FINAL PROPOSAL

TITLE:

"DEVELOPMENT OF PRAYER RAKA'AT COUNTER USING ULTRASONIC SENSOR"

BY:

MUHAMMAD AMMAR BIN SAIPULLAH

(08DEP20F1051)

DECLARATION

I hereby declare the final year project book is authentic record on my own work carried out for one-year final year project for the award of the Diploma of Electronic Engineering

PROJECT SUPERVISORS:

PN. NADIAH BINTI DIN

Communication with honours, under the guidance of PN NORAZLINA BINTI JAAFAR from the week 1 until week 15.

SIGNATURE :----------

NAME : MUHAMMAD AMMAR BIN SAIPULLAH

REGISTRATION NO : 08DEP20F1051

DATE : 18/06/2022

ENDORSEMENT

I hereby acknowledge that I have read this report and I find that its contents meet the requirements in terms of scope and quality for the award of the Diploma in Electronic Engineering (Communication).

SIGNATURE :----------

NAME : PN NADIAH BINTI DIN :

POSITION PROJECT SUPERVISOR

DATE :

ACKNOWLEDGMENT

In this part, I'd want to convey my gratitude and appreciation to everyone who has donated their time and effort to assisting me in the completion of this project.

Firstly, I dedicated this report to the Almighty God, Allah, thank you for the guidance, strength, power of the mind, protection and skills and for giving us a healthy life.

Next, I'd like to thank Pn. Nadiah Binti Din, my project supervisor, for supervising me and giving me with invaluable direction, advice, and support, as well as inspiration, from the beginning to the end of this research. This study assignment would not have been completed in such a timely and professional manner if it hadn't been for her smart suggestions and attention to coaching me. Her excitement and support for this endeavour had aided me in finishing my final year project to a large extent.

Then, I'd want to express my gratitude to Polytechnic Sultan Salahuddin Abdul Aziz Shah for allowing me to do this study and complete my Diploma courses. I had finally gained a lot of insight into how to conduct research and analyse data that would be valuable in our future investigations. It's significant because I've received a great deal of information that will be useful and beneficial in the future.

In addition, I would like to thank to Pn Zarina Md Amin, Pn Nur Ilya Binti Ismail and Pn Hayati Binti Mohd Yasin as my supporter to achieve the objective of my project. They also assisted me in inspiring recommendations and encouragement, as well as assisting me in the preparation of my project, particularly by providing me with ideas to inspire my project. Working in this profession necessitates great efficiency and competence to facilitate the work process, thus they also function as a panel who has provided a lot of direction and criticism in every job they perform.

Last but not least, many thanks and appreciation also go to all these people and friends who directly or indirectly involved in this study. Without them, this research work would never have been complete.

ABSTRACT

Every Muslim is required to study and do solah five times a day. Each family has its unique approach for teaching their children to practise and perform solah, particularly at a young age. However, parents today have challenges in teaching their children about solah since youngsters now have a variety of justifications, including being sluggish and lying about their solah practise. When performing solah, the biggest issue is that it's easy to lose track of how many raka'ah you've performed. This issue frequently occurred during doing raka'ah prayers such as Zuhr, Asr, and Isya'. When performing as well as the elders, inexperienced youngsters will be confused as to how many raka'ah they have previously performed.A display for indicating a prayer or Raka'ah count, a first proximity sensor for sensing when a Sudjood position has been assumed by the user, and a processor operably associated with the indicator and first proximity sensor for updating the indicator to the next Raka'ah are all included in an interactive electronic prayer counter that indicates a current or completed Raka'ah of a plurality of Rakat performed by a user during an Islamic ceremonial prayer. The user is kept informed of his or her progress through the Islamic ritual prayer in this way. The first proximity sensor can detect the Sudjood position without the user having to touch it. A second proximity sensor can be added to identify a certain stage of the prayer cycle and update the display accordingly. Electrical and electronic technologies, namely ultrasonic systems, are used in this research. These subsystems are connected using an Arduino Uno. The Arduino was chosen as the main microcontroller for this system because of its ease of use and ability to read and run Programming language. It's also a straightforward platform that's appropriate for a wide range of IT projects.

