IoT Based Smart Monitoring System for Fish Pond

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Abstract. The Internet of Things (IoT) is a rapidly growing technology, and the subject of IoT is now spreading its wings into all areas. toughness Due to the fact that they live in water, fish require more attention than other pets such as cats, sunshine, and hamsters. Usually, fish have been abandoned along with a lack of regard to outweigh certain things, like profane lots within the aquarium or fish breeding ponds. Some of the options after catering to the problems include an IoT-based smart aquarium power rule. This lookup affords a raised prototype of an IoT-based Smart Aquarium Monitoring System in order to preserve a clean cloud between the aquarium and its fish habitats. The dictation features are revealed after the fresh lotos because of the healthier fish life habitat. This regulation operates so fish feeding dictation is yet managed with the aid of a clever telephone in its operation. The Arduino UNO and WiFi module have been reintroduced into the designed system. communication on the Wi-Fi module is ancient in the astronaut database, then the governor after powering the operation. The analogue pH sensor is ancient in accordance with observing the pH value over water, the temperature sensor is aged in conformity with locating the lotus temperature, and the IR sensor is chronic to depend on the fish, then display the price through the Liquid Crystal Display (LCD). The coding is constructed by way of the use of the Arduino Software IDE. The dictation is designed according to the screen, the pH charge is up to expectation, including the kind of fish life, then the fish feeding is ruledout using the wind database. This lookup is widespread closer to IR4.0 law development among helping fish pets and larger assignments because fish classes within the pond are able to stay sampled along their task, which contributes to the economic system's influences on the country.

Keywords: Arduino UNO, Wi-Fi module ESP8266

1. Introduction

Stability With the advancement of power and automation technology in recent years, research in aquaculture has evolved from improvement over manufacturing technologies to extend the characteristics of the fish farming ponds, resulting in conformity with enhancement and growth in fish production. To a large extent, we distinguish three typesof ponds: those that are born of tropical fish, those that are old fashioned, namely pets commonly known as aquariums, and ponds that are born of fish for food. Our focal point in that order are the ponds with tommy fish because food, generally constructed or maintained in faraway eco-clean areas, close to lotus springs, or some outdoor environmental emphasis, negatively affects the fish production. This is in accordance with reality, as fish are cold-blooded animals that modify

ITSPWC 2022, May 14-15, Karur, India

DOI 10.4108/eai.14-5-2022.2318887

their heat at once by using the surrounding environment. Consequently, on this, "temperature is certain on the many parameters up to expectation is wanted in conformity with stand monitored, including essential factors likemild intensity, water level of the tank, etc." As a result, the limit of its eco-system is a problem comprised of incomplete multiple sub-problems that are linked to one another and interact in a consistent manner. Their interaction is a complexmethod, so they desire a cluster regarding time, dedication, and expertise through humans in conformity to keep it managed and maintained.

2. Literature Review

A temperate paper between writing overview facilities around how the aquatic lifestyles which influence due to the fact over progress within lotos virtue parameters [2] then whether IoT is utilized in conformity with conquer the issue.IoT is attaining the ground level together with its application to agriculturists [3],[4]. A bunch of numbers focuses ofbit kind sensors as pH, DO, Turbidity [5], [6], [7] then and forth or a answer because these issues. pH, DO, conductivity, salinity etc are directly based regarding dead heat [8], [10], [11], [12].

3. Problem Statement

Aquaculture is certain concerning the increasing areas of dense countries in the world given that they make a bid for fish, yet the fish prepared meals are expanding period by day. According to the United Nations Food and Agriculture Organization (UNFAO) "2012 State concerning World Fisheries or Aquaculture", worldwide yearly production of fishery objects assimilates on average 128 bags per tone. The animal protein intake by a single person is about 15%, which increases the ethnical faith in fishery resources. The common wreck regarding fish merchandise is 19 to 20 kgper person per year lately, and the choice is to stay at 16.7 kg per person per year into 2030 in accordance with UNFAO. Fisheries production, development, and after-meal needs are all inextricably linked [1].Aquaculture entails the acceptance of exercises, statistics, and methods as a result of the compliance of aquatic plant life, followed by a small beast group. This pastime is extremely important in economic enchantment or food production. Commercial aquaculture is confronting numerous troubles due to unexpected climatic hesitations due to modifications of cloud attribute parameters. Aqua farmers are relying on upstairs guides to check out the circumstances of more than a few parameters of the water. But this manual check out is epoch ingesting and also consigns inconsistent consequences asparameters because of measured lotos characteristic adjustments continuously. It will require a higher postulate automatic rule to be followed in some way. So modern-day technological know-how is added in accordance with aquaculture after overmatching the problem.

4. Working Principle

The power supply is given to step down transformer where 230V is stepped down to 12V, the bridge rectifier in the power supply board will convert ac to dc. The dc power supply is again converted into 12V and 5V using the regulator, the 5V supply is given to the sensors, microcontroller, Arduino and the lcd display. All the output from the sensors are stored in the

cloud using the Wi-Fi module.

