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IOT SMART FISH FEEDER

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CERTIFICATION OF PROJECT ORIGINALLY AND OWNERSHIP

IOT SMART FISH FEEDER

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We hereby declare that this report is the result of our work, except that we have outlined its sources and this project will be the owner of the polytechnic.

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DATE: 15/11/2024 ……

DATE: …….

ACKNOWLEDGEMENT

Thankfully to the Almighty with His grace. We have completed our Final Year Project and this report to meet the requirement of each polytechnic student taking a diploma. Although many challenges we faced in order to complete the project and this paperwork quoting with lots of patience, effort, and struggle among group members finally we are able to complete the task. We would like to express our deepest appreciation to all those who provided us with the possibility to complete this report. Our appreciation is given to our great supervisor, Sir Aly Rajaie Bin Halim, whose contribution in giving suggestions and encouragement to help us coordinate our project especially in writing this report and also during our final project. Last but not least, may thank you our family for lots of support, friends and who have been involved directly or indirectly in guiding the team during this project. We wish congratulate to continue our diploma. Finally, we sincerely apologize for being wrong and mistaken during the progress of this project. Hopefully, this opportunity will always be our common benefit in the future. Thank you.

ABSTRACT

The IoT smart fish feeder is an automated device meant to improve fish feeding efficiency in aquaculture systems, notably in fish ponds. Using internet connectivity, this feeder allows users to control and monitor feeding remotely via a mobile application, providing a practical alternative for pond managers to manage feeding regimens without requiring continual on-site observation. The system promotes a healthier aquatic environment by providing exact control over the amount and frequency of feed distributed, hence preventing overfeeding and minimizing feed waste. This technique improves operational efficiency and provides a dependable method of ensuring regular feeding, making it useful for both small and large-scale aquaculture enterprises seeking to improve fish care through remote management.

LIST OF CONTENT

CHAPTER 1

1.1 INTRODUCTION

Figure 1.1: A Fish Pond

IoT smart fish feeder is an intelligent technology-based project that can be used to simplify the process of feeding in fish ponds or aquariums. This system, which has the ability to connect with the internet, ensures fish owners feed their aquatic life even if they cannot take out some time from their schedule in order to feed them on a regular basis. The increasing demand for sustainable and efficient aquaculture practices makes IoT smart fish feeder a suitable solution that modernizes fish care by decreasing the manual feeding procedure that tends to hassle farmers, thus saving time and labor.

The main principle behind the smart fish feeder using IoT is a very simple device that releases food into the water at regular intervals. Inconsistent feeding can lead to various problems with the health and growth of the fish, which is why automatic feeders help out. This process of automation ensures that the fish are fed the right quantity at right time to minimize problems associated with overfeeding or underfeeding which can create adversative effects on water quality and fish health respectively.

The mobile application allows control of the system and enables users to view and adjust feeding patterns from anywhere in the world. The pond owner can know for certain that the fish or other aquatic life are will receive food to sustain them even while they at home or in the office, or maximum effective of all when they're on vacation, without having to depend within permanent attendance. This is especially helpful for people who farms fish on a large scale or have multiple ponds, which mean that he/she does not have to be present every time at the feeding time.

The other added merit of IoT-solutions based smart fish feed feeder is their role in enhancing the efficiency of aquaculture. This automation minimizes human error and inconsistency between feeding schedules. This, resulting in a more consistent and reliable feeding schedule, which is vital for the proper growth of fish and balancing of the aquatic environment. Also, it saves time from feeding the fish by hand to do other business and therefore makes you more productive in managing your fish pond.

Conclusion, the IoT smart fish feeder is a new concept to modernize how aquaculture practices are carried out. The personalization aspect, along with the automation of food dispensing and ease of remote operation through mobile devices provides convenience, efficiency, and resource management over time scales. The IoT smart fish feeder has the potential to change how fish care and aquaculture operations are conducted as demand for more sustainable and resource-efficient farming methods remains high.

1.2 PROJECT BACKGROUND

The IoT smart fish feeder project is integral to creating an efficient approach of feeding fish in aquariums and ponds. Its design is centered on offering the most straightforward and efficient means of guarantee that fish are fed as planned. From a basic remote control, it is possible to set the speed and the quantity of the food feeder through a mobile application. This system is easy to use by pointing and it is appropriate for fish owners who desire a standard yet effortless means of feeding their fish without much human interference.

Powered by Internet of Things (IoT) system, it is possible to control the feeding process in an independent manner using a smart fish feeder. The feeding process can be initiated anytime by the users with the help of the mobile app and also the portion size is also adjustable. This remote management feature makes it easy to feed fish without the need for a user to show up physically, at a given time, that saves time and energy as well. Therefore, it is a better solution for fish owners who have little time to spend with their pets or those who need an ability to control the feeding time and chose the exact moment, but do not want to involve any additional technologies.

While this system is unequipped with such features as sensors to determine the amounts of food to be dispensed or the use of solar energy, this system provides convenient features for the users. The design is very basic and therefore very efficient both in its application and setting up; thus it will be suitable for those people who do not need complicated mechanisms to take care of their fish but need better solutions in fish care. The IoT smart fish feeder creates a usable automation for small fish owners with a need for simple feeding mechanisms and is an ideal solution for hobby fish owners who want an efficient and economical method of feeding their fish.

1.3 PROBLEM STATEMENT

Keeping the timing of feeding the fishes in the ponds consistant is a herculean task if an IoT smart fish feeder is not in use. Apart from automation, the owners have no choice but to feed the fish by hand, which means an obvious lack of a definite feeding schedule and an unknown amount of food. It is also worrisome because it can lead to poor growth rates, since fish may not be fed what they need, at the right times. Additionally, when the owners of the ponds are not available feeding time may be missed or be delayed this affects the general wellbeing of the fish, and in turn the efficiency of fish farming.

The need for manual feeding as the most common practice used in feeding fish is also a concern in the current use of fish feeds. Manually feeding the fish is also very tedious and relief demands a lot of human resource so as to ensure that the fish feeds at the right time and right portion. As a result of this dependence on human labor,, it make higher the cost of production and also make the fish farming difficult to scaling up, especially in large or multiple pond systems. Further, because of poor animal handling ability, including overfeeding or underfeeding, it is also difficult to feed the animals because the food is wasted or the animals do not get enough nutrition.

One of the usual difficulties in farm fish feeding management in fish pond is irregular feeding that is not supported by an automatic feeder. With feeding by hand, the portions given are in many occasions not consistent since consistency in portion sizes to the different animals is not easily achieved. These differences can result in feeding excess which leads to food wastage, and water pollution or lack of feeding which results in stunted growth of the fish and resultant mal nutrition. Since feeding is a main function in fish farming and without a reliable means of ensuring the function is well developed food is delivered accurately and on time issues may arise which hinder the health and growth of fish thus affecting the general productivity and sustainability of the business.

Figure 1.3: Example Fish farming

1.4 OBJECTIVE PROJECT

The objectives of this research are:

- To energy efficiency system.
- To develop an automated feeding system for optimized feed distribution and reduced manual labor.
- To design and build an automatic fish feeder and IoT.

1.5 SCOPE OF PROJECT

This project aims to develop an IoT Smart Fish Feeder for its operation. Here's a breakdown of the project scope:

The IoT Smart Fish Feeder project encompasses the design, development, and implementation of an automated feeding system specifically tailored for fish ponds. This project aims to integrate IoT technology to monitor and manage fish feeding processes effectively, ensuring optimal feed distribution based on real-time environmental data and fish behavior. The project will focus on creating a user-friendly interface for both monitoring and controlling the feeding system remotely, thereby enhancing operational efficiency for fish farmers.

The project will also address the development of a mobile or web-based application that enables fish pond owners to monitor their feeding systems remotely. This application will provide users with real-time notifications, data analytics, and insights into fish health and feeding patterns. By incorporating a user-friendly design, the application will allow farmers to easily adjust feeding parameters, enhancing their ability to manage their fish stocks effectively.

Furthermore, the project will involve rigorous testing and validation of the feeding system to ensure its reliability and effectiveness in different pond environments. This includes evaluating the performance of the sensors, the accuracy of feed dispensing, and the overall impact on fish health and growth. Feedback from fish farmers will also be incorporated to refine the system and address any practical challenges they may face in real-world scenarios.

Aquaculture facilities and fish farming operations will benefit from the feeder's ability to operate independently, reducing the labor and resources required for manual feeding. The incorporation of IoT technology will enable efficient monitoring and control of multiple feeders, streamlining the feeding process and ensuring optimal nutrition for the fish. Overall, the auto fish feeder aims to provide a cost-effective, sustainable, and efficient solution for fish feeding, addressing the diverse needs of individual owners, aquaculture facilities, and large-scale fish farming operations.

Finally, the scope of the project will include considerations for sustainability and environmental impact. By optimizing feed usage and minimizing waste, the IoT Smart Fish Feeder aims to promote healthier fish farming practices that contribute to better water quality and reduce the ecological footprint of aquaculture operations. The project will explore ways to enhance the sustainability of fish farming through innovative technology and efficient resource management.

1.6 EXPECTED RESULT

The IoT Smart Fish Feeder project for fish ponds is planned to culminate in a fully automated feeding system that optimizes feed distribution using real-time environmental data and fish behavior. This technology will provide constant, data-driven feeding, reducing manual labor and feed waste while also improving fish health. Furthermore, the use of a mobile or web-based application will allow fish farmers to manage feeding schedules, measure fish development, and assure effective operation. The initiative also intends to improve sustainable fish farming by lowering environmental impact and increasing water quality through precision feeding procedures.

1.7 SUMMARY

The IoT Smart Fish Feeder project aims to create an automated feeding system for fish ponds that leverages IoT technology to enhance feed distribution and increase efficiency. The device will automatically administer feed based on predetermined schedules and real-time monitoring, eliminating the need for manual work and maintaining consistent feeding. A mobile or web-based application will enable fish farmers to remotely monitor and manage feeding operations, improving operational efficiency and giving them more flexibility in managing their ponds. This initiative seeks to enhance fish health, minimize feed waste, and promote sustainable aquaculture practices.

