E-Monitoring System for Biofloc Fish Farming

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Abstract: The aim of labor is an embedded system for automatic control of fish farming. In aquaculture, which is additionally mentioned as aquafarming which is that the farming of aquatic organisms. This work supports mainly remote monitoring of fish farming supported IoT. within the Fish farming process, we’ve also used sensors like PH sensors, Temperature sensors, TDS sensors, And Gas sensors.

IndexTerms - Temperature Sensor, TDS Sensor, Gas Sensor, PH Sensor, IoT

I. INTRODUCTION

The research in agriculture has an input to extend the assembly and therefore the decade of scientists has efforts which are resulted in modern technologies of varied aquaculture main aim of this project is to remote monitoring of fish farming by using various sensors. In this, we use sensors like PH value, Temperature and level sensors. By using these sensors, the work is going to be automated and straightforward to watch fish farming. In fish farming, when the water temp rises, the fish rate is going to be increased and also leads to less dissolved oxygen within the water. If the PH value is a smaller amount than 4.5, then the Fish will die.

II. LITERATURE SURVEY

In paper [1] “The design and development of Automatic Fish Feeder System using PIC Microcontroller”, by M.Z.H. Noor, A.K. Hussain, M.F. Saaid, M.S.A.M. Ali, M. Zolkapli that they had discussed the Research developed to scale back the labor cost also as dispense system. consistent with this device, it uses the PIC Microcontroller application and it's developed using the mechanical and electrical system in controlling fish feeding activity. This process consumes longer and energy as compared to an automatic fish feeding system and it's highly reliable at a really low rate.

In paper [2] “Automatic Arowana Raiser Controller Using Mobile Application supported Android”, by Nurliani Hidayah Ritonga, Rifki Wijaya, Agung Nugroho Jati had discussed this application requires Routine and patience maintenance techniques in terms of feeding and conditions. These devices were build using the smart home device and it's supported IoT for building IoT architectures. the entire part of these systems is often interconnected by the planet as an upscale fish. These systems contain three parts including device gateway and android application for the user.

In paper [3] “IOT based low-cost system for monitoring of water quality in Real-Time”, by Anuradha T, Bhakti, Chaitra R, pooja D focused on nowadays pollution has been one among the most important problems within the world. to stop this pollution we’ve to estimate the water parameter like PH, temperature, TDS. The pollution of water is increasing day by day. Many other factors might be found in water to work out the standard of sensors. In previous papers, we discussed the various systems using Biofloc Fish Farming. We are using Gas Sensor, PH Sensor, TDS sensor, Temperature Sensor using the IoT system.
III. SYSTEM DEVELOPMENT

Figure. Block Diagram of E-monitoring System for Biofloc Fish Farming Block Diagram Description:

In this, we present the idea of real-time monitoring of fish tank water quality within the IoT environment. The general diagram of the proposed method is as shown within the above figure. During this proposed diagram contains sensors like temperature, pH, TDS, gas is connected to the core controller. The core controller is accessing the sensor values and processing them to transfer the info through the web. Arduino is employed as a core controller. The sensor data are often viewed by the web Wi-Fi system.

The whole design of the system is predicated mainly on the IoT system which may be a newly introduced concept within the world of development. There are two parts included, the primary one may be hardware & the other is that the software. The hardware part has sensors that help to live the real-time values, another one is that the Arduino atmega328 converts the analog values to the digital one, & LCDs show the output from sensors. These sensor values are get uploaded into IoT through Wi-Fi ESP 8266 module. In software, we developed a program supported embedded C language.

The PCB designs at the primary level of construction and component and sensors mounted thereon. When the system gets started 5vdc current given to the Arduino board and WIFI gets connected to a respected available router. The parameters of water are tested and their result's displayed on to the LCD and obtain updated thereon too. Thus like this when the kit is found on any specific aquarium and WIFI is provided, we will observe its real-time value anywhere at any time.
ATmega328P:-
Arduino may be a microcontroller board that supported the ATmega328P. It's 14 digital input/output pins (of which 6 are often used as PWM outputs), 6 analog inputs, a 16 MHz quartz, a USB connection, an influence jack, an ICSP header, and a push-button. It contains everything needed to support the microcontroller. Arduino Software (IDE) were the reference versions of Arduino, now it developed to newer releases.

PH Sensor:-
PH stands for Potential of Hydrogen. A pH is a device that's used for measuring the pH level within the water. pH is described because of the “negative logarithm” of proton concentration in water.

$$pH=-\log[H^+]$$

A pH meter consists of special probes that are connected to an electronic meter that might display the reading to the LCD. If the pH level is bigger than 7 then it's alkaline, if the pH level is a smaller amount than 7 then it's acidic, and usually, the range of pH is 0-14pH. The project we are setting the extent between 6.46 to 7.78.

MQ135 AMMONIA (NH3) GAS SENSOR :

The MQ 135 may be a gas sensor. In our project, we use an ammonia sensor that senses gases like ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide, and smoke. We convert units ppm into a percentage. The operating voltage of this gas sensor is from 2.5V to 5.0V. The MQ-135 gas sensors are often implemented to detect the NH3, NOx, alcohol, benzene, steam, smoke, CO2 and other harmful gases.

TDS Sensor:-
TDS (Total Dissolved Solids) indicates what percentage milligrams of soluble solids dissolved in one liter of water. Generally, the upper the TDS value, the more soluble solids dissolved in water, and therefore the less clean the water and TDS measures within the ppm i.e. parts per million. In our project, we are using LDR to detect the impurities within the water.
LM35:-

LM 35 temperature sensor is an integrated-circuit, whose output voltage is proportional to Celsius temperature. LM35 has a plus over linear temperature sensors because the user can obtain convenient Centigrade scaling without subtracting an outsized constant voltage from its output. It detects the temperature within the water for fish.

Wi-Fi:-

We used the ESP8266 module. In this, we'd like to attach the mobile hotspot to the WiFi module. The transmission of the knowledge is completed by transmitter and receiver operation.

IoT:-

Here's the new technology we used that's IoT. within the IoT system, the readings of the water parameters like TDS Sensor, Temperature Sensor, PH Sensor, and Gas Sensor output is saved within the server. we'd like to make the id for our project for data uploading.

IV. RESULT AND DISCUSSION

![Project in run condition](image-url)
CONCLUSION:-

Commercial aquaculture development includes a considerable number of economic, biological, engineering, precision measurement, and calculation areas. Technological development can produce more accurate control and better economic efficiency. This text discussed physical measures like temperature, TDS, PH value, and ammonia using the A to D signal processing, via internet transfer on IoT. The data messages are analytically processed, sent to the server database, and displayed on IoT. The system also features a monitoring function. System control is installed in workplace terminal equipment to allow administrators to observe the workplace status about temperature, PH, and thus the gas. An issue history is supposed within the transmission section to greatly reduce the equipment, management, and labor cost.

REFERENCES


Figure. 2 while checking parameters

Figure. 2 Project showing the output readings