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SMART AQUARIUM SYSTEM USING IOT

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ABSTRACT

Fish is one of the pets that need intensive care compared to other pets like cat, rabbit, and hamster since they live in the water. Usually, fish had been abandoned with a lack of care such as in unclean water in the aquarium or fish breeding ponds. An IoT-based smart aquarium monitoring system is one of the solutions to cater to the problems. This project presents an IoT-based Smart Aquarium Monitoring System to keep fresh water in the aquarium for fish life habitats. The system functions to monitor the freshwater for healthier fish life habitat. This system operates as a fish feedings system and is controlled by a smartphone in its operation. Arduino and NodeMCU controllers are used in the designed system. Wi-Fi communication on the NodeMCU is used between the smartphone and the controller to control the operation. An Analog pH sensor is used to detect the pH value of water and display the value through the Liquid Crystal Display (LCD). The coding is created by using Arduino Software IDE. The system is designed to monitor the pH value that is suitable for the type of fish life and control the fish feeding using a smartphone and the android application.

Keywords: *NodeMCU, Arduino Software IDE, Liquid Crystal Display (LCD).*

INTRODUCTION

Aquaculture comprises the set of exercises, information, and techniques for the rearing of aquatic plants and a few animal groups. This activity has an awesome significance in the financial improvement and food production. Commercial aquaculture is confronting numerous issues because of sudden climatic vacillation leading to changes in water quality parameters. Aqua farmers are relying upon manual testing for knowing the condition of the various parameters of the water. But this manual testing is time-consuming and also gives inappropriate results as parameters for measuring PH quality changes continuously. It will be better if automatic monitoring can be done somehow. So modern technology should be brought to aquaculture to overcome this problem. For rural development, technologies have to support several key application areas, for example, living quality, wellbeing, environmental change, etc. So we have to be more selective in choosing the appropriate technologies for this kind of advancement. An integrated on-chip computer Arduino is used in our

system as a data processing and storing device. Using the Dataplicity service we can also access the NodeMCU through the internet. So, no additional Wi-Fi or Internet module is required.

LITERATURE REVIEW

S.NO	JOURNAL WITH YEAR	TITLE	AUTHOR	LEARNING OUTCOMES
1.	JANUARY 2017	IoT based Automation of Fish Farming	Kanaga Suba RAJA Subramanian •	The proposed work supports remote monitoring of the fish farming system based on the Internet of Things (IoT) for real-time monitoring and control of a fish farming system. The objective of this manuscript is to provide an automatic fish farming monitoring system thereby saving time, money & power for the farmer.
2.	OCTOBER 2018	IoT Based Automated Fish Farm Aquaculture Monitoring System	Sajal Saha	In this work, we have outlined and actualized monitoring of water quality of aquaculture utilizing Raspberry Pi, Arduino, various Sensors, Smartphone Cameras, and Android applications. Water quality parameters used in this work are Temperature, pH, Electrical Conductivity, and Color. Sensor acquisition is conducted

				by Arduino and Raspberry Pi is used as a data processing device as well as a server.

EXISTING METHOD

In traditional Aquarium monitoring, we are monitoring the water quality of fish tanks is done manually. Sometimes it may not be possible to monitor the water and to feed the fish for house people.

DRAWBACKS:

- Manual Interference
- Lots of time for cleaning
- Water quality cannot check accurately

PROPOSED METHOD

In the proposed, we are using a pH Sensor and Temperature Sensor for monitoring the fish tanks. If the value of the pH in water increases and is above 7 it is good for fish. If it is between 6 to 7 then it is in moderated condition or if it is less than 6 then the water is not good for the fish so an alert message will be given to the owner by GSM. By using a Temperature sensor, the surrounding temperature can be measured and will give an alert when the temperature is exceeded. An ultrasonic Sensor is to check the water level in the fish tank. The sensor data will be uploaded to the cloud server using NodeMCU. The fish food can be served by using Servo Motor. By using the Cloud Server we can open and close the servo motor.

METHODS OR TECHNIQUES USED

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RESULT

Different tests were conducted to investigate, troubleshoot and test different sensors and modules.

- The normal temperature of the water of the aquarium was set as 28 degrees Celsius.
- The normal Ph level was set at 7. If the pH increases or decreases the GSM mobile would send an SMS on the mobile and after 15 seconds it would again send a reminder SMS on the given number.
- The ultrasonic sensor would send an SMS if the water level decreases or increases after a certain level.
- If the water in the aquarium is below 27 degrees Celsius or greater than 29 degrees Celsius, the heater attached to the outside wall of the aquarium would turn on by sending an SMS to the mobile, and the fan attached on the top faces the aquarium would turn ON.
- The TDS sensor would sense the presence of dissolved solids and send an SMS to mobile if the water becomes too cloudy due to the presence of dissolved solids**.**

ADVANTAGES

1. More Reliable
2. Low Cost
3. More Compatible

APPLICATIONS

1. Used in the fish pond
2. Can be applied to aquaculture
3. Convenient use in homes

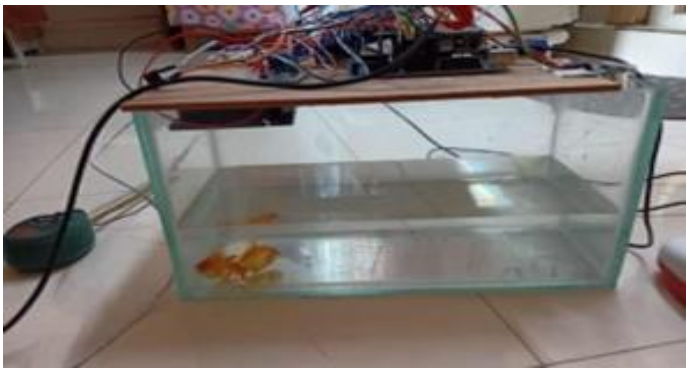

Fig.1: Indicates water level

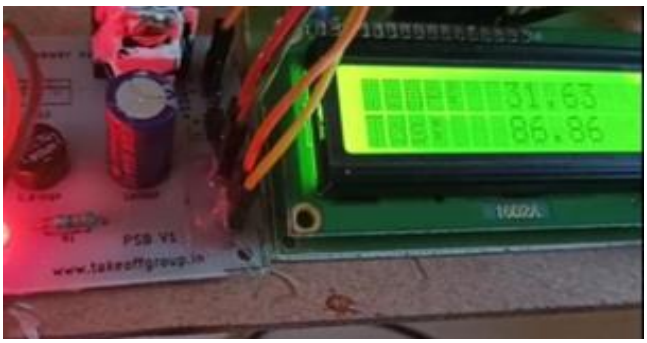

Fig.2: Displays value of TDS

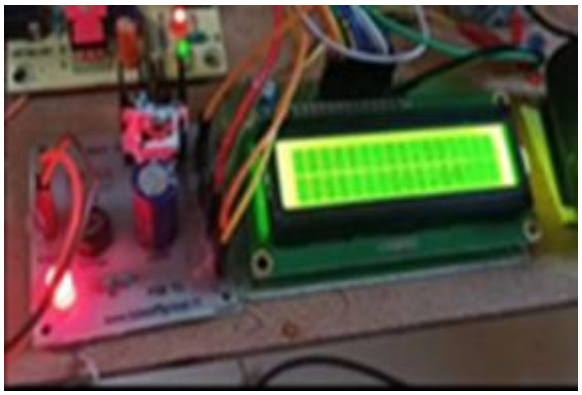

Fig 3. Displays water temparature

CONCLUSION

This work designs and implements a unique aquaculture monitoring system based on IoT. Both Wi-Fi and Internet are combined in this system for convenience. This work finds a way to give better results with low cost than other available systems. Aqua farmers can avoid time-consuming manual testing now. This will help the aqua farmers to produce more number of fishes which will help to fulfill the demand for fish.

FUTURE SCOPE

In the future, we are expecting to use upgraded sensors and the collection of more data that can be used for big data and analytics or to develop some AI algorithms for process optimization.

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