CHAPTER 2
LITERATURE VIEW

2.1 INTRODUCTION

The Internet of Things (IoT) has altered several sectors, including aquaculture, by allowing for remote monitoring and control via linked equipment. Traditional feeding methods in fish farming are frequently labor-intensive and require continual supervision to ensure that fish receive appropriate nutrients without being overfed, which can lead to water pollution. The integration of IoT into fish feeders has created new opportunities for effective feeding management, boosting resource allocation while decreasing manual intervention. IoT-based fish feeders provide a remote-operated solution, allowing fish farmers to monitor and manage the feeding process via smartphone or computer. This breakthrough offers substantial advantages in terms of ease and efficiency.

Research has shown that overfeeding and underfeeding are common issues in aquaculture, resulting in increased costs and environmental degradation. Excess feed can lead to water pollution, affecting aquatic ecosystems and fish health. Studies have demonstrated that IoT-based systems can monitor environmental parameters and fish behavior, allowing for precise control of feeding schedules and portions. By addressing these issues.

Moreover, the development of user-friendly interfaces and mobile applications is critical for the successful adoption of IoT technologies in aquaculture. Studies have emphasized the importance of accessibility and ease of use for farmers, particularly those with limited technical expertise. The IoT Smart Fish Feeder will include a mobile or web-based application that provides adjustment speed, enabling fish farmers to manage their operations more efficiently.

Sustainability is another important aspect of modern aquaculture practices, and the IoT Smart Fish Feeder aims to contribute to this goal. Literature reveals that optimizing feed usage not only reduces costs but also minimizes the environmental footprint of fish farming. By ensuring that fish receive the appropriate amount of feed based on real-time data, the feeder helps maintain water quality and promotes the health of the aquatic ecosystem. This aligns with the growing emphasis on sustainable practices within the aquaculture industry.

In conclusion, the IoT Smart Fish Feeder represents a promising innovation in the field of aquaculture, addressing key challenges related to feeding efficiency, fish health, and environmental sustainability. By leveraging IoT technology, this system has the potential to transform traditional fish-feeding practices into more efficient, data-driven processes. As the aquaculture industry continues to evolve, the implementation of such smart solutions will be essential for meeting the demands of sustainable and productive fish farming.

2.2 PREVIEW STUDIES / JOURNAL / INVESTIGATION

The journal paper " IoT Based Smart Fish-Feeder and Monitoring System" enhances aquaculture practices through automation and real-time data analysis. The methodology involved integrating sensors to monitor environmental parameters such as water temperature and fish behavior, with a microcontroller processing this data to optimize feeding schedules and quantities. Results showed significant improvements in feed efficiency and fish health, with reduced wastage and enhanced growth rates compared to traditional methods. The project successfully achieved its objectives of automating the feeding process, promoting sustainability, and providing a user-friendly mobile application for remote monitoring, thereby empowering fish farmers to manage their operations more effectively and improve productivity.

The journal paper " Fish Feeder for Aquaculture with Fish Feed Remaining and Feed Out Monitoring System Based on IoT" presents a methodology that integrates IoT technology to automate fish feeding in aquaculture. The system employs sensors to monitor both the remaining feed and the amount dispensed, allowing for real-time data collection and analysis. Results indicate that the IoT-based feeder significantly reduces feed wastage and optimizes feeding schedules, leading to improved fish health and growth rates. The project's objectives of enhancing feeding efficiency, minimizing labor, and promoting sustainable aquaculture practices were accomplished, demonstrating the potential of IoT solutions in modern fish farming.

The journal paper " Fish Feeder System using Internet of Things" outlines a methodology that involves designing and implementing an automated fish feeding system utilizing IoT technology. The system is equipped with sensors to monitor environmental parameters such as water temperature and fish activity, enabling real-time adjustments to feeding schedules. Results indicate that the IoT-based feeder significantly reduces feed wastage while ensuring optimal nutrition for the fish, ultimately leading to healthier fish growth. The project objectives of enhancing feeding efficiency, minimizing labor costs, and providing remote monitoring and control capabilities were accomplished, demonstrating the feasibility and effectiveness of integrating IoT in aquaculture practices.

The journal paper "Smart Feeder Monitoring Devices with Mobile Application" outlines a methodology that involves designing and implementing an automated feeding system integrated with IoT technology. The project utilized sensors to monitor feeding schedules and environmental conditions, allowing for real-time data collection and analysis. The results demonstrated enhanced feeding efficiency and reduced feed wastage, significantly improving the overall management of feeding processes. Additionally, a mobile application was developed to enable users to remotely monitor and control the feeder, providing notifications and insights into feeding patterns. The objectives of the project were accomplished by creating a user-friendly system that optimizes feed distribution and supports sustainable aquaculture practices.

The journal paper "Design and Development of Microcontroller Based Automatic Fish Feeder System" outlines a methodology that involves the use of a microcontroller to automate the fish feeding process. The system integrates sensors to monitor environmental conditions and fish activity, allowing for precise control of feeding schedules and portion sizes. Results indicate that the automated feeder significantly reduces feed wastage and labor costs while improving fish growth rates compared to traditional feeding methods. The objectives of the project, including the enhancement of feeding efficiency, minimization of manual intervention, and promotion of sustainable aquaculture practices, were successfully accomplished, demonstrating the effectiveness of the microcontroller-based approach in optimizing fish feeding operations.

The journal paper "Viewpoints on the Experiences and Challenges of Fishery Energy Internet" presents a comprehensive examination of the integration of fishery operations with energy internet technologies, termed Fishery Energy Internet (FEI). The methodology employed involves a systematic review of literature, case studies, and expert opinions to explore the practical implementation and obstacles faced within FEI initiatives. Results highlight a range of experiences and perspectives on technological advancements, regulatory frameworks, economic factors, and environmental considerations relevant to FEI projects. The paper successfully achieves its objectiveof providing insights into the experiences and challenges encountered in the deployment of FEI, laying the groundwork for future research and strategies to optimize the integration of fishery operations with energy internet technologies.

2.3 SUMMARY

The literature on IoT Smart Fish Feeders emphasizes the transformative potential of integrating IoT technology in aquaculture to enhance feeding efficiency and fish health. Studies highlight the common challenges in traditional fish-feeding practices, such as overfeeding and environmental degradation, which can be mitigated through automated systems that utilize real-time data from sensors. Research has shown that IoT-enabled feeders can optimize feed distribution by adjusting feeding schedules and portion sizes based on factors like water quality and fish behavior. Additionally, the development of user-friendly interfaces for remote monitoring and control has been identified as crucial for adoption among fish farmers. Overall, the existing literature supports the effectiveness of IoT Smart Fish Feeders in promoting sustainable and efficient fish farming practices..

CHAPTER 3
METHODOLOGY

3.1 INTRODUCTION

The incorporation of the Internet of Things (IoT) into aquaculture marks a big step forward in the management of fish farms. Traditional methods of fish feeding frequently rely on human operations, resulting in inefficiencies and possibly harmful effects on fish health and growth. Recent studies have highlighted the need for novel solutions that use technology to increase productivity and sustainability in fish farming. The IoT Smart Fish Feeder seeks to address these issues by automating the feeding process and leveraging data-driven methodologies to enhance feed distribution in fish ponds.

Next, the feeding system is designed to automate the dispensing of feed based on predetermined schedules and conditions. The Arduino Uno is programmed with algorithms that determine the optimal feeding times and quantities, taking into account factors such as fish size, growth stage, and environmental conditions. This approach ensures that fish receive the appropriate amount of food, promoting their health and growth while minimizing waste

The software development phase includes the creation of a user-friendly mobile or web application that enables remote monitoring and control of the fish feeder. The application provides a dashboard displaying real-time data regarding the feeding system's status, allowing users to track feeding schedules and quantities easily. Moreover, it includes features for setting feeding parameters, receiving notifications, and accessing historical data analytics. This interactive interface ensures that fish farmers can manage their feeding practices effectively, even from remote locations.

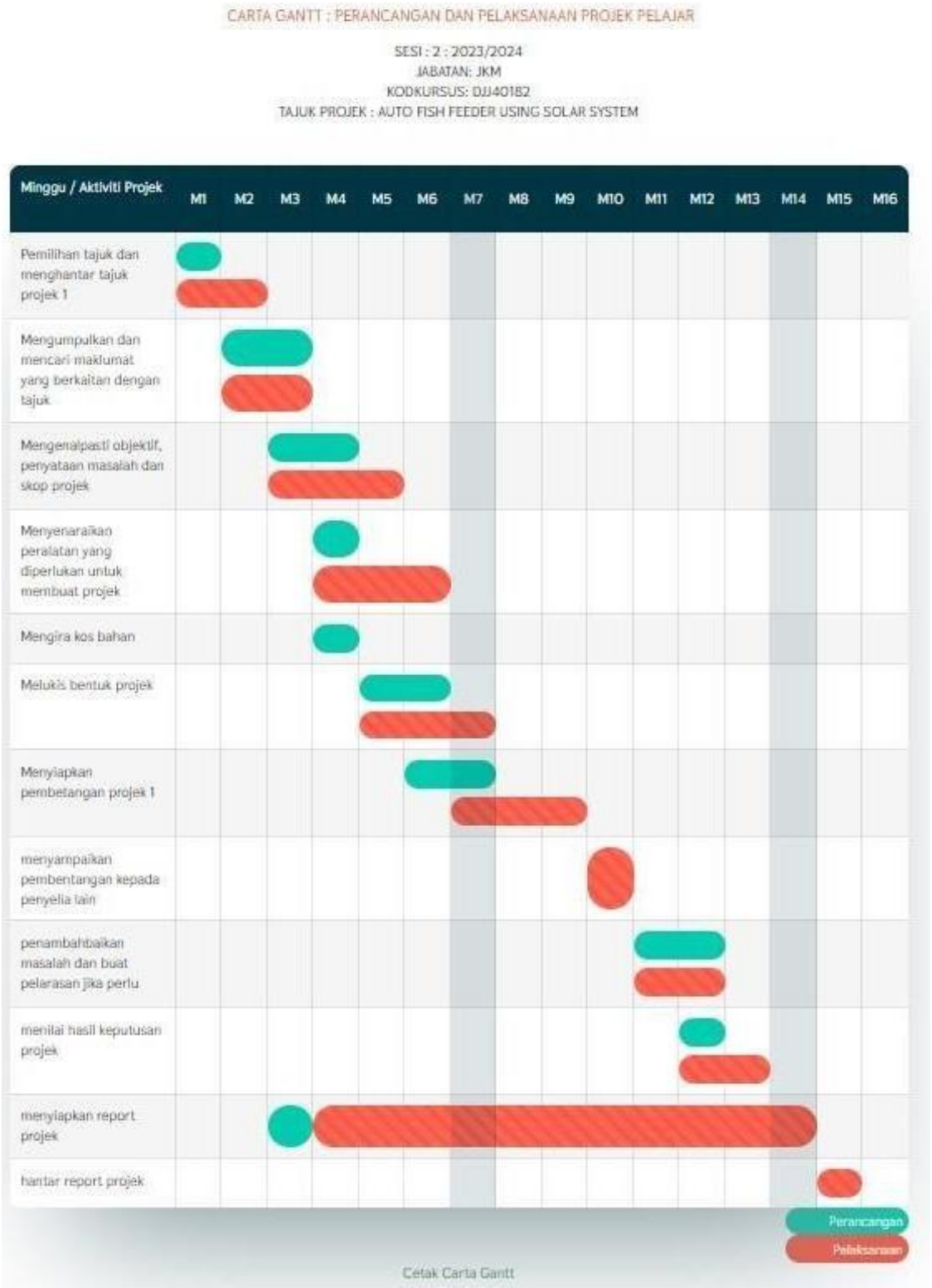
Testing and validation of the smart fish feeder system are crucial components of the methodology. This phase involves deploying the feeder in a controlled environment, such as a pilot fish pond, to evaluate its performance under real-world conditions. Various metrics, such as feed efficiency and fish growth rates, are monitored throughout the testing period. Feedback from these trials is used to refine the system, addressing any issues related to feed dispensing or user interface functionality.

Finally, the methodology includes an evaluation of the overall impact of the IoT Smart Fish Feeder on fish farming practices. This assessment focuses on comparing traditional feeding methods with the automated system in terms of efficiency, cost-effectiveness, and environmental sustainability. By analyzing the results, the project aims to demonstrate the benefits of integrating IoT technology into aquaculture, ultimately providing insights that can be applied to improve fish farming operations on a larger scale.

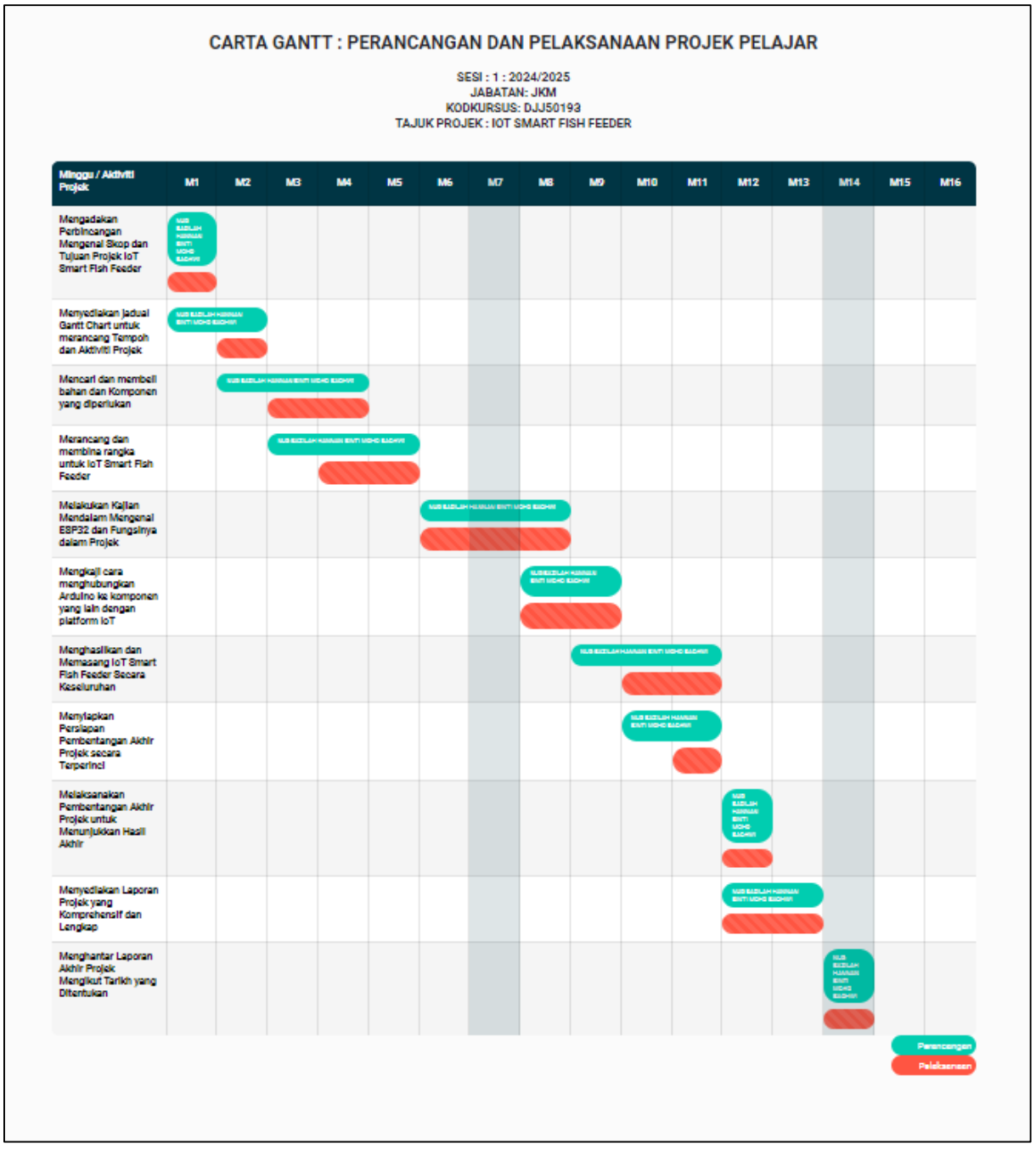
3.2 GANTT CHART

Shows a Gantt chart of the entire activity and process of designing an IoT Smart Fish Feeder from the idea search, title selection, testing, and data analysis until the project is fully complete:

GANTT CHART: PROJECT 1



GANTT CHART: PROJECT 2



3.3 BLOCK DIAGRAM

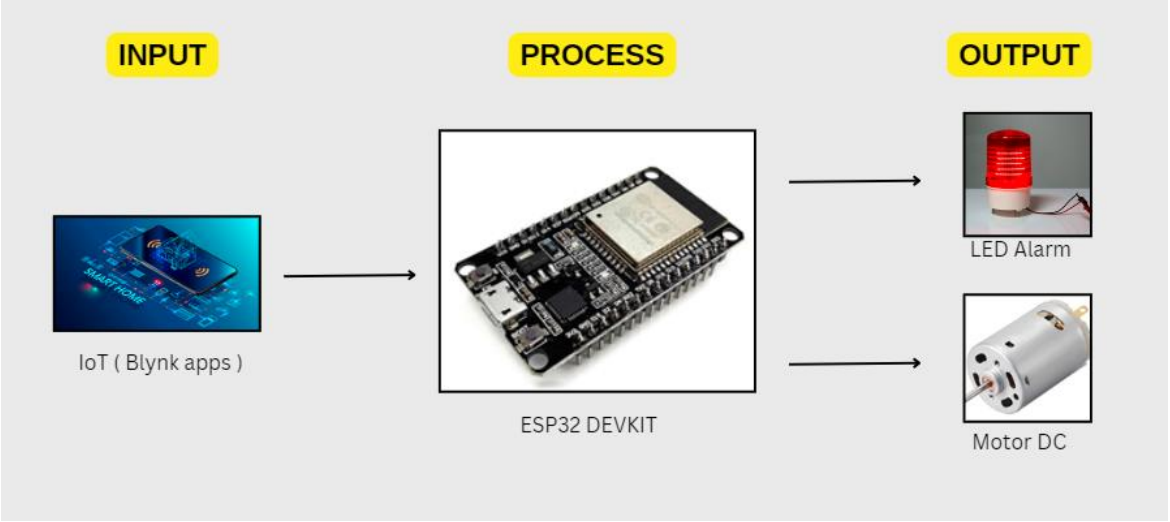


Figure 3.3: Block Diagram

3.4 MATERIAL AND EQUIPMENT

1. RUBBISH BIN (6 GALLON)

Figure 3.4.1: Rubbish Bin

The rubbish bin used for fish feed plays an important role in maintaining feed quality by keeping it dry and protected from insects or contaminants. Adequate storage capacity allows for large quantities of feed to be stored, reducing refill frequency and enhancing system efficiency.

2. 30L JERRYCAN

Figure 3.4.2: 30L Jerrycan

The 30l jerry can functions as a buoyancy device, providing support to the structure of the automatic fish feeder. This enables the feeder to float steadily on the water surface, ensuring convenient access for fish to receive their food.

3. BATTEN

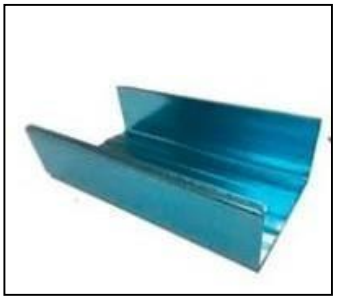


Figure 3.4.3: Batten

Iron battens function as distributors, providing structural support to the fish feeder. their use ensures that fish food is evenly distributed within the trash bin or storage container. This even distribution guarantees that each section of the container receives an equal amount of food, thereby preventing any potential imbalances in fish nutrition.

4. MILD STEEL ANGLE BAR

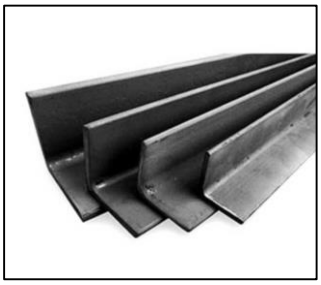


Figure 3.4.4: Mild Steel Angle Bar

Mild Steel Angle Bar to provide strong, corrosion-resistant structural support in a wet environment. With their rust-resistant properties, stainless steel angle bars guarantee long-term durability, preventing damage from moisture or corrosion, making them perfect for fish pond use.

5. LED WARNING LIGHT

Figure 3.4.5: LED Warning Light

The led warning light serves as a visual indicator confirming the successful feeding process. When the device dispenses fish feed, the LED light illuminates, providing confirmation to the user that the feeding mechanism has operated correctly.

6. 12V DC MOTOR

Figure 3.4.6: 12v Dc Motor

The 12v DC motor is responsible for driving the mechanism that dispenses fish food from the storage container into the fish tank or feeding area. Additionally, the IoT system can regulate the motor's operation, allowing for adjustment of the speed motor.

7. ESP32 DEVKIT

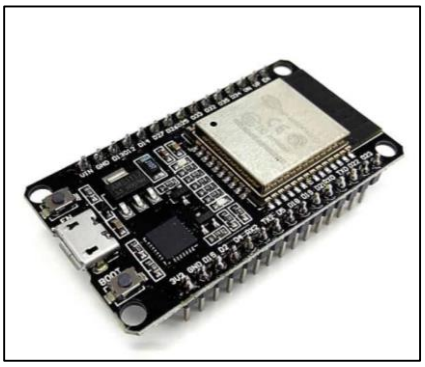


Figure 3.4.7: ESP32 Devkit

The ESP32 comes with built-in Wi-Fi and Bluetooth, enabling the device to connect to the internet or mobile devices. In the IoT Smart Fish Feeder project, Wi-Fi can be used to connect the feeder to a mobile app, enabling monitoring and control of the motor speed.

8. 5MM MOTOR SHAFT ADAPTER

Figure 3.4.8: 5mm Motor Shaft Adapter

The 5mm Motor Shaft Adapter is used to connect the 12V motor with the batten movement mechanism. By linking the motor to the drive shaft, this adapter transmits the motor's rotational power to the physical component responsible for the movement of the arm or batten.

9. PLASTIC FUNNEL

Figure 3.4.9: Plastic Funnel

The funnel is used to channel fish food from the storage container into the feeding mechanism with precision and accuracy. Its smooth and durable surface ensures the smooth flow of food without clogging, allowing for efficient and consistent feeding of the fish.

10. L298N MOTOR DRIVER

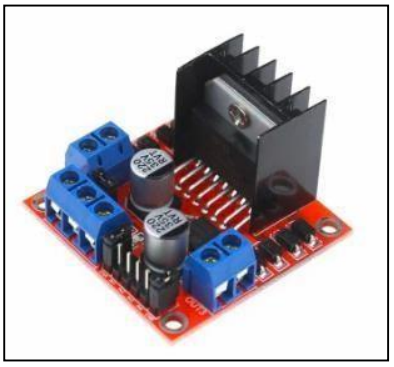


Figure 3.4.10: L298n Motor Driver

The L298N Motor Driver facilitates directional control of DC motors, providing the capability to precisely manage the direction of rotation. These built-in capabilities safeguard the motors by monitoring and regulating current flow, preventing instances of overheating and potential damage.

11. 12V BATTERY 8.0 AH

Figure 3.4.11: 12V Battery 8.0 Ah

The 12V 8.0Ah battery powers the entire IoT Smart Fish Feeder system. It ensures the device works smoothly and continuously. The battery provides power to key components, like the motor driver and motor 12v This makes the system reliable and efficient.

12. BREADBOARD

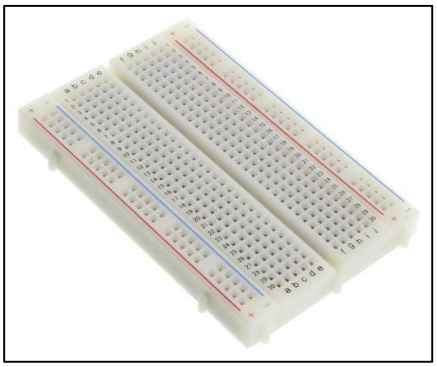


Figure 3.4.12: Breadboard

A breadboard is useful in an IoT Smart Fish Feeder project as a testing or prototyping board that allows you to connect components without soldering them permanently. With a breadboard, you can assemble and connect various electronic components like a microcontroller (such as ESP32), motors for the feed dispenser, and other required modules.

13. BOLT, NUT, WASHERS

Figure 3.4.13: Bolt, Nut, Washers

Bolts, Nuts, and Washers function as strong connectors to ensure the stability and security of the device. Bolts join the parts together, nuts lock them in place, and washers distribute pressure and reduce friction, making the device more durable and stable.

14. WIRE CABLE

Figure 3.4.14: Wire Cable

The use of wire cables plays an important role in transmitting power and signals to ensure the smooth operation of the device. Wire cables are used to connect components such as the motor and microcontroller, allowing each component to function synchronously, smoothly, and efficiently.

15. WIRE MESH STAINLESS STEEL

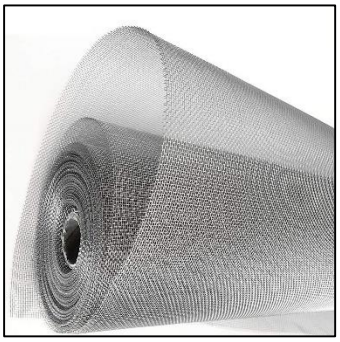


Figure 3.4.15: Wire Mesh Stainless Steel

The use of wire mesh stainless steel as a support or enclosure for the control box is essential for durability, especially when the control box is placed on top of the mesh. Additionally, the positioning of the wire mesh protects the control box from water exposure and prevents it from falling into the water.

16. PLASTIC CONTAINER BOX

Figure 3.4.16: Plastic Container Box

A plastic container box is used to protect sensitive electronic and mechanical components from damage caused by weather, dust, and water. It serves as a physical insulator, shielding the device from rain that could damage the circuitry or disrupt system functionality.

17. BLACK COLOUR SPRAY PAINT

Figure 3.4.17: Black Colour Spray Paint

The use of black colour spray paint functions as a protective layer to prevent iron from rusting when exposed to water, which commonly occurs in fish pond areas. Additionally, it provides an attractive aesthetic appearance and gives a neater look for outdoor environments.

18. STEEL BAND

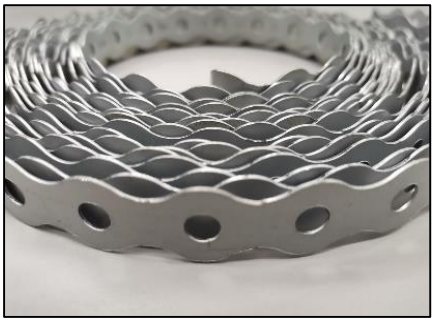


Figure 3.4.18: Steel Band

The steel band is used to secure the jerrycan, which functions as a flotation device, ensuring it remains stable and fastened to the metal frame of the feeder. The use of the steel band ensures that the metal frame does not sink, enhancing its durability and strength.

19. JUMPER WIRE

Figure 3.4.19: Jumper Wire

Jumper wires are used to connect electronic components to the main circuit board, such as a microcontroller, to ensure a stable and correct flow of electrical current. They are used to link pins or ports located at various locations, including from modules such as a motor driver or ESP32, to ensure smooth and accurate communication between components.

20. MOUNTING MOTOR

Figure 3.4.20: Mounting Motor

The motor mounting functions as a support or place to attach the motor used to drive the automatic feeding system. The motor mounting also ensures that the motor is securely and stably attached, reducing the likelihood of damage caused by vibrations or movement during operation.

21. GREEN ROPE

Figure 3.4.21: Green Rope

Green rope can function effectively as a securing or stabilizing element in the installation of the IoT Smart Fish Feeder. It can be used to suspend or support the frame in the middle of the fish pond, ensuring it remains static and does not shift. This helps maintain the feeder's position, allowing for consistent and effective fish feeding.

22. CABLE TIES

Figure 3.4.22: Cable Ties

It is used to tie and organize various cables within the equipment in the feeder. By using cable ties, it helps ensure that the cables do not become tangled, are neatly managed, and are protected from damage due to weather or mechanical disturbances.

23. POWERBANK

Figure 3.4.23: Powerbank

A power bank is used as a portable power source that ensures the system continues to function even without direct access to a fixed electricity supply. It allows the feeder to operate in remote areas or locations without a stable electrical connection, such as in outdoor fish ponds.

3.5 DATA ANALYSIS METHOD

For an IoT smart fish feeder, the major data collecting approach is to collect use logs from the feeder's app (such as Blynk) or interface. These logs can record user activities such as the number of manual feeding activations per day, the time between activations, and any changes to the feeding duration or volume. This information may then be used to provide a historical record of eating habits, assisting in the identification of trends or abnormalities in feeding behavior. Analyzing this information allows for insights into the most commonly utilized feeding periods and average feeding frequency, which can aid in the optimization of manual feeding plans.

Data analysis may be undertaken by looking at the frequency of feeder use and any changes made to feeding settings over time. By observing how frequently users manually activate the feeder, it is feasible to determine the demand for feeding at various times of day. Furthermore, by observing how users modify feeding volumes or speeds, one might infer feeding preferences or requirements. This study sheds light on feeding habits, such as whether users feed more frequently throughout various seasons or in reaction to specific fish behaviors. Identifying these tendencies can help influence the adjustment of feeding schedules and volumes to better match natural eating patterns.

The insights obtained from usage records, human observations, feeder frequency, and environmental correlations may be combined to create data-driven suggestions for improving the use of the IoT fish feeder. For example, if data reveals that fish eat less at certain times, consumers might be instructed to limit feeding during certain times to prevent waste. In contrast, high activity times can be maximized by prescribing larger feed volumes or more frequent manual activations. Finally, these ideas can assist users in developing a feeding regimen that promotes healthy fish development, decreases waste, and requires less manual involvement. Even without sensors, solar, or automated scheduling capabilities, the data acquired and evaluated will provide a significant foundation for fine-tuning the feeding process over time.