Keyword : Raka'ah counter, Arduino UNO, Ultra-sonic sensor

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

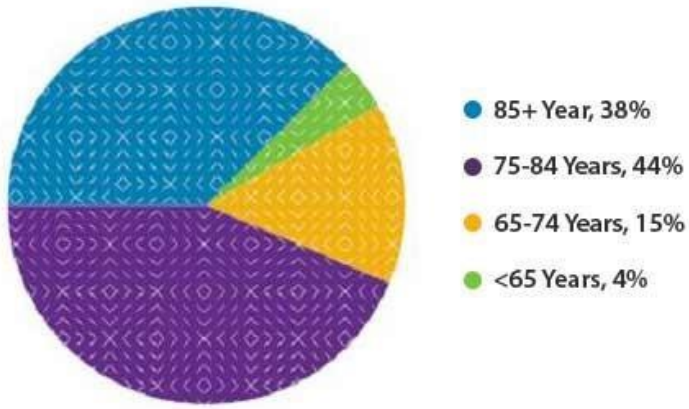
In Islam, the term "salah" refers to the act of praying. It is divided into two categories: Fardu (obligatory) and Sunat (recommended) prayers. Muslims are supposed to pray five times a day, at specific times throughout the day, within the allocated time. The second of Islam's five pillars, required prayer, is the second of the five pillars. Dawn (Fajr or Subh), noon (Zuhr), afternoon ('Asr), sunset (Maghrib), and dusk are the five daily prayers that must be said at specific times (Isha). Muslims are still required to pray five times a day even if they are sick. All Muslims of the Mukallaf are required by Allah Almighty to do their worship to the best of their abilities (Ali, M. M., 1939) [1] The ultimate reason is that salah is Islam's most essential worship, and failing to perform it carries only one penalty. According to the Quran, verse 45 in Surah Al-Ankabut, Muslims believe that salah can protect a person from doing wrong or sinful activities [2]. Furthermore, salah is seen to be a remedy for all diseases. When a person performs salah, he or she acknowledges Allah Almighty as the greatest, most knowledgeable, and most powerful protect As part of the prescribed daily prayer known as salah, Muslims do a single iteration of regulated motions and supplications known as raka'ah. Every Muslim prayer includes several raka'ah. Takbir, standing in salah, recital of Sura Al-Fatihah, ruku (bowing), straightening up from ruku (I'tidal), sujud (prostration), rising from sujud, and the second sujud before standing again for the next raka'ah are all part of raka'ah. However, it is possible for a person to lose track of whatever raka'ah they are on at any one time. It happens for a variety of reasons, including distraction. The difficulty for a person to remember which raka'ah is currently being performed mostly occurs to the elderly, especially those who are diagnosed with mild cognitive impairment and memory weakness diseases, such as low-stage dementia, mild amnesia, and level-1. Alzheimer (18 Mar 2019) [3]

1.2 BACKGROUND RESEARCH

This resarch analyses the degree of memory of older people and investigates the impact of their amount of social activity on their memory. This research included a total of 104 older individuals. TOMAL-SE was adjusted to test the degree of memory and a social and lifestyle activity questionnaire was used to determine the amount of activity. According to the study's findings, there is a considerable difference in the memory levels of older people living in urban and rural locations, there is a substantial difference in the level of memory of senior people who participate in social activities, and the level of social activities has a major favourable impact on the level of memory among the elderly.

According to human development theory, as a person enters middle adulthood, his or her memory begins to deteriorate gradually and follows the ageing process (Berk, 2010). Individuals aged 60 and over are classified as senior citizens in our nation, according to official figures issued by the Department of Statistics Malaysia, who totaled 2.5 million senior citizens in 2014. As a result, this group will require extra attention, particularly in terms of cognitive and mental health. Usually, the things that are often worried about the family or the elderly themselves are memory impairment and Alzheimer's disease.[4]

Figure 1 Proporyion of People With Alzheimer's Disease in the United States by Age



Percentages may not tatal 100 because of rounding. Created Form Data from data from Hebert et al. (114) A3

1.3 PROBLEM STATEMENT

Performing solah is the second pillar of Islam. It is required to be performed by Muslims with high degree of proficiency and full of reverence. It is likely that many person can lose track of the number of raka'ah during the observation of their prayer. This can have a negative impact on their proficiency and reverence especially for children. As a parent, they want to make sure that their children completed their solah with the right number of raka'ah. This project is investigate designed in a way to investigate and provide an appropriate solution to automatically counting the number of raka'ah. The suggested solution is based on the design of the Raka'ah Counter Device which counts the number of raka'ah automatically for both normal and disabled people. The problem statement that produce the reason for the outcome idea for this project are the difficulty and doubt in remembering the number of raka'ah that has already been completed in solah which could happen to inexperience children, elderly and those who having memory weaknesses.

There is about a threefold higher odds of being cognitively impaired among those who have poor social support Attributable risk analysis showed that 65 per cent risk of cognitive impairment in the sample was due to poor social support whereas in the population it was 24.0 per cent. Conclusion The rapid urbanization and the changes brought along with it are likely to affect social support and eventually the cognitive health of the elderly.