Components
Arduino UNO
pH sensor
Temperature sensor
Ultrasonic sensor
IR sensor
LCD display
Wi-Fi module
Cloud database
Buzzer
Arduino UNO
The Arduino UNO used in the project is a microcontroller board based on the ATmega328. It is a platform of open source electronics easy-to-use hardware and software. The Arduino can read the inputs such as light on a sensor and convert it as output such that publish the result in online for the user.
pH sensor

The pH sensor is typically used to detect the amount of alkalinity and acidity in water and in other solutions. In this project the pH sensor is used to detect those parameters so that the optimum level needed for the fish to survive can be maintained to increase the breeding of fish.

Temperature sensor

The temperature sensor is used to detect the temperature of surrounding. So here the temperature sensor is used to measure the temperature of the water in the pond. For the fish to survive and to increase the breeding of fish the optimum temperature has to be monitored and maintained.
Ultrasonic sensor

Ultrasonic sensor is basically used to measure the distance using the ultrasonic sound waves. So based on its working, in the pond it is used to measure the level of water since the water level has to be monitored carefully.
IR sensor

The IR sensor detect the infrared radiation around it. So, in the pond it could count the number of fishes in it. It can detect the fish only when the fishes are in motion.
LCD display

The LCD display use liquid crystals to produce the desired image. A power supply of 5V is given to the LCD display and it displays all the results simultaneously that is read from the sensors used to detect the parameters of the water.
Wi-Fi module

The Wi-Fi module used is ESP8266 Wi-Fi module , it is a self-contained SOC with integrated

TCP/IP which can givethe Arduino access to the Wi-Fi network.

Cloud database

The cloud database runs on a cloud computing platform and access to the database provided. In this set-up it is used to stimulate the output and it can be viewed using the website.

Buzzer

Buzzer is an audio signaling device. It is either mechanical or electrical. It alarms when the water level decreases.

5. Circuit Diagram

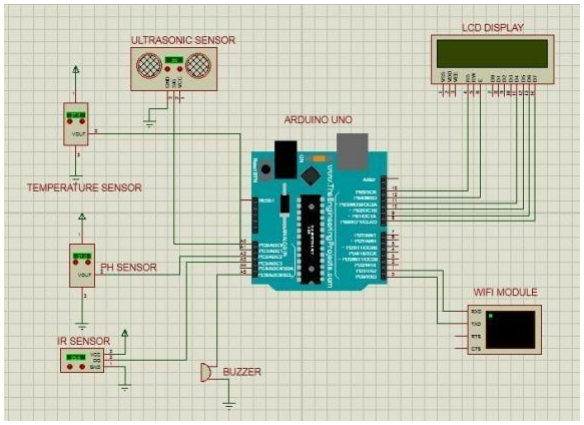

Figure 1: Circuit Diagram

Working

This project is designed to monitor the parameters of water in the pond so that it would be a suitable environment for the fish to survive and breed. Monitoring is the main and must procedure that has to be done to make the pond a suitable environment for the fish. So making the process of monitoring the fish pond in a easier way the concept ofIoT is used. So by implementing the concept of IoT it reduces the time and the efforts that has to be done manually. All the output form the sensors used is read by the Arduino and is stored in the cloud database using the Wi-Fi module.

6. Results and Conclusion

In conclusion, it does commend many advantages in conformity with the people, especially amongst the fish defendersnowadays. It is very beneficial in accordance with revealing the pH value regarding lots and easement, the clothing procedure of the fish. The development of the Internet of Things (IoT) is absolutely useful because of the smartphoneusers in this era. Its task is the use of pH virtue coding, namely the principal section of the project. The pH sensor is used to examine the pH cost, so it video displays the pH price to the user. As a result, consumers

do understand whetheror not the circumstances on lotos are comfortable, yet they need to keep it replaced in imitation of modern water. Thetrip to disclose the instant issue is very beneficial, specifically over building current matters among the system to redact them usefully. Finally, the Smart IoT Aquarium is one of the most recent ventures, but it is extremely useful to fish keepers all over the world.

Simulation Results

Figure 2: Fish count graph

Future Enhancement

In the near future, we are awaiting the use of upgraded sensors yet series of more records, so we can keep back because of vast statistics and analytics or in imitation of enhancing incomplete AI algorithms for system optimization.

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Acknowledgement

Our gratitude passes on to Dr. V. Kumar Chinnaiyan,M.E..,Ph.D.,Professor, Head of the Department of Electrical and Electronics Engineering ,for his valuable support and encouragement during this project.We are grateful to Mr.P.Ravikumar Assistant Professor(Sr.G), Department of Electrical and Electronics Engineering, the project supervisor, for his timely suggestions and constant encouragement and support that led to the accomplishment of theProject.