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3.6 FLOW CHART

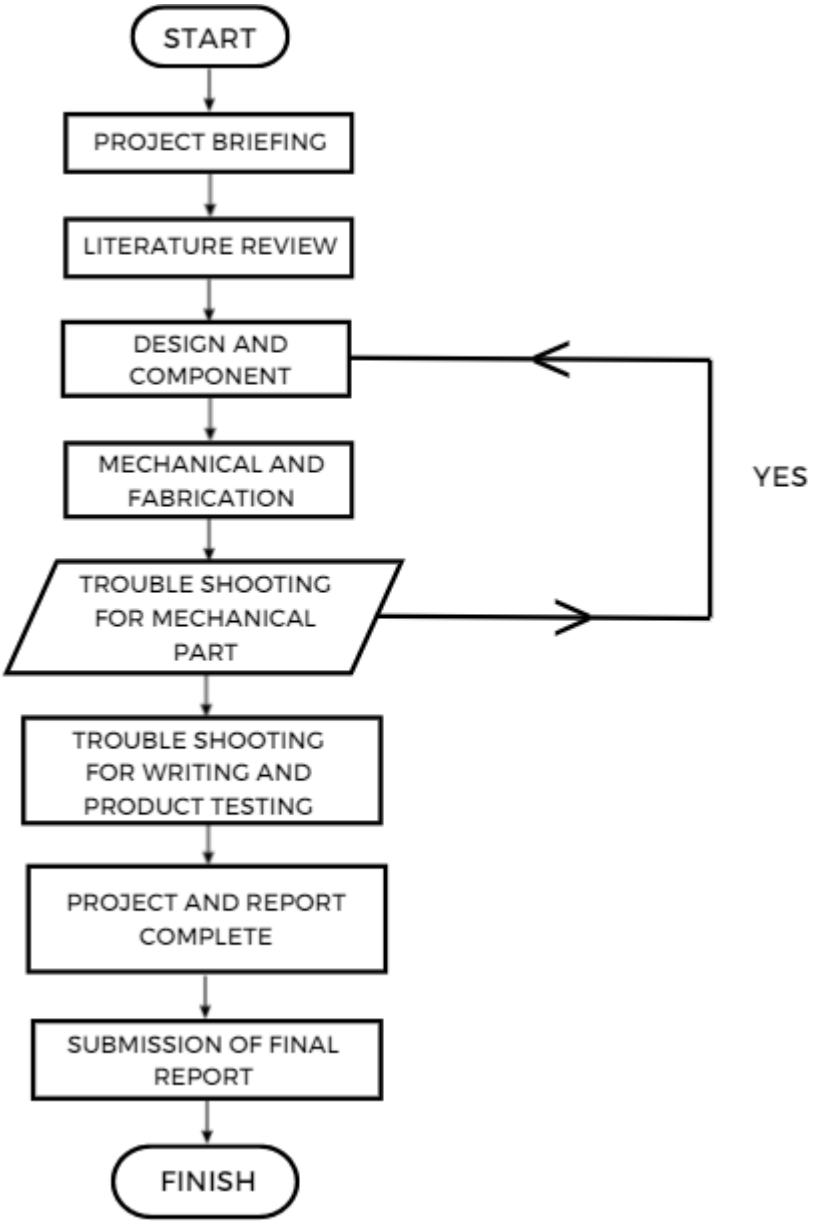

Figure 3.6.1: Flow Chart

3.7 PROJECT DESIGN

In developing our Iot Smart Fish Feeder, the combination of Autodesk Inventor, and hand sketching plays a vital role in the design process. 3D models with precise specifications and design aspects for optimal functionality may be created with Autodesk Inventor. This is enhanced by Autodesk Inventor, which offers accurate 3D views and technical information to guarantee that the design complies with engineering requirements. Additionally, hand sketching is a quick and intuitive method to explore initial concepts and refine design ideas. The combination of these technologies enables us to move from idea to detailed design with ease, guaranteeing that the IoT Smart Fish Feeder is both visually stunning and highly useful.

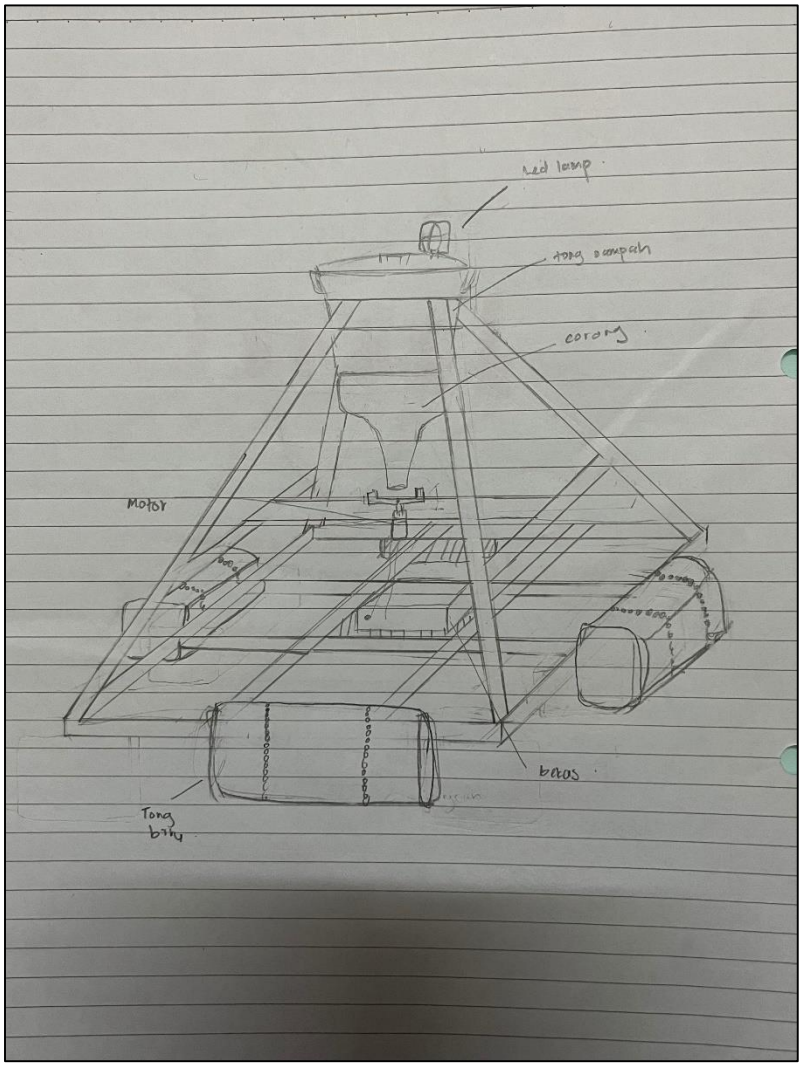

Figure 3.7.1: Project Sketch

The Autodesk Inventor sketch of our IoT Smart Fish Feeder pays close attention to every little detail. The 3D model is accurately rendered, showcasing the rubbish bin as a store fish food, mild steel, distributor, and jerrycan as buoyant. Parametric modeling techniques are used in the drawing to ensure dimensional accuracy and uniform proportions.

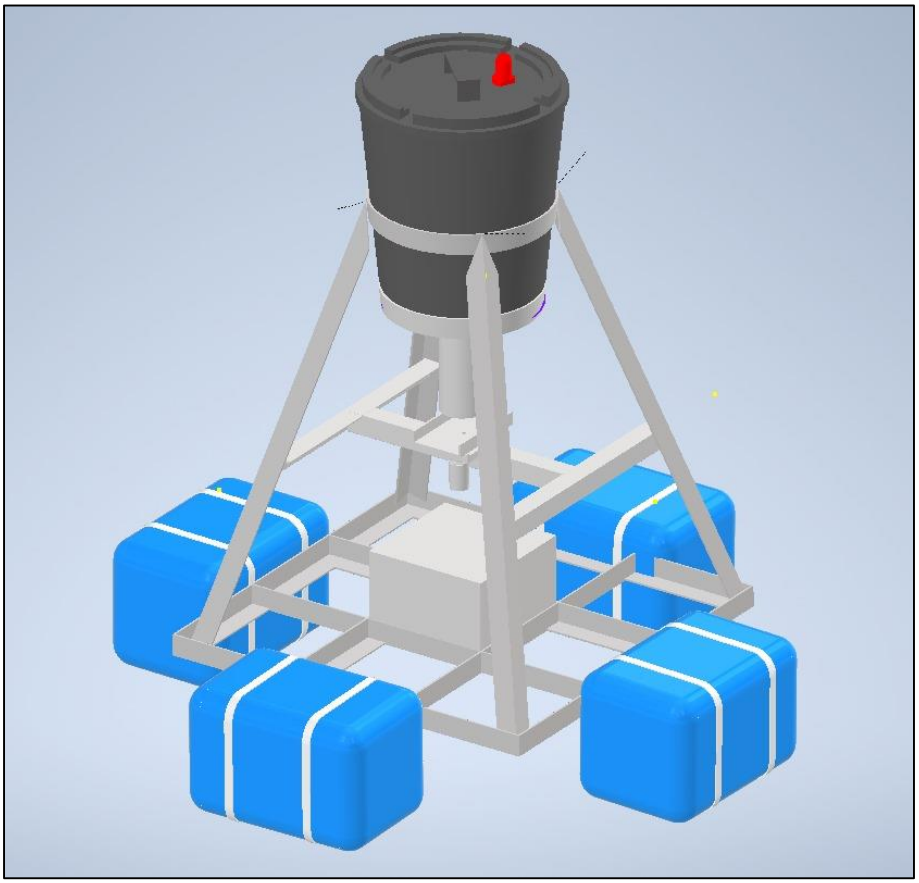

Figure 3.7.2: Sketch Using Inventor Using Front View

In the isometric view of our project, the 3D representation provides a comprehensive and visually engaging depiction of the entire system. The auto fish feeder is presented with all sides visible, allowing a simultaneous view of the front. The distributor ensures that the food is spread evenly throughout the pond, so all fish have equal access to it. The isometric view captures the design in a dynamic and easily understandable manner, providing stakeholders and users with a holistic perspective of IoT Smart Fish Feeder form and function.