1.4 PROJECT OBJECTIVE

The objectives of implement this project is to find out the problem facing by the residents around Malaysia with their current mailbox. After finding out the problem occur is trying to brainstorm the solution to overcome the problems and helps users to gain their productivity throughout the day.

More specifically the principle objective of this research are:

1. To build an indicator system that can notify numbers of raka'ah using ultra-sonic sensor
2. To develop a program that is going to count the amount of raka'ah that has been done by the user.

1.5 PROJECT SCOPE

The scope of the project is to targets all prayer activities of Muslims, especially citizens aged about 20 to 60+ years old, and especially during certain prayer times such as Zohor, Asar, and Ishaq.

1.6 PROJECT SIGNIFICANCE

During project implementation, every aspect of the project or process needs to be known sure to ensure the project is completed as it has been targeted. Here is the stage of the project journey outlined.

- Easy to use
- Work perfectly
- Portability

CHAPTER 2: LITERATURE REVIEW

The term “literature” means a research article that is referred to understand and study the research problem. The literature review is used to provide the context of the study by looking at the research that has been conducted in the field of research and not just summarizing the research conducted by other researchers. The contents of this chapter may contain a brief introduction to the subject of the study, concept or theory, previous studies related to the field of study and summary of this chapter.

2.1 INTRODUCTION

A literature review also focuses on the knowledge and ideas established on a topic as well as their strengths and weakness. Nowadays, technology is getting better and better to replacing the traditional system to speed up the process by introducing the computerized system. Before I start this Rakaah Counter project, I have to analysis and choose the need of the project such as program and circuits that I should use for this project. Besides, the physical prototype also needs to be tested before I make the real one. This is a safe process to avoid the damages of this project.

2.2 LITERATURE REVIEW TOPIC 1

Many Muslims around the world, including those in Malaysia, will take extremely seriously their individual responsibilities toward their religious commitments. Puberty is the age at which all Muslims are required to pray or salah. It usually strikes girls between the ages of ten and fourteen, whereas it strikes boys between the ages of twelve and sixteen (Melissa, C. S., 2015) [5]. Every Muslim who has attained puberty is required to offer five daily prayers. I've learnt a lot from other people's work, and they serve as a springboard for my own ideas. Abdullah Solihin Mohd Fauzi and his team are among the authors whose smart projects I have studied. The Development of Solah Chair Using Electronic Sensor to Assist Disabled Muslims in Performing Prayers is their project. A counter system is included with their salah chair. The counter system is used to replace the tasbih or prayer beads as a tool for zikir (remembrance of Allah). God

emphasises that the only way to acquire inner peace is to remember Him (Bavardi, M.,2012) [6]. Zikir has several advantages, including expelling the devil, weakening his plans, and removing the devil's bad whisperings from a Muslim's heart. Zikir also makes it easier to go about one's everyday activities. It gives a Muslim's life more honour, beauty, and shine (Zarairfan, 2018) [7]. The counter is a sequential logic circuit that can calculate the number of incoming pulses using binary integers as input. Almost all electronic equipment that uses digital systems in its circuit contains a device that can control the sequence of programme operations (Fhajar R. B., 2001) [8].This counter system will be located at the sujud panel to ease the users to use them directly right after they finish performing the salah. According to Daghistani (2015)[9], some groups of people ranging between 15 years old and above face difficulties to perform salah as defined by the Sharia due to health or disability problems (Daghistani, F., 2016). Standing is a crucial part of praying, and if a person does not stand during the prayer, from the initial takbir to the final salam, and has no valid excuse for that, his or her prayer is invalid. Allah says: “And stand before Allah with obedience” [al-Baqarah 2:238].[10]

Next, I investigate the project from Soh Wei Kiat & Chua Qin Di.Their project is Push Up Counter. Typically, The gadget is usually placed just beneath the prone person's chest on the ground. When a person's chest presses against the device's pressure plate, the device counts how many push-ups they did. This technology has a flaw in that it cannot verify the posture of the individual doing the push-ups. You can count how many push-ups you did with bad posture. When doing push-ups, for example, a person's back may not be straight, making them easier. [11]

Finally, Nikhil Nailwal is one of the authors whose intelligent projects I have studied. His idea involves utilising an IR sensor and an Arduino to create an object counter. His project's main goal is to count the number of obstacles that pass in front of the IR sensor in a single direction. On a 162 LCD display module, the total counts or the count number are displayed. The module has an IR LED as an emitter and an IR photodiode as a detector. The infrared sensor we're employing in this project is an active infrared sensor. When it detects an object inside its range, it produces a high output; otherwise, it produces a low output. The sensor's range can also be adjusted by twisting the built-in trim pot. The count starts at zero and increases by one every time something moves in front of it.[12]

2.4 SUMMARY

The goal of this chapter's discussion is to describe the perspective of the sensor that has been used in earlier research or projects, as well as to classify how closely this project is connected to prior studies and theories. Furthermore, this chapter will demonstrate the ideas and concepts that were employed to address the problem. Theoretical considerations are critical while doing any type of study.

As a result of this chapter, we had chosen Ultra-sonic sensor for detection of the movement in Salah. Because of their low power consumption, they may be used in a wide range of electronic devices, including computers, phones, and PDAs. Aside from that, they can detect motion in the presence or absence of light with almost the same accuracy, and they don't require contact with the object to do so. Furthermore, the best aspect about this sensor is that it is easy to find in any electrical store and is inexpensive.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

Methodology is a method and technique for designing, collection and analyzing data to produce evidence that can support a research. Methodology describes how a problem being research can be solved with the best method. The methodology aims to help you better the application of the method by describing the process of the research.

Methodologies can also be a reference to a group the implementation of the project that they want to do. A methodology is also required to update the progress the project. With the methodology, implementation of the project will be more organized and can be complete in a timely manner. Project supervisor will also be aware of the work done by the students in completing the project.

In this methodology, there is a more in-depth description of the use of material used to carry out project. Also included are the operating procedures of the work and the procedures used to carry out the project. This methodology is important for every project implementation or improvement of an existing project in the market.

3.2 PROJECT DESIGN AND OVERVIEW

3.2.1 BLOCK DIAGRAM OF THE PROJECT

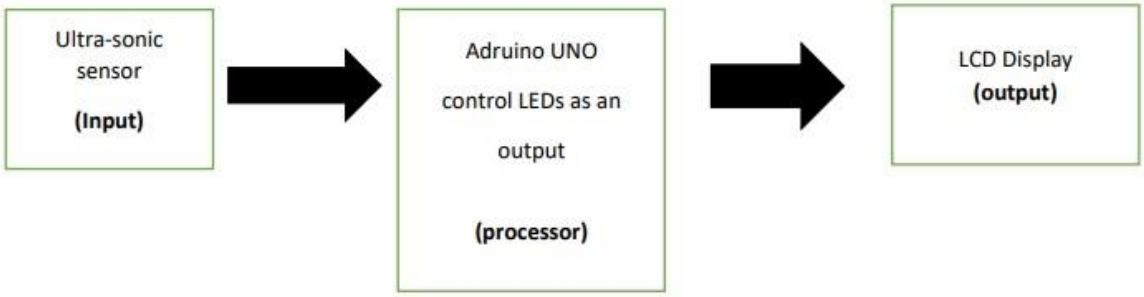


Figure 3.1: block diagram

3.2.2 FLOWCHART OF THE PROJECT

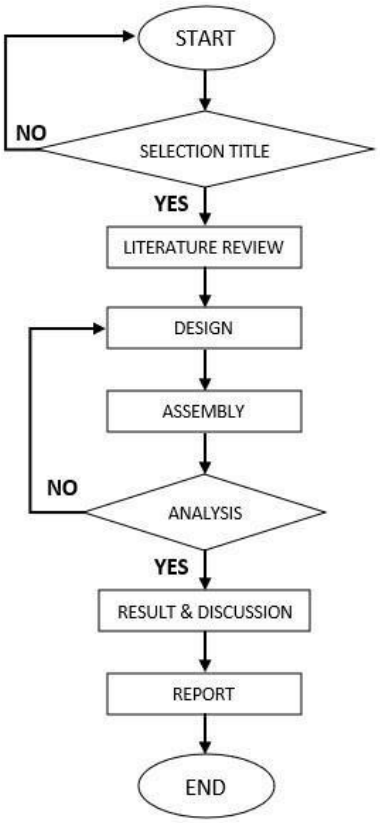


Figure 3.2: flowchart of the project

3.2.3 PROJECT DESCRIPTION

The counter, which is always on during prayer, uses ultra-sonic sensors (sensors that detect nearby objects without any physical contact) to count how many Rakats the user has completed. On the card, the sensors will display indicators to show the number of Rakats.. For a pleasant experience, the screen light up at night so it doesn't distract users but sensors are still able to detect movement, even in light conditions

