DEVELOPMENT OF AN AUTOMATIC SOLAR POWER FISH FEEDING VIA IOT SYSTEM

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BACHELOR OF SCIENCE (HONS) IN MECHANICAL ENGINEERING

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DEVELOPMENT OF AN AUTOMATIC SOLAR POWER FISH FEEDING VIA IOT SYSTEM

By

ALYUDHA PUTRA

Project Submitted in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Mechanical Engineering (Hons.) in the Faculty of Information Sciences and Engineering

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Abstract of the project presented to the Senate of Management & Science University in partial fulfillment of the requirements for the degree Bachelor of Science in Mechanical Engineering (Hons.)

DEVELOPMENT OF AN AUTOMATIC SOLAR POWER FISH FEEDING VIA IOT SYSTEM

By

Alyudha Putra

May 2023

Faculty of Information Sciences and Engineering

Abstract

The increasing fish consumption poses challenges for fish supply. Manual fish feeding by farmers is time-consuming and lacks dose control. Automatic feeders have limitations in distributing feed over a larger area. The objective of this project is to develop an efficient automatic solar-powered fish feeder controlled via smartphone. It aims to improve feeding effectiveness, efficiency, and pellet distribution. The project utilizes components such as Node MCU V3, Wi-Fi module, LCD, infrared sensor, solar panel, and the Blynk application. This innovation is expected to ease fish feeding and increase production.

In addition, the development of an automatic solar-powered fish feeder controlled via smartphone brings significant advancements to fish farming in Indonesia. It addresses the limitations of manual feeding and traditional automatic feeders, offering improved feeding effectiveness, efficient scheduling, and even distribution of feed. This innovation has the potential to increase fish production, enhance farming efficiency, and contribute to sustainable aquaculture practices in the country.

Keywords: Fish Feeder, IoT, Solar Panel, Blynk Application

Abstrak tesis yang dikemukakan kepada Senat Management & Science University sebagai memenuhi sebahagian keperluan untuk ijazah Sarjana Muda Kejuruteraan Mekanikal (Kepujian).

DEVELOPMENT OF AN AUTOMATIC SOLAR POWER FISH FEEDING VIA IOT SYSTEM

Oleh

Alyudha Putra

May 20223

Fakulti Sains Maklumat dan Kejuruteraan

Abstrak

Peningkatan penggunaan ikan menimbulkan cabaran untuk bekalan ikan. Pemberian ikan secara manual oleh penternak memakan masa dan tidak mempunyai kawalan dos. Pengumpan automatik mempunyai had dalam mengagihkan makanan ke kawasan yang lebih besar. Objektif projek ini adalah untuk membangunkan penyuap ikan berkuasa solar automatik yang cekap dikawal melalui telefon pintar. Ia bertujuan untuk meningkatkan keberkesanan pemakanan, kecekapan, dan pengedaran pelet. Projek ini menggunakan komponen seperti Node MCU V3, modul Wi-Fi, LCD, sensor inframerah, panel solar dan aplikasi Blynk. Inovasi ini dijangka memudahkan pemberian makanan ikan dan meningkatkan pengeluaran.

Di samping itu, pembangunan penyumpan ikan berkuasa solar automatik yang dikawal melalui telefon pintar membawa kemajuan yang ketara kepada penternakan ikan di Indonesia. Ia menangani batasan penyuapan manual dan penyuap automatik tradisional, menawarkan keberkesanan pemakanan yang lebih baik, penjadualan yang cekap, dan juga pengedaran makanan. Inovasi ini berpotensi untuk meningkatkan pengeluaran ikan, meningkatkan kecekapan penternakan, dan menyumbang kepada amalan akuakultur yang mampan di negara ini.

Keywords: Fish Feeder, IoT, Solar Panel, Blynk Application

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CHAPTER I

INTRODUCTION

2.1. BACKGROUND OF THE PROJECT

Consumption of fish in Indonesia which continues to increase in line with economic and population growth is a challenge for the supply of fish in the future. As an archipelagic country, Indonesia is surrounded by oceans and tropical rain forests, making Indonesia rich in animal natural resources. Regardless of technological advances and the era of modernization that human live in today, many fish farmers in Indonesia still provide fish feed manually, but this can be time-consuming, especially when large numbers of tanks must be dealt with, or when there are many meals per day. which is often a hassle. Not to mention if they forget, get lazy, or have to go out of town for a few days and have no one to feed. Starving fish will be stressed and susceptible to disease.

Feeding fish regularly is one of the important things in fish farming, in general in Indonesia it is still oriented towards human resources which results in sporadic schedules and sizes so there are differences in each feeding. Feeding planning must be precise so that fish can grow large quickly and progressively as expected. For fish farming activities, the problem of fish feeding is the main thing because maintenance costs are spent on buying feed and paying labor wages. One of these precautions is the development of automatic fish feeding.

The creation of an autonomous fish-feeding system will eliminate the need for the manual system, which requires more labour. The amount of food to be provided to water bodies will measure or control maintaining the aquarium's cleanliness and the health of the fish, among other benefits that contribute to its development. The fish can be conveniently fed by the feeder even when the owner is not home.