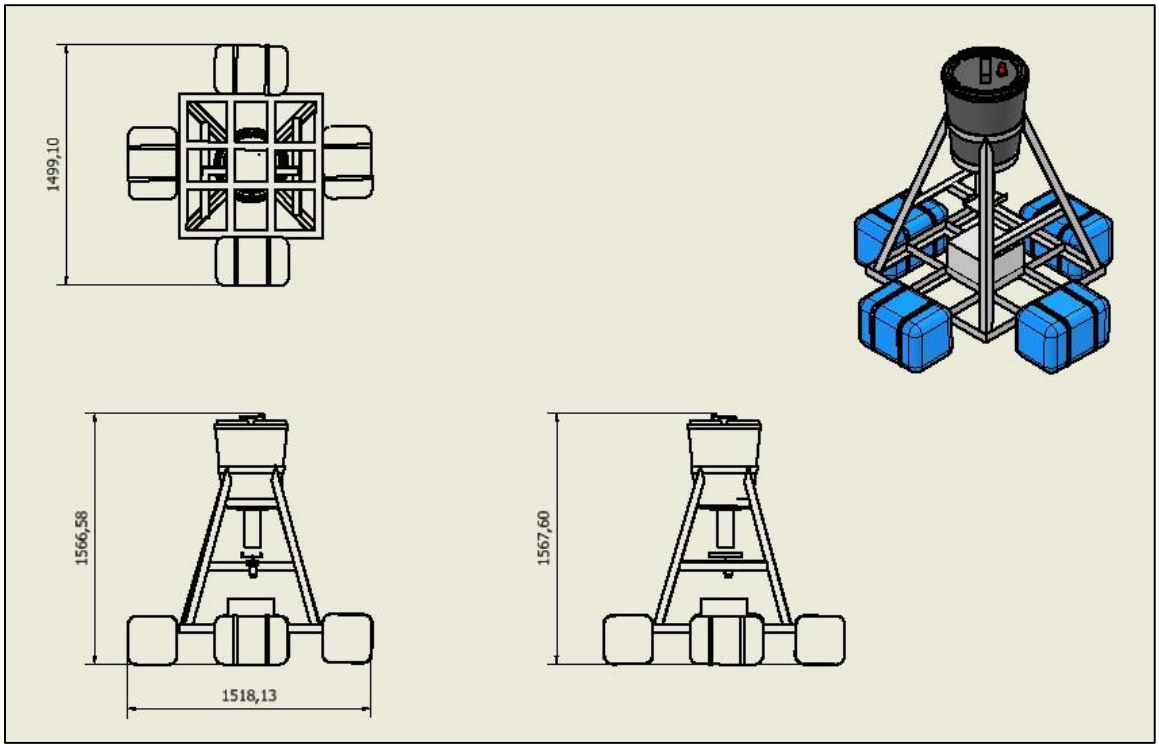

Figure 3.7.3: shown the isometric drawing of the project

In an exploded view of our project, each component is strategically separated and spaced apart to showcase the individual parts and their relationships. . This exploded view provides a clear understanding of the internal structure and how each part contributes to the overall functionality of the IoT Smart Fish Feeder. It serves as a visual guide for assembly and maintenance, allowing for a comprehensive understanding of the design and facilitating effective communication during the manufacturing process.

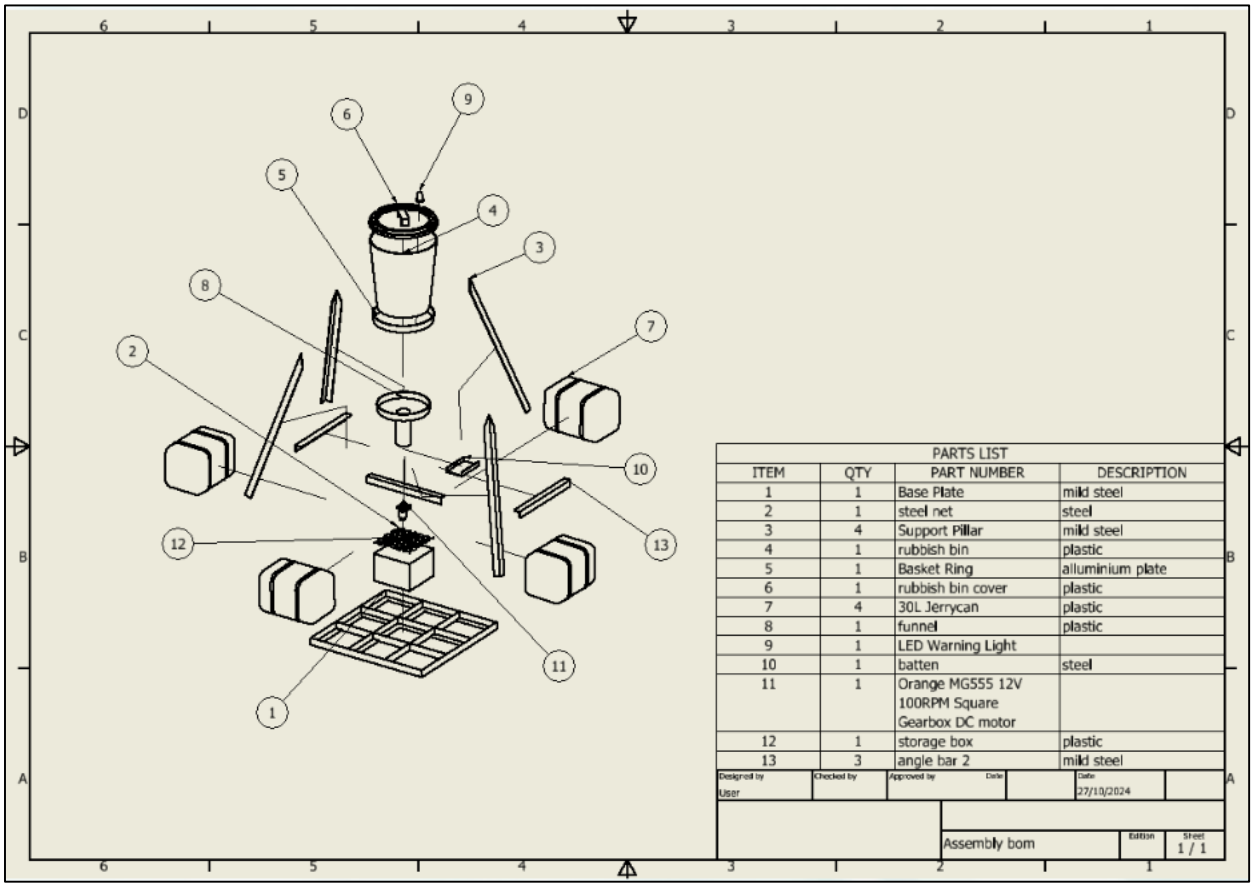

Figure 3.7.4: shown the exploded drawing of the project

3.8 FABRICATION / ARRAGEMENT

The fabrication process of the IoT Smart Fish Feeder was made at the project workshop, mechanical engineering department, Polytechnic Banting Selangor. To guarantee the smoothness of the project, each team member is given a scope of their respective tasks. This will explain in detail each task arrangement and the fabrication steps that have been implemented.

3.9.1 MEASUREMENT AND MARKING PROCESS

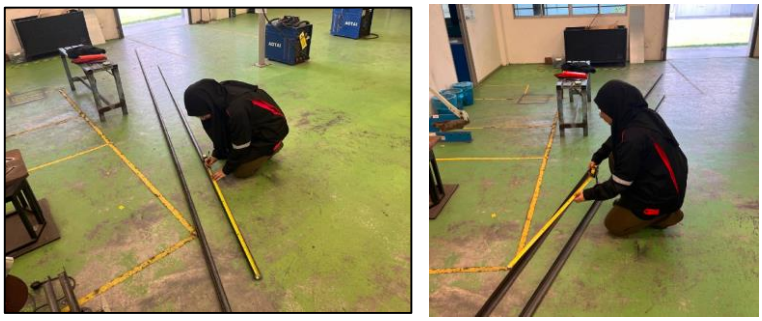

Figure 3.9.1 shows the measurement and marking process

Figure 3.9.1 Measurement and marking of materials. The first step in making the frame for the IoT Smart Fish Feeder was to measure and mark the dimensions by establishing the width and height of the mild steel angle bar. To mark, one will need to use a pen as the marker while finalizing all the measurements at the same time as the checks for accuracy are carried out before commencing with the cutting process. Therefore, it is also important to record the measurement and the marks for reference during the manufacturing process.

3.9.2 CUTTING PROCESS

Figure 3.9.2 shows cutting process

Figure 3.9.2 shows the mild steel angle bar cutting process performed after the marking process. There are three mild steel angle bars that need to be cut using a cut-off saw machine. Each mild steel angle bar is 6 meters long and needs to be cut into 1-meter sections. Before starting the cutting process, it is important to wear safety equipment, such as safety goggles, to prevent any injuries. The cutting should follow the markings made during the measurement process to ensure the correct dimensions are maintained. This ensures that the cutting process is carried out safely and accurately.

3.9.3 WELDING PROCESS

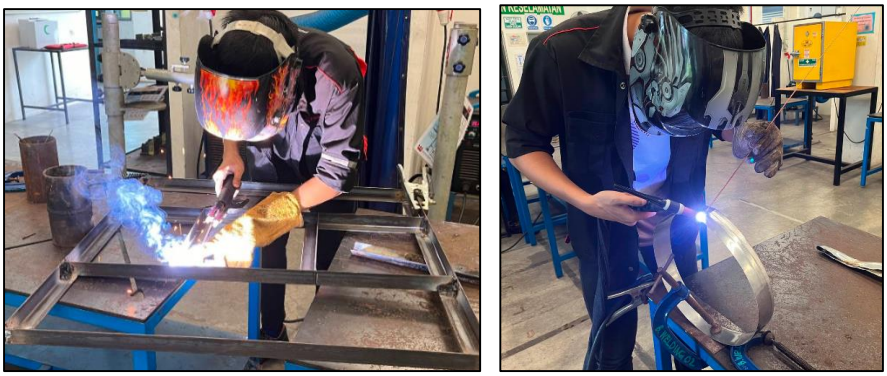

Figure 3.9.3 shows the welding process

Figure 3.9.3 shows the welding process for this process using both arc welding and TIG welding in the manufacturing process. Arc welding is used to join the mild steel angle bars to create the frame, ensuring strong and stable connections. On the other hand, TIG welding is used to connect the metal circle that serves as a holder for the rubish bin, which also functions as the fish food container. Safety during welding is very important, so we ensure the use of welding gloves and helmets to protect ourselves from potential hazards during the process.

