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Basaveshwar Engineering College, Bagalkote

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

2024-2025

PROJECT REPORT ON

**“AUTOMATIC FISH FEEDER USING ARM
MICROCONTROLLER”**

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CERTIFICATE

This is to certify that the mini project work entitled "Automatic fish feeder using ARM microcontroller" is a bonafied for the work carried out by "Mahesh (2BA22EC041), Manoj H Naik (2BA22EC045), Anil Kempanna Mangaj (2BA22EC013), Chandrashekhar. B (2BA22EC025)" of department Electronics and communication Engineering, Basaveshwar Engineering College (Autonomous) Bagalkote affiliated to VTU Belagavi during the academic year 2024-2025, the mini project report has been approved as it satisfies the academic requirements in respect of mini project work .

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Signature with Date

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DECLARATION

We hereby declare that this project report titled "**Automatic Fish Feeder using ARM Microcontroller**" submitted in partial fulfillment of the requirements for the award of the degree of Bachelor of Engineering in Electronics and Communication Engineering, is a record of original work carried out by us under the supervision of **Dr.V.S.Jigajinni**. This work has not formed the basis for the award of any other degree or diploma in this or any other institution or university. In accordance with ethical practices in reporting scientific information, due acknowledgments have been made wherever the findings of others have been cited.

ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of this project would be incomplete without the mention of the people who made it possible, without whose constant endurance and encouragement would have made efforts go in vain. We considered privileged to mess gratitude and respect towards all those who guided us through the completion of this project.

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ABSTRACT

An automatic fish feeder is a device that automatically feed the fish at a predetermined time. In a way, it is to control the fish feeding activity by using a fish feeder that combined the mechanical system and electrical system to form a device instead of manually feeding the fish by hand. Fish owners whom are away for a long time will have trouble knowing the situation of the pond or aquarium. Thus such device is very convenient. The device consists of a STM32 bluepill, wifi module(ESP8266), stand, fish storage, The device will feed the fish by dropping the feed from the storage through a hole. The size of the hole is controlled by a piece of block connected to a motor. A timer is used to control the number of feeding time at an interval of time. Also, there is a feedback system that sense the level of feed left in storage. It will give warning to the user through SMS (Short Messaging Service) so the user will put new feed into the storage. With this, the user or the owner can be away from home with the device monitoring the aquarium condition.

Automatic Fish Feeder using Arm Microcontroller

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1.Introduction

Food and feeding are the important elements for growth and production, their management being one of the main challenges for aquaculture development, survivability and maintenance. The adjustment of food delivery to ensure the survival of the fish is important for fish owners, whether as pet or aquaculture. Related to economic aspect, especially for highly invested aquaculture project, the control of fish feeding will also determine the survivor of the company involved. However for this project, main focus is on the fish reared by home owners. In order to solve this problem, several direct and indirect techniques have been developed. Self-feeders may be used for direct adjustment, whereas indirect methods have also been used based on using automated device to deliver the feed to the fish. Therefore, the aim of the present study is the development of a automatic feeder that can handle good control of fish food feedings. Also, send the amount of food remained in the storage unit through WiFi module interfaced to ARM microcontroller.

2. Problem Statement

In these modern times, there are many aquarists or fish owners of the home based aquarium leads a busy life especially those who are away on business or vacation. They are often difficult to maintain a regular feeding schedule. However, for the fish survival, the fish require regular care in order to remain healthy. If fish are not constantly fed small amounts of food at regular intervals, there can be significant loss of fish due to starvation.

However, the problem with an automatic fish feeder is that there may be a time a user forgot to resupply the fish feed into the device . For this project we have designed an automatic fish feeder with a warning system so the amount of food in the aquarium can be replenished.

3. Objectives

The objectives of the Automatic Fish Feeder project are:

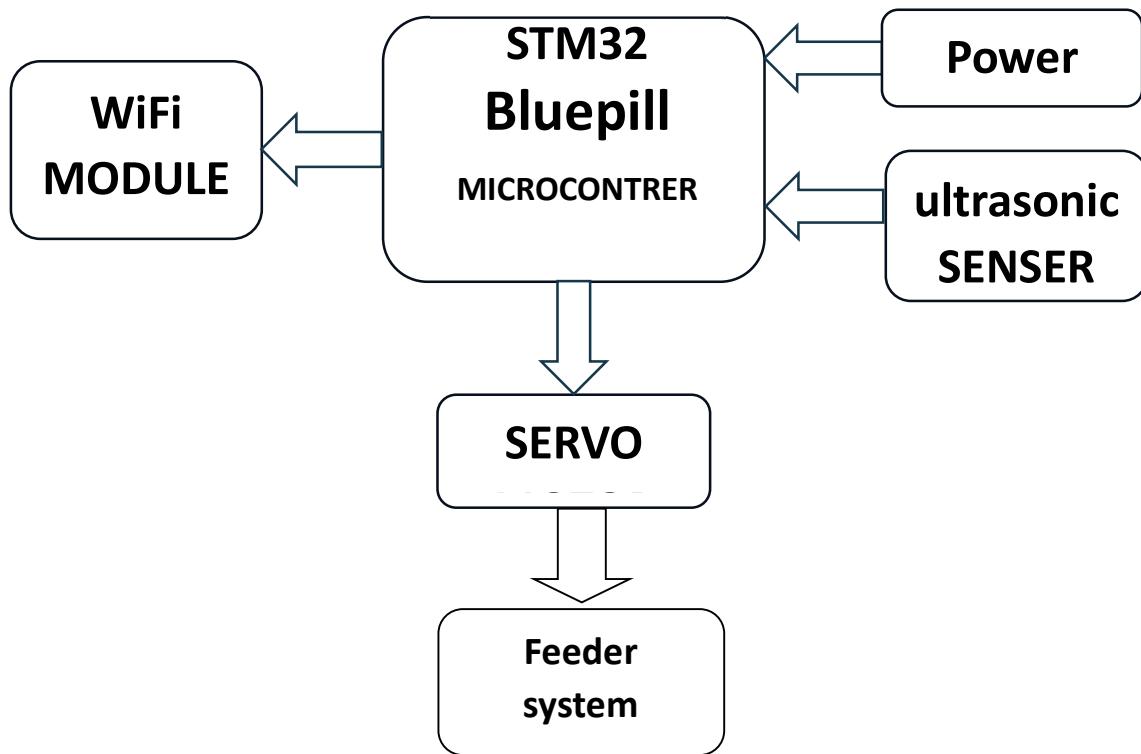
- Automation: To automate the feeding process of aquarium fish, ensuring they receive food at regular intervals without human intervention.
- Remote Monitoring: To enable users to monitor the feeding via a WiFi connection.
- Food Level Detection: To implement a system that can detect the food level in the container and notify users when it is running low.
- User-Friendly Interface: To provide a simple and intuitive interface for users to set feeding intervals and receive alerts.
- Reliability: To ensure the system operates reliably over extended periods, maintaining the health and well-being of the fish.

4. Literature Survey

1. Ahmed M.A., Haidar, Chellali B., M. Zahir (2013). Software Interfacing of Servo Motor with Microcontroller. J. Electrical Systems 9-1 (2013): 84 99 References Références Referencias
2. B.C Mohapatra, Bikash S., K.K. Sharma and D. Majhi. (2009). Development and Testing of Demand Feeder for Carp Feeding in Outdoor Culture System. Agricultural Engineering International : the CIGR Ejournal. Manuscript No 1352. Vol. XI
3. Chen S., Zhong K, Cai Y.L. (2011). The Design and Application of the Water Temperature Control System for Large Aquaculture Pond. Measuring Technology and Mechatronics Automation (ICMTMA), 2011 Third International Conference on Measuring Technology and Mechatronics Automation, Volume: 3 Publication Year: 2011, Page(s): 737-739
4. C.L. Ku, Y.K. Tan, S.K. Panda (2006). High Precision Position Control of Linear Permanent Magnet BLDG Servo Motor for Pick and Place Application. Pg2191-2924

By considering all above references we designed a automatic fish feeder using ARM microcontroller (STM bluepill) .This model can also used in various places like aquarium shops,ponds etc

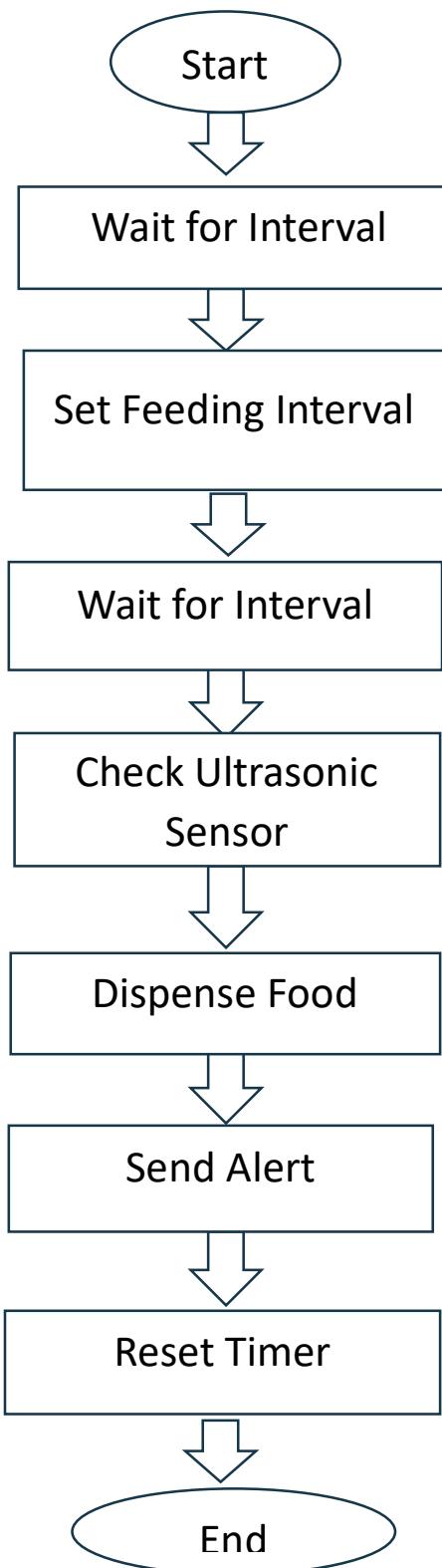
5. Block Diagram



6.Methodology

1. System Design: Design the hardware layout, including the microcontroller, servo motor, and sensors.
2. Circuit Implementation: Assemble the components and establish connections based on the design.
3. Programming: Develop the software to control the hardware, set feeding intervals, and communicate with the Wi-Fi module.
4. Testing: Test the system's functionality, accuracy, and reliability.
5. Deployment: Install the feeder in an aquarium and monitor its performance over time

7. FLOWCHAT



Automatic Fish Feeder using Arm Microcontroller

This flowchart describes how an automated feeding system works step by step.

1. **Start:** The system begins its operation.
2. **Initialize Components:** All the necessary parts (like a servo motor to dispense food, an ultrasonic sensor to measure food levels, an ESP8266 Wi-Fi module for alerts, and an STM32 microcontroller) are prepared and turned on.
3. **Check Time for Feeding:** The system checks whether it's time to feed.
 - **If Yes (Feeding Time):**
 - The ultrasonic sensor checks the food level in the container.
 - **If the food level is low:** The system sends an alert using the ESP8266 module (possibly via a service like Circuit Digest API) to notify that the container needs to be refilled.
 - **If the food level is adequate:** The servo motor rotates to dispense the food. Once food is dispensed, the system checks when the next feeding time will be.
 - **If No (Not Feeding Time):**
 - The system waits until the next feeding interval.
4. **End:** The system finishes its operation.

7. Outcome:

1. Automated Feeding Schedule:

The device should dispense fish food at user-defined intervals to ensure timely feeding without human intervention.

2. Feed Level Monitoring :

Sensor used to monitor the level of fish food in the container that it should be calibrated to trigger an alert when the feed reaches a predefined low threshold.

3. SMS Notification System:

The WiFi module should send an SMS to a predefined phone number, informing the user to refill the container. The message could read something like: "Alert: Feed level low. Please refill the container to ensure continuous feeding."

8.Conclusion

The Automatic Fish Feeder project demonstrates a practical application of IoT in enhancing aquarium management by automating the feeding process, the system offers a convenient solution for fish owners, ensuring the health and well-being of their aquatic fishes. Future improvements could include integrating additional sensors for water quality monitoring and expanding the system's connectivity features.

9. References

1. Ahmed M.A., Haidar, Chellali B., M. Zahir (2013). Software Interfacing of Servo Motor with Microcontroller. J. Electrical Systems 9-1 (2013): 84 99
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2. B.C Mohapatra, Bikash S., K.K. Sharma and D. Majhi. (2009). Development and Testing of Demand Feeder for Carp Feeding in Outdoor Culture System. Agricultural Engineering International : the CIGR Ejournal. Manuscript No 1352. Vol. XI
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