

An Iot Based Fish Health Monitoring System In Aquaculture Farming

P. Chinni Krishna, M. Venkateswara Rao, V. Ramesh Reddy

Abstract: *The proposed work is an implanted framework for Programmed Wellbeing observing of fish cultivating. And also animals like shellfish and crabs by utilizing the different sensors to decrease the dangers. In existing works a message is send to farmer saying that requirement of water and other parameter violations and he/she used to check motor and on (or) off the motor and other parameters but now we proposed work bolsters remote observing of the fish cultivating framework dependent on Internet of Things (IOT) having Arduino Uno board and Wireless sensor network (WSN) for continuous monitoring of a fish cultivation and analysing in "Think speak" an IOT based platform and alternate sources like E-mail messages, Notifications on smart phone through applications are programmed with Arduino IDE. Goal of this original copy is to give a programmed fish cultivating observing framework accordingly sparing time, cash and intensity of the rancher and it provides alerts messages when it needed a user intervention. IOT innovations have altered ranch generation in the nation. In the fish cultivating process we utilize different sensors like pH esteem, temperature and level sensors. By utilizing these sensors all the work is mechanized and it will likewise be anything but difficult to screen the fish cultivating remotely from other area.*

Index Terms: *Aquaculture, Arduino Uno, Wireless sensor network (WSN), Think speak.*

I. INTRODUCTION

Research in aquaculture is a contribution to increment balanced out generation. In a decade ago different researchers have tried continued endeavours that brought about advancement of present-day generation advances that have reformed homestead creation. The primary point of the venture is to remote checking of the fish cultivating framework by utilizing the different sensors to lessen the dangers. In these procedures we utilize sensors like pH esteem, temperature and level sensors. By utilizing these sensors all the work is mechanized and it will likewise be anything but difficult to screen the fish cultivating remotely from other area. Fish cultivating have been utilized for over three decades. Research in aquaculture is a contribution to increment and settle creation. Fish cultivating alludes to cultivating assortment of marine species, for example, shellfish, sport angle, snare angle, elaborate fish, scavengers, molluscs, green growth, ocean vegetables, and fish eggs to breed, back and reap in various water situations, for example,

Revised Manuscript Received on May 06, 2019

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lakes, streams, lakes, and sea. Fish are wanton creatures, managing their body temperature straightforwardly by the water condition. Changes in water temperature influence the measure of broken up oxygen in the water and fish oxygen utilization. Although the fish can withstand a wide water temperature go, any sudden, extraordinary changes in water temperature will considerably affect angle physiology. Chilling damage will make the fish hurry into, loss of motion with lost parity, prompting passing. The reason might be the respiratory focus, or osmotic direction is influenced at high temperatures. As the water temperature builds the fish endure respiratory capture.

Fish World magazine discovered that the measure of broken-down oxygen in water increments or reductions with the seasons. At the point when the water temperature rises, angle metabolic rate will be expanded and results in less broken-down oxygen in the water. Low water temperature diminishes angle metabolic rate and expands measure of broken-down oxygen in the water. On the off chance that the measure of disintegrated oxygen in water is lessened to underneath a specific farthest point angle development will be ruined. At the point when the measure of broken up oxygen moves toward becoming lower than the fish survival conditions the fish will kick the bucket. By and large fish cultivating the causticity and soluble of the water ought to be kept between 6 to 8. Excessively acidic or antacid will cause unfavourable impacts, corrosive disintegration of the gill tissue, tissue coagulation rot, expanded bodily fluid discharge, stomach clog and irritation. On the off chance that the PH esteem is under 4.5, the fish will pass on.

II. LITERATURE SURVEY

[1] This paper consists of prediction of water quality containing regression analysis and accuracy. This model is based on support vector regression (SVR) is used to solve the quality of water prediction problem. The investigations give half and half methodology known as genuine esteem nonexclusive help vector relapse (RGA-SVR) it quantifies SVR parameters and used to anticipate the water quality and information gathered from the amphibian industrial facilