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SOLAR BASED AUTOMATIC FISH FEEDER USING IOT

Shwetha R[1], Anusha[2], Divya[3], Kirana[4], Tabassum[5]

[1]Assistant Professor, Department of Electrical & Electronics Engineering, Raja Rajeswari College of Engineering
[2345]UG Students Department of Electrical & Electronics Engineering, Raja Rajeswari College of Engineering

ABSTRACT :

Adequate and frequent feeding of fish is important, particularly in aquaculture hobbyists and farms. This project also includes a smart, solar-powered fish feeder the Internet of Things (IoT) technology for the automation of feeding. It employs water temperature, pH, and feeding level sensors, and can be remotely monitored and are operated remotely with a mobile app.

This automation delivers the maximum nutrition to fish, Reduces food loss, and improves the sustainability of aquaculture.

Introduction

Manual feeding of fish is time-consuming and typically intermittent, leading to fish health issues and additional food wastage. The provided IoT-based automatic fish feeder solves this issue, since feeding times and quantities are controlled automatically according to environmental sensor readings. It comes equipped with a smartphone application, through which one can monitor and control feeding remotely. It is specifically helpful to those who may not be in a position to feed their fish every day due to busy schedules.

Problem Statement

The main problem this system solves is inefficiency of manual feeding of fish. Problems such as irregular feeding timing, overfeeding, underfeeding, and remote monitoring incapability have a negative effect on fish health. This project offers the solution in the form of a reliable and remotely controllable automated feeder.

Literature Review

Studies show that the majority of fish farms still employ manual feeding, which may be misleading. Smart feeders were more efficient and produced healthier fish and less waste, studies show. Usability testing with the system Usability Scale (SUS) resulted in a score of 61.25, meaning that the users find automated feeders more efficient than traditional ways.

Existing System

Conventional IoT-based feeders use a microcontroller and a mobile app to feed fish automatically based on a predefined schedule. While helpful, they most often do not incorporate real-time environmental monitoring nor advanced customization of feeding schedules.

Proposed System

The proposed system enhances traditional models by incorporating water quality sensors and a camera. It utilizes:

- ✓ A Node MCU micro controller to regulate the entire system
- ✓ A temperature sensors to measure water temperature
- ✓ A pH sensor for water quality
- ✓ ESP 32 CAM for visually observing fish behavior
- ✓ Blynk user monitoring and operation mobile application

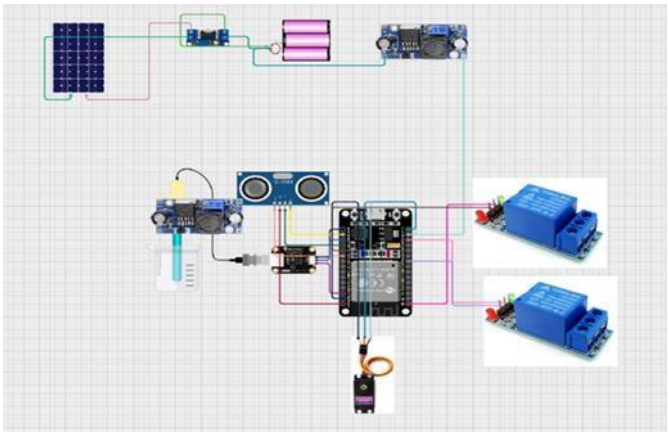
The data obtained by the sensors allows the system to control feeding amounts and timing in real-time.

Hardware and Software Implementation

Hardware and software implementation

**Hardware Components: **

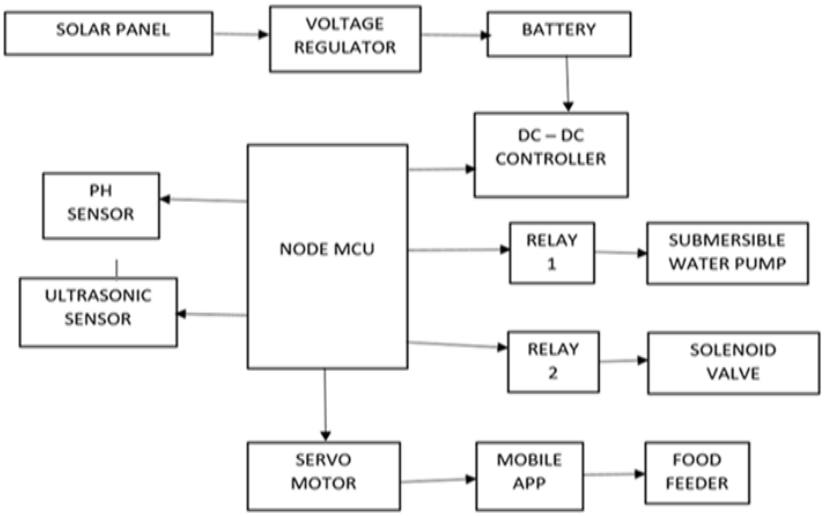
- ✓ Node MCU microcontroller
- ✓ Motorized fish feeder mechanism
- ✓ Temperature and pH sensors
- ✓ ESP 32 CAM module
- ✓ Wi-Fi module for communication



**Software Components: **

- ✓ Sensor data analysis and scheduling control algorithms
- ✓ Blynk smartphone app remote access
- ✓ Cloud-based monitoring and data storage system

7. System Block Diagram



- ✓ Node MCU
- ✓ Temperature Sensor
- ✓ pH Sensor
- ✓ ESP 32 CAM
- ✓ Fish Feeder Setup
- ✓ Blynk App

Each component serves a role of gathering environmental data and regulating the feeding process in an intelligent manner.

Result

The system demonstrated steady performance providing fish with feed in cyclic time intervals and feeding schedules modified according to sensor inputs. Real-time monitoring and remote operation were enabled by incorporating IoT technology, reducing the involvement of humans.

Conclusion

This smart fish feeder with IoT delivers a stable, efficient, and convenient aquaculture feeding system. It optimizes feeding, maintains water quality, and detects disease early. It combines advanced technology like IoT, machine learning, and computer vision to enhance fish care, reduce waste, and is ideal for small-scale and big-scale fish farms.

Future Enhancements

Future extensions can be:

- More environmental sensors to completely monitor
- AI-driven decision-making to optimize feeding schedules
- Improved system reliability and security

These improvements will further enhance fish welfare and enhance operational effectiveness.

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