2.2. PROBLEM STATEMENT

a) Less effective of manual feeding

Manual feeding often results in errors in scheduling fish feeding and also the absence of dose control at each feeding. Underfeeding causes decreased growth, overfeeding causes water pollution and wastage of expensive feed. Proper feeding greatly affects fish growth, as well as the feed conversion that can be achieved.

b) Pellet distribution

Automatic feeders generally only provide feed in a fixed area resulting in a lack of fair distribution of feed. To limit or regulate the opening of the gate where pellets or other fish food were guided through the outlet, this type of delivery often employs a straightforward motor and door design. The region that needs to be fed is only within a small range, despite the fact that this type gives precise feeding time and amount of food.

c) Energy

The next problem here is to ensure that the energy used in the automatic fish feeder is able to drive the fish feeder without having to pull an electric cable into the middle of the farm which can cause a short circuit due to wetness.

Therefore, it need a system that can regulate fish-feeding activities automatically by using solar power as the main energy to facilitate fish farmers and by using a smartphone as a control component so that it can be monitored remotely.

2.3. OBJECTIVES

The objectives of the project are:

a) To develop an IoT system of an automatic solar power for fish feeding via smartphone.
b) To analyze the IoT system using Blynk V 1.7.4 software.
c) To evaluate the effectiveness of the new fish feeder in terms of efficiency, feeding time, and pellet distribution.

2.4. SCOPE OF PROJECT

The development of an automatic solar IoT system for fishing through smartphones is a tool that can provide fish feed automatically and can be regulated and controlled via a smartphone. the focus of this project is to boost the achievement of fish consumption needs in Indonesia.

2.5. SIGNIFICANCE OF THE PROJECT

This project contributes a great significance to small scale fish farmers providing fish farmers with the simplest and most efficient way to feed fish, especially in terms of energy which can be obtained for free through solar panels. This can also help fish farmers to avoid losses due to overfeeding fish which can have a negative impact on fish and their water. Hence, this project is in line with Sustainable Development Goals (SDGs) number 2 (Zero hunger) and 12 (Responsible consumption and production).

2.6. LIMITATIONS OF THE PROJECT

The limitation of the project are:

1. The electricity generated depends on how long the solar panels are exposed to the sun.
2. Moisture effect, fish food in tanks located at the top of the feeder is exposed to moisture in the air which can affect its condition. many types of fish feed can easily melt when reacting with water.
3. This product is intended for farmer users.

CHAPTER V

CONCLUSION

5.1 CONCLUSION

The automatic solar power fish feeder via the IoT system presents a promising solution for fish farmers in Indonesia, enhancing feeding accuracy, efficiency, and overall fish productivity. the discussion covered various aspects related to the development and testing of an automatic solar power fish feeder via an IoT system. The increasing fish consumption in Indonesia, coupled with the challenges faced by fish farmers in manual feeding, highlights the need for an efficient and automated feeding solution.

The proposed automatic fish feeder addressed the limitations of manual feeding by providing a more precise and controlled feeding mechanism. The system was designed to ensure accurate feed dispensing, consistent feed delivery rates, optimal water quality control, and even pellet distribution within the fish tank.

Through system tests, it was demonstrated that the automatic fish feeder achieved high feed dispensing accuracy, delivering feed very close to the programmed quantity. The feed delivery rate was consistent and efficient, ensuring a steady supply of feed to the fish. The integration of pH water monitoring successfully maintained the desired water quality, creating a suitable environment for the fish to thrive. Furthermore, the feeder achieved an even distribution of pellets, promoting fair access to feed for all fish within the tank.

Overall, the automatic solar power fish feeder via the IoT system proved to be an effective and reliable solution for fish farmers. It simplifies the feeding process, enhances feeding accuracy, improves water quality control, and supports optimal fish growth and health. By leveraging solar power and smartphone control, the system offers convenience and efficiency for farmers, enabling them to remotely monitor and manage fish feeding activities.

The successful development and testing of the automatic fish feeder signify its potential to contribute to the sustainable and efficient production of fish in Indonesia. By automating the feeding process and ensuring precise feeding parameters, this system can help meet the increasing demand for fish while reducing labor-intensive manual feeding practices.

5.2 RECOMMENDATION

There is room for upgrades and improvements in this project as it represents the initial prototype. The current features, design, and systems have yet to reach their maximum potential. In the current prototype of the automatic solar power fish feeder, the float component is made of plastic material. While plastic is lightweight, it lacks stability. To enhance the design, it is recommended to replace the plastic float with a more stable alternative such as a pipe or other types of floats that offer better stabilization.

While the primary focus of the project is on fish farming, it is recommended to consider expanding the capabilities of the system to cater to other aquatic species, such as shrimp or prawns. By doing so, the technology can be more versatile and applicable to a broader range of aquaculture practices. This expansion would provide farmers with a flexible solution that can be adapted to different species, maximizing the potential benefits of the automated solar power fish feeding system.

APPENDIX

Table 3.1 – Project Schedule Table

Task	week																											
	Dec-22				Jan-23				Feb-23				Mar-23				Apr-23				May-23				Jun-23			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Start FYP	★																											
Discussion and meeting with supervisor																												
Project Title Selection	★	★																										
Project Title Appropval		★																										
Literature Review		★	★																									
Research			★	★																								
Draft Proposal				★																								
3D Modelling				★	★																							
Defense Presentation					★																							
Revision					★	★																						
System Configuration						★	★	★	★	★	★	★																
Progress and report presentation													★															
Revision													★	★														
Start making prototype														★	★	★	★	★										
Android Application																	★	★	★	★	★	★	★					
Testing and troubleshooting																							★	★	★	★		
Finalizing																										★	★	
Technical paper and poster																											★	★
IREX																												★

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