform and help the environment and people by applying it to many people drains in various areas that can overflow after heavy rain. When this Smart Drain Sensor is placed, it helps warn people nearby, detects spills and then sends information and alerts residents before a flood occurs. So, there is only one prototype, but it can work with two functions.

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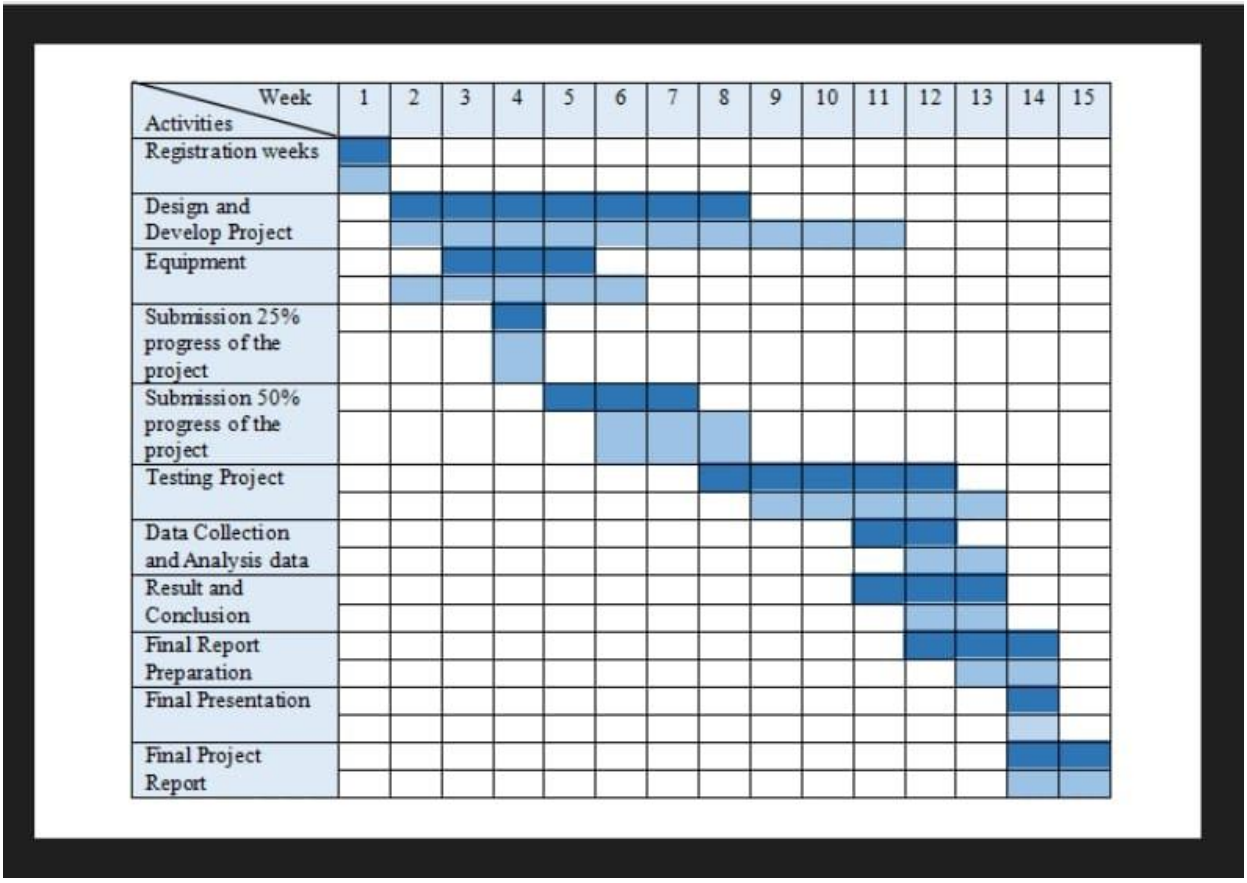
GANTT CHART



ESTIMATED COST

Material	Quantity	Cost
Ultrasonic Sensor	1	RM25.00
Wire	2	RM1.00
Rectangular Plastic Container Tupperware	1	RM1.00
Transistor BC-547	4pcs	RM1.60
ESP 8622	1	RM3.50
Solderless Breadboard	1	RM4.90
LED (Red,Green,Yellow)	3pcs	RM0.60
Buzzer with wire	1	RM3.00
Wire Jumper	1	RM1.50
Resistor	3pcs	RM0.30
Total		RM42.40