3.3 PROJECT HARDWARE

3.3.1 SCHEMATIC CIRCUIT

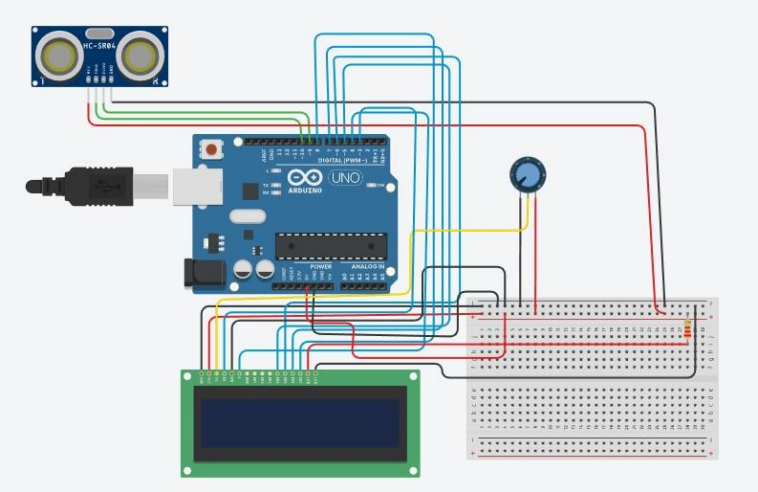


Figure 3.3: schematic diagram on Tinkercad

3.3.2 DESCRIPTION OF MAIN COMPONENT

3.3.2.1 Ultra sonic Sensor

Ultrasonic transducers and ultrasonic sensors are devices that generate or sense ultrasound energy. They can be divided into three broad categories: transmitters, receivers and transceivers. Transmitters convert electrical signals into ultrasound, receivers convert ultrasound into electrical signals, and transceivers can both transmit and receive ultrasound. (Della Corte), (July 2019).[13]

Figure 3.7: Ultra sonic snsor

3.3.2.3 Arduino UNO R3

Arduino UNO is a microcontroller board based on the **ATmega328P**. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.(markespace)(2017)[14]

Figure 3.8: Arduino UNO R3

3.4 PROJECT SOFTWARE

Figure 3.8: Arduino IDE

Arduino IDE is a software that used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. (The Arduino Duemilanove) ("2009")[15]

Figure 3.9: Tinkecad platform

Tinkercad is a free-of-charge, online 3D modeling program that runs in a web browser. Since it became available in 2011 it has become a popular platform for creating models for 3D printing as well as an entrylevel introduction to constructive solid geometry in schools.

3.4.1 FLOWCHART OF THE SYSTEM

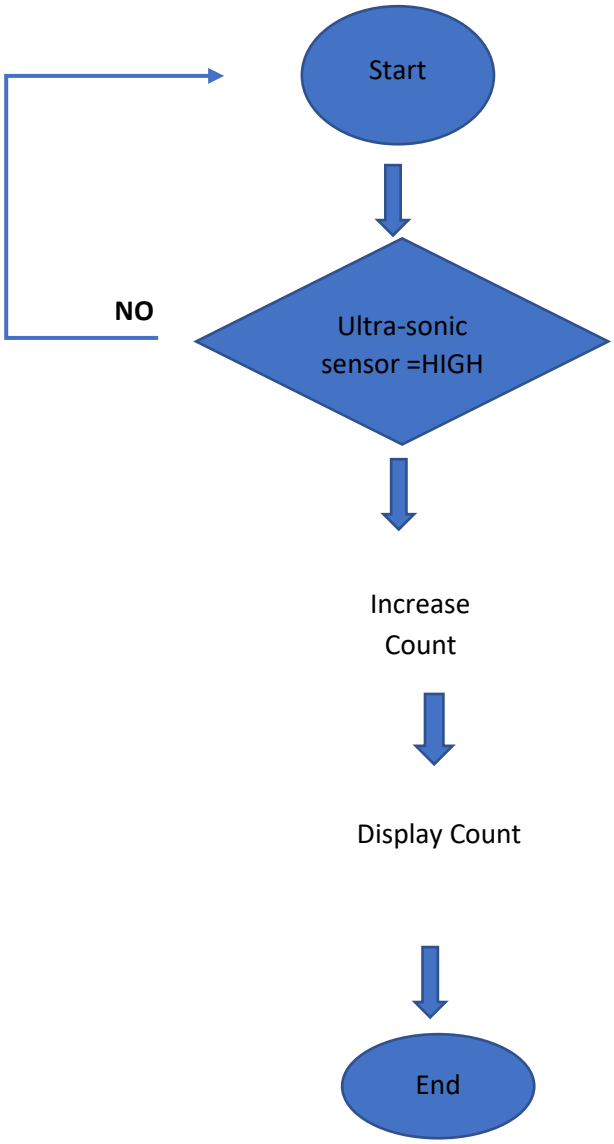


Figure 3.10: flowchart of the system

3.4.2 DESCRIPTION OF FLOWCHART

Based on the figure above, the flowchart is shown how the software is working. The system will start if the infrared sensor detects an object that passing the sensor, if not it will be going back to the start and start it again. Next, if the Ultra sonic sensor detected a movement it will send the information to the microcontroller which is Arduino UNO to process the data that come from the sensor. The Arduino UNO will process the data based on the programming that I compile it to the microcontroller. After the data has being processed, the Arduino will sent the information LCD display to show the counter that has been detected by ultrasonic sensor.