3.9.4 DRILLING PROCESS

Figure 3.9.4 shows the drilling process

Figure 3.9.4 shows the drilling process, the first step is to mark the locations of the holes to be mild steel angle bar. After marking, we selected a 5mm drill bit and attached it to the drill. Before starting the drilling process, ensure the drill is stable and properly aligned to avoid any mistakes during drilling. The hole created will be used to attach the steel band using bolts and nuts (jerrycan) for the assembly and connection of components. The success of this process depends on accurate alignment to ensure the holes are clean and fit the project's requirements.

3.9.5 ASSEMBLY PROCESS

Figure 3.9.5 shows the assembly process

Figure 3.9.5 shows the assembly process**,** after the welding process is completed, the frame for the IoT Smart Fish Feeder is created. Next, we attach a trash bin to store fish food and a funnel to the circular part of the metal frame. Additionally, the jerrycan is mounted using a steel band, which is bolt nuts to the side of the metal that has been drilled.

3.9.6 PROGRAMMING PROCESS

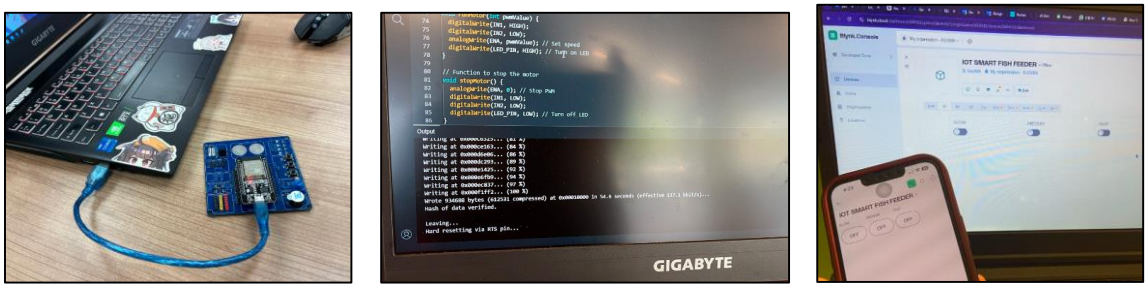

Figure 3.9.6 shows the programming process

Figure 3.9.6 shows the programming process, we created the coding using ChatGPT to assist in the coding process. The ESP32 is the main component for programming, acting as the controller for the system. After the coding is completed, the next step is to test and verify each connection of the code to ensure everything functions properly. We also used the Blynk app to control the ESP32 remotely, allowing for easy and efficient control and monitoring of the system.

3.9.7 WIRING PROCESS

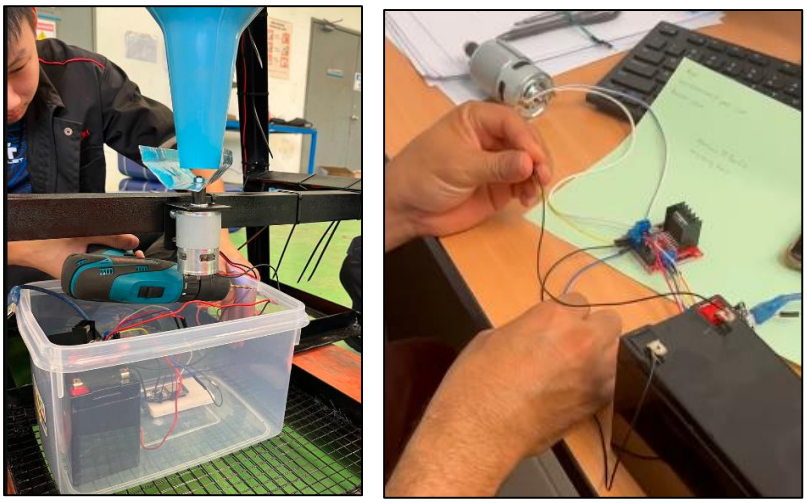

Figure 3.9.7 shows the wiring process

Figure 3.9.7 shows the wiring process for creating an IoT Smart Fish Feeder using ESP32 and a 12V DC motor, connecting the DC motor to the ESP32 circuit using a motor driver to control the motor's speed. Additionally, connect the LED warning light to the motor driver to ensure it functions properly. Make sure all circuit connections are secure to prevent any risk of fire or damage to the components.

3.9.8 FINISHING PROCESS

Figure 3.9.8 shows finishing process

Figure 3.9.8 shows finishing process , The finishing process in this project serves several important purposes to enhance the functionality, aesthetics, and overall presentation of the final product. We used a grinder to remove dust or rust on the metal parts, ensuring the surface is clean and ready for the next finishing steps. For the IoT Smart Fish Feeder frame, we applied black spar paint to give it a neater and more attractive appearance, adding a more professional visual touch to the final product.

3.6 SUMMARY

Certain major steps are involved in the fabrication of the IoT Smart Fish Feeder to give it strength and stability, ensuring that it functions properly. Accurate measurements and marking on materials such as mild steel angle bars are important for the assembly of the components. The frame is made by cutting and shaping the angle iron, connecting each part together into a solid foundation. A grinder is then applied on the metal surface, thereby cleaning it; dust or rust will be eliminated. The frame will have a layer of black spar paint for it to have a great finish and protection. Some parts of the components are also put in position and mounted on the frame, including the feeding mechanism, which allows automated and remote feed operations. This organized fabrication process provides good functionality and appearance for the IoT Smart Fish Feeder.

CHAPTER 4

DATA AND DISCUSSION

4.1 INTRODUCTION

The IoT Smart Fish Feeder is a cutting-edge technology for automating and optimizing fish feeding, solving fish farmers' concerns about overfeeding, underfeeding, and labor intensity. Users of a control and connectivity system can utilize a mobile application that connects to the feeder via WiFi to conveniently monitor and control feeding remotely. This data-driven method saves waste, improves fish development, and increases farm efficiency. The IoT Smart Fish Feeder has sparked debate about its potential advantages in aquaculture, as the technology not only encourages sustainable practices but also meets modern needs for efficient and scalable food production.

4.2 SURVEY QUESTION

Customer feedback is essential for our IoT Smart Fish Feeder, gathering valuable opinions, comments, and insights from users who interact with this innovative environmental solution. This input serves as an important tool for our organization, helping us assess user satisfaction, identify preference trends, and pinpoint specific areas for improvement within the IoT Smart Fish Feeder. Customer feedback functions as a dynamic source of data, allowing us to make informed decisions, drive continuous improvement, and maintain a user-centered approach in the ever-evolving field of environmental products and services. Your feedback is key to our commitment to delivering an exceptional experience with our project.