CHAPTER 4: RESULT & DISCUSSION

4.1 PROJECT ANALISIS

After designing and programming the RAKAAT COUNTER according to the required standards, I have test all functions of this project. First, I tested the ultrasonic sensor function and I got it the sensor works perfectly. Next, I tested the arduino uno which was used to get the signal from the ultrasonic sensor and was able to send the information to the LCD display as programmed through coding in the arduino software. Finally, I can see what the LCD displays after making an attempt to count the number of rakaat.

4.1.1 LAYOUT SPECIFICATION

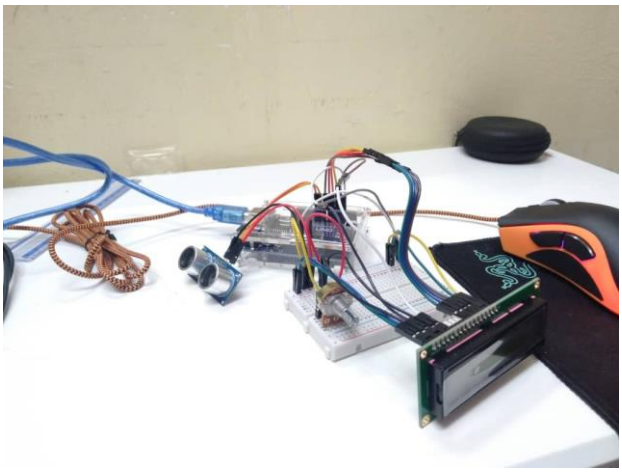
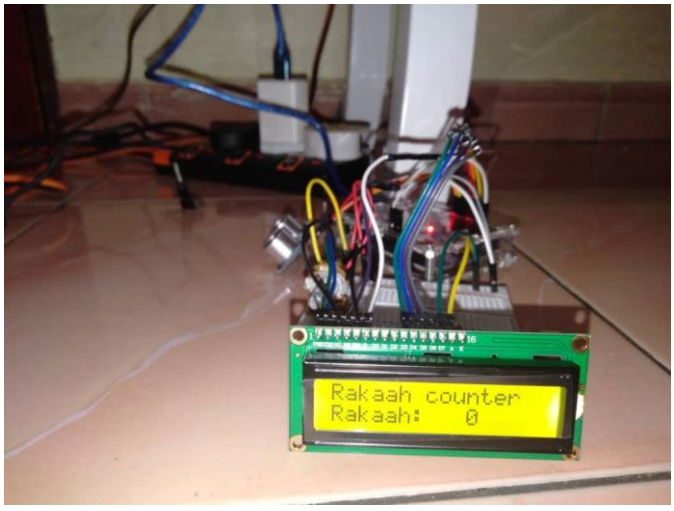
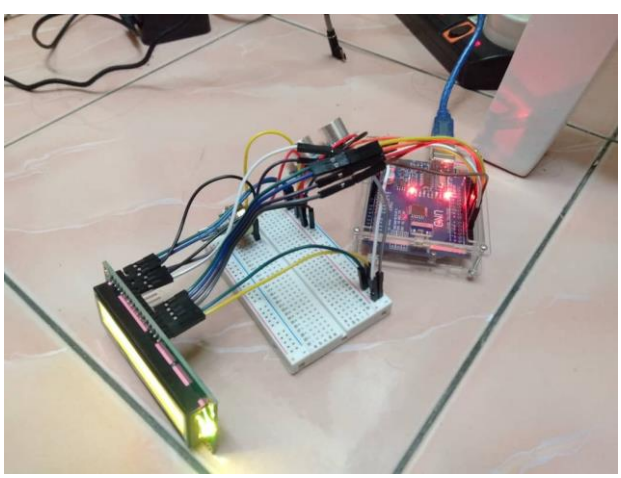
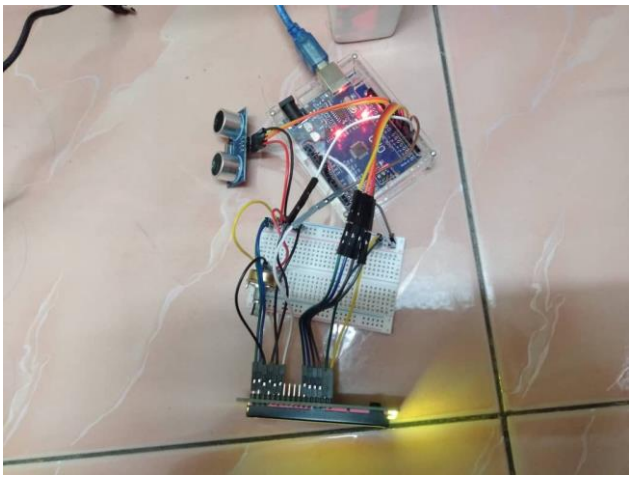


Figure 4.1.1 side view



Fiugre 4.1.2 front view





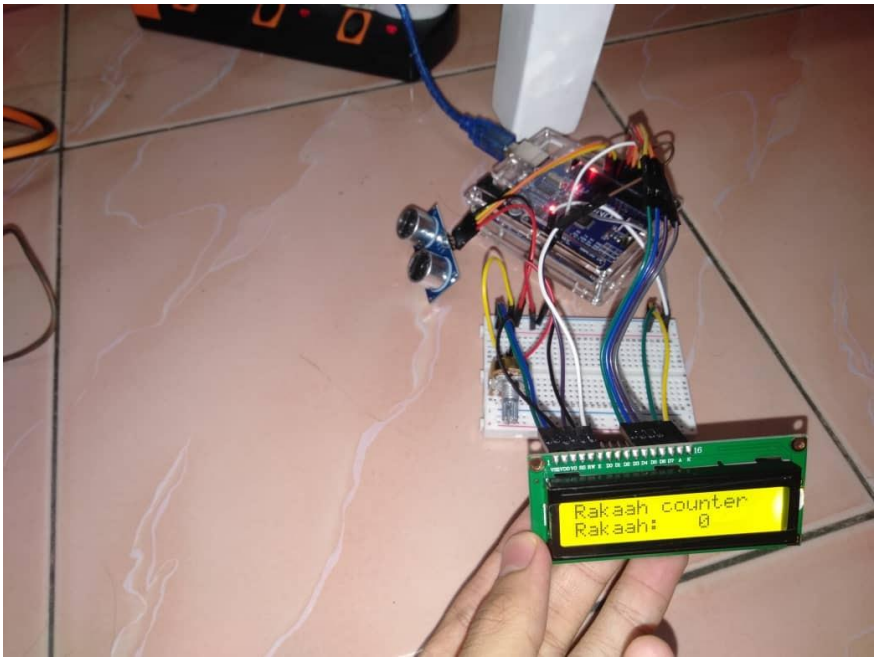
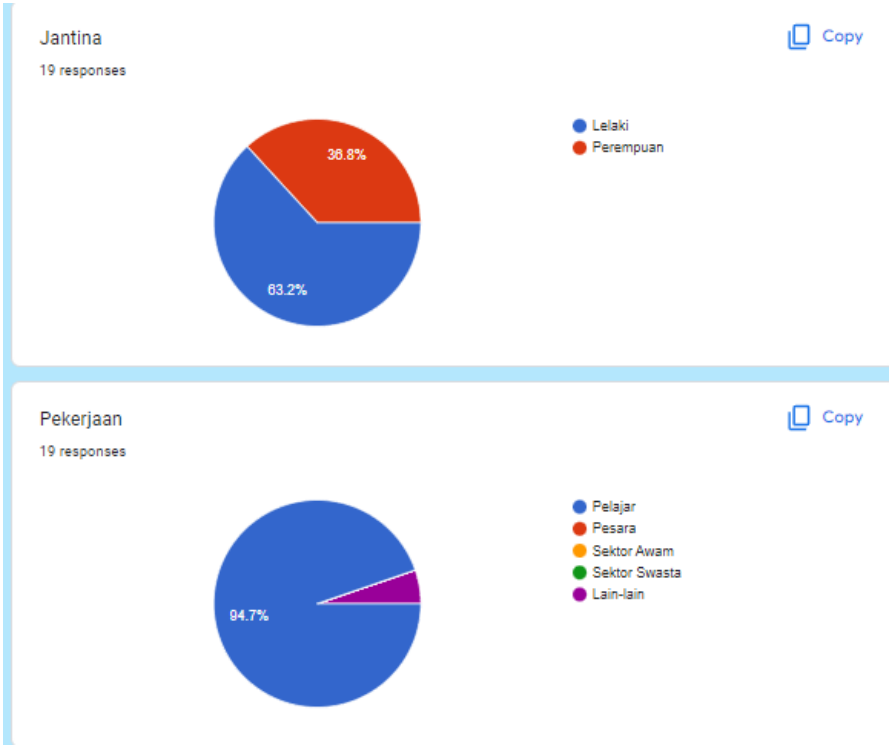


Figure 4.1.(3,4,5) top view

4.2 SURVEY OF PROJECT

A survey was done to find out if a product would be successful in the marketplace. This study was also carried out to demonstrate the aims of the researcher in order to complete the project, construct, and test the product.

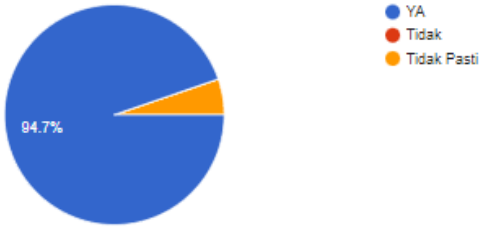
4.2.3 DATA COLLECTED PRESENT BY CHART



Section B

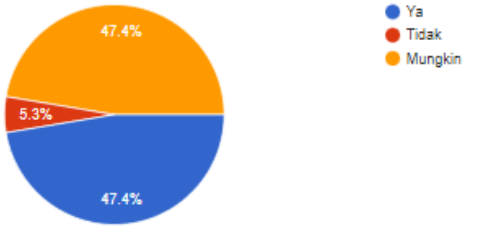
Adakah anda selalu menunaikan solat? Copy

19 responses



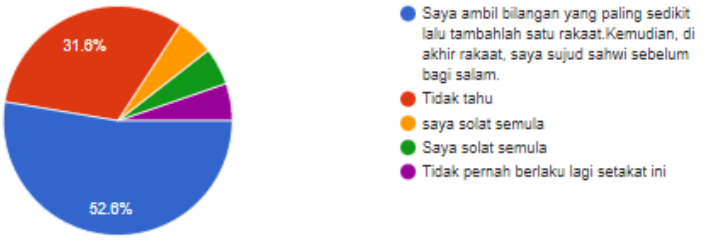
Adakah anda pernah berhadapan dengan masalah terlupa bilangan rakaat ketika solat? Copy

19 responses



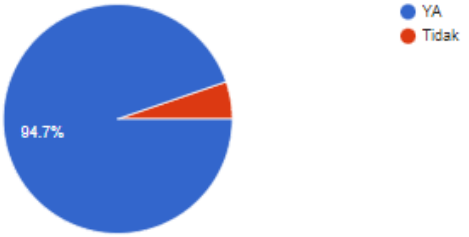
Apakah yang akan anda lakukan jika terlupa bilangan rakaat ketika solat? Copy

19 responses



Sekiranya peranti Sejadah digital (Raka'ah Counter) dibangunkan, adakah alat tersebut dapat membantu anda dalam memperbaiki kualiti solat anda? Copy

19 responses



4.2.3 DISCUSSION

For the process to go well, proper preparation and organization are required. Researchers can learn the benefits and drawbacks of constructing the project based on this conversation. The debate is based on the study's goals. It has been challenging to get solid outcomes as this project has developed. Making a translation is where this project's development is most difficult. When the utilised code was added to the Arduino programme, an error occurred. However, in order to get decent outcomes, researcher are working to develop new codes. a number of codes before getting the best outcomes.

CHAPTER 5: CONCLUSION & RECOMMENDATIONS

5.1 CONCLUSION

In conclusion, we can conclude that human sometimes can be forgetful. They need to always be reminded so that, something which is important will not be forgotten. By proposing Raka'ah Counter project. Sensor technologies have evolved in almost every aspect of our lives to provide us with a better experience and make some tasks more efficient and trackable. a small device initially designed to count the number of Rakats performed in prayers. The goal of the device is to help people who have memory problems such as Alzheimer's disease. So the project's goal has been accomplished. Because it is cost-effective, easy to execute, and improve, this initiative may help the Muslim community. Furthermore, this idea can be implemented in a different way and is already available to a large number of people.

5.2 RECOMMENDATION

The option to add notifications for the time of Sunnah prayers is one of the other enhancements that may be made because Sunnah prayers cannot be conducted constantly. Using IoT as a data recorder for prayers and the most recent prayer schedule, the prayer time may be established. Other than that, this project can be deployed with another approach and already accessible by many peoples, such as developing a mobile app with some extra features and functionality.

REFFERENCE

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