Respondent: Polytenchnic Banting Student & Fish Farmer

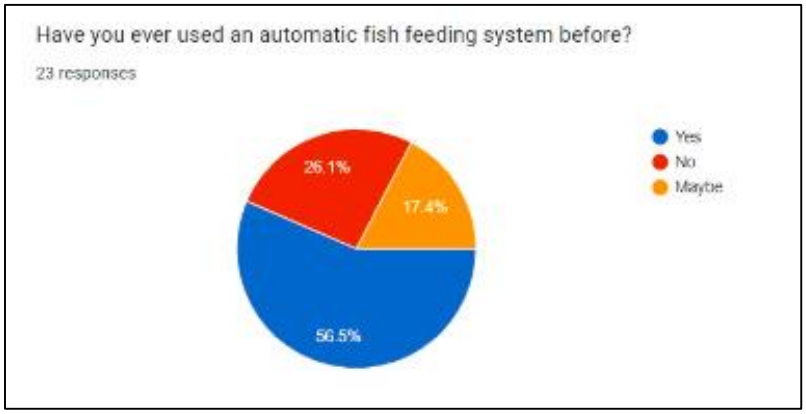

Figure 4.2.1

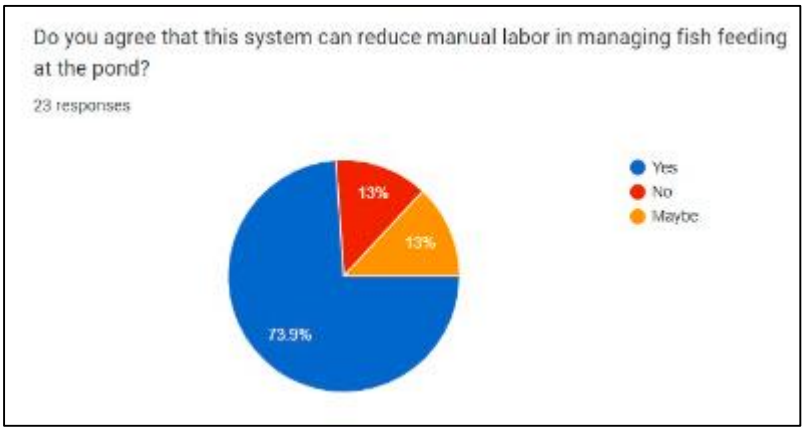

Figure 4.2.2

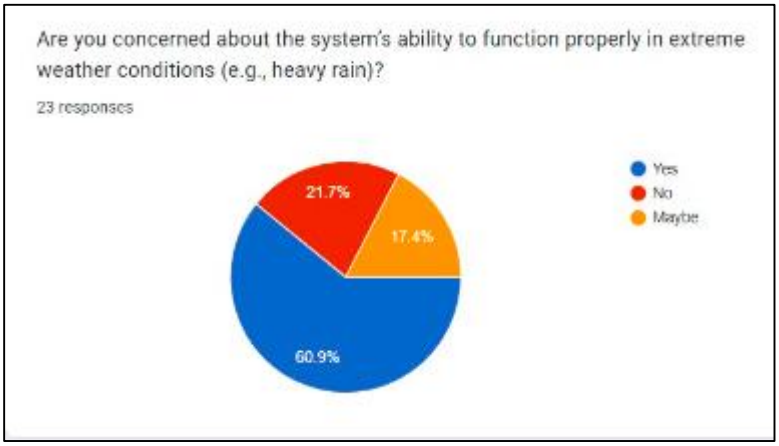

Figure 4.2.3

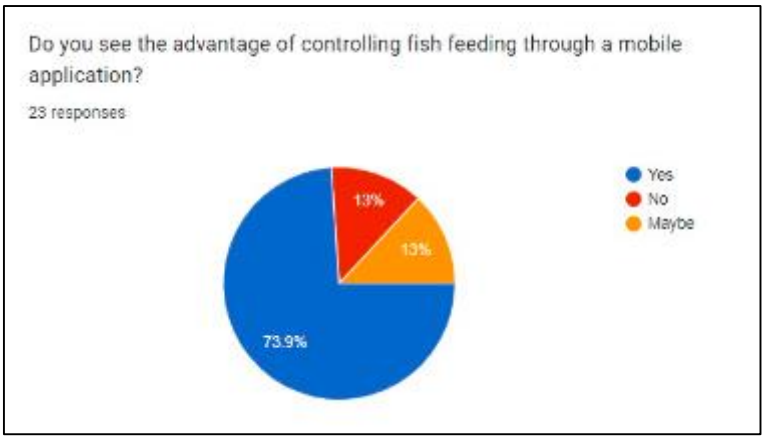

Figure 4.2.4

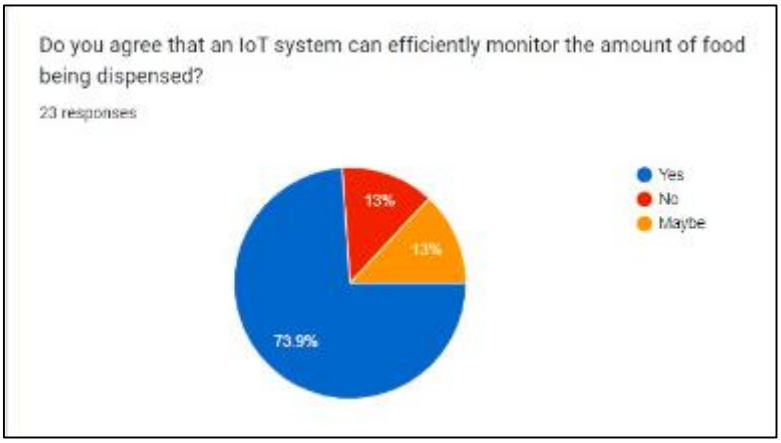

Figure 4.2.5

4.3 PROJECT COSTING

Component	Unit	Cost/unit	Total (RM)
Rubish Bin (6 gallon)	1	RM 20.80	RM 20.80
30L Jerrycan	4	RM 29.00	RM 116.00
Mild Steel Angle Bar	3 x 6 meter	RM 28.00	RM 84.00
LED Warning Light	1	RM 24.00	RM 24.00
12V DC Motor & Mounting Motor	1	RM 34.99	RM 34.99
ESP32 DEVKIT	1	RM 28.19	RM 28.19
5mm Motor Shaft Adapter	1	RM 14.19	RM 14.19
Plastic Funnel	1	RM 9.50	RM 9.50
Jumper Wire	2 box / 40 pin	RM 2.00	RM 4.00
Cable Ties	1 / 10 pieces	RM 8.00	RM 8.00
L298N Motor Driver	1	RM 11.09	RM 11.09
12V Battery 8.0 AH	1	RM 39.49	RM 39.49
Breadboard	1	RM 7.49	RM7.49
Bolt, Nut, Washers	1 box	RM 3.70	RM 3.70
wire cable	1 x 3 meter	RM 8.00	RM 8.00
wire mesh stainless steel	1 x 1 meter	RM 11.00	RM 11.00
Plastic Container Box	1	RM 9.90	RM 9.90
Black Colour Spray Paint	4	RM 5.80	RM 22.10
Steel Band	1	RM 24.00	RM 24.00
Green rope	2 x 10 meter	RM 5.00	RM 10.00
		Total Cost :	RM 490.44

4.4 RESULT OF PROJECT

The results obtained during the IoT Smart Fish Feeder project were aimed at optimizing fish feeding and reducing labor. We measured the success of the feeding process through several performance indicators, such as controlling fish feeding via a smartphone and having motor speed control for the food distributor. Additionally, we found that the smart fish feeder was able to function effectively on the surface of the pond, ensuring stability and efficient food dispensing. This system not only facilitates remote control but also provides a more efficient and effective solution for managing fish feeding.

Figure 4.4.1: This project involves a floating test conducted at the Politeknik Banting lake.

Figure 4.4.2: Result of Project

CHAPTER 5

RECOMMENDATION AND CONCLUSION

5.1 PROBLEM FACED DURING INNOVATION

Coding mistakes in programming the ESP32, which can cause malfunctions or system breakdowns, are one of the obstacles encountered throughout the IoT Smart Fish Feeder innovation process. Furthermore, there are issues with connecting the device to Wi-Fi (ESP32), especially when using the Blynk app on the phone. These flaws might disrupt the system's smooth functioning and cause delays in progress, necessitating debugging and changes to enable flawless integration between the feeder and the mobile application for efficient remote control.

5.2 PROBLEM FACED WHEN DESIGNING THE PROJECT

Several obstacles arose during the design and manufacturing of the IoT Smart Fish Feeder. One important difficulty was measuring mistakes in the mild steel frame, which caused uneven cuts, making assembly difficult and time-consuming.

Furthermore, welding faults occurred during the fabrication stage, compromising the overall structural integrity and alignment of the frame. These concerns necessitated rework and changes, resulting in delays and complexities throughout the feeder's final design and construction.

5.3 PROBLEM FACED IN THE USE OF MATERIAL

One of the most difficult aspects of selecting materials for the IoT Smart Fish Feeder is ensuring that the electronics are water resistant. The enclosure's materials may decay or disintegrate after extended exposure to moisture, resulting in internal component malfunctions or corrosion.

This problem emphasizes the necessity for strong, waterproof materials that can resist the extreme conditions of being immersed or exposed to water for lengthy periods without impairing the functionality of the electronics.

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5.4 OVERALL DISCUSSION

The IoT smart fish feeder is an automated system for feeding fish in ponds that can be managed and monitored remotely via the internet. The gadget offers adjustable feeding speed levels that can be controlled using a smartphone app like Blynk, making fish care more simple and efficient.

The use of IoT technology allows consumers to remotely manage the feeding process, reducing the need for physical labor. This saves time while also providing more efficient and consistent management over the fish's feeding schedule.

5.5 RECOMMENDATION

so there are some recommendations for improvement to make this IoT Smart Fish Feeder more effective:

1. Sensor Integration:

Integrating a food level sensor into the feeder would improve functionality by monitoring remaining food and giving low-food alerts via the Blynk app. This would allow users to replenish the feeder on time, avoiding overfeeding or running out of food while assuring constant feeding. It would also increase automation, making the system more dependable, particularly for customers with several ponds or tanks.

2. Timer Enhancements:

Adding a timer capability to the app would allow users to create feeding schedules for specific times of day, such as morning, noon, and evening, as well as manage the duration and amount of food given. This function allows for customized feeding regimens, assuring regular feeding based on the individual demands of various fish species even while the user is gone.

3. Solar Power Integration:

Creating a solar-powered version of the smart fish feeder would increase its sustainability by utilizing renewable energy, lowering operating costs, and making it more ecologically friendly. Solar panels would be especially beneficial in outdoor or off-grid settings, while storage batteries would assure consistent functioning at night or in overcast conditions. This integration reduces dependency on traditional power sources and aligns the gadget with eco-friendly technological trends.

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5.6 CONCLUSION

In conclusion, the IoT Smart Fish Feeder project marks a big step forward in aquaculture management. This feeder improves feeding efficiency and lowers manual effort by combining automation and smart technologies. As the need for smart farming solutions grows, the IoT Smart Fish Feeder emerges as a cutting-edge technology that not only boosts production but also promotes sustainable aquaculture practices. Future expansions and modifications can broaden its capabilities, making it a valuable tool for fish pond owners and aquaculture firms.

5.7 REFERENCE

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JABATAN KEJURUTERAAN MEKANIKAL
JADUAL AGIHAN TUGASAN INDIVIDU KUMPULAN PROJEK
TAJUK PROJEK : IOT SMART FISH FEEDER

SUB-CHAPTERS	DESCRIPTION
NAME OF STUDENT : LAW SHI WEI (24DTP22F1033)	
CHAPTER 1	**1.4 PROJECT OBJECTIVE** **1.5 EXPECTED PROJECT RESULT** **1.7 SUMMARY**
CHAPTER 2	**2.1 INTRODUCTION** **2.2 PREVIOUS STUDIES / JOURNAL / INVESTIGATION**
CHAPTER 3	**3.2 GANTT CHART** **3.6 FLOW CHART** **3.7 DRAWING PROJECT** **3.8 FABRICATION / ARRANGEMENT** **3.9 MEASUREMENT AND MARKING PROCESS**
CHAPTER 4	**4.2 SURVEY QUESTION** **4.4 RESULT OF THE PROJECT**
CHAPTER 5	**5.3 PROBLEM FACED IN THE USED OF MATERIAL** **5.4 OVERALL DISCUSSION** **5.7 REFERENCE**
NAME OF STUDENT : NUR BAZILAH HANNAN BINTI MOHD BAGHWI (24DTP22F1009)	
CHAPTER 1	**1.0 INTRODUCTION** **1.1 PROJECT BACKGROUND** **1.2 PROJECT SCOPE** **1.3 PROBLEM STATEMENT**
CHAPTER 2	**2.2 PREVIOUS STUDIES / JOURNAL / INVESTIGATION** **2.3 SUMMARY**
CHAPTER 3	**3.1 INTRODUCTION** **3.3 BLOCK DIAGRAM** **3.4 MATERIAL AND EQUIPMENT** **3.5 DATA ANALYSIS METHOD** **3.10 SUMMARY**
CHAPTER 4	**4.1 INTRODUCTION** **4.3 PROJECT COSTING**
CHAPTER 5	**5.1 PROBLEM FACED DURING INNOVATION** **5.2 PROBLEM FACED WHEN DESIGNING THE PROJECT** **5.5 RECOMMENDATION**

Pengesahan Penyelia Projek :

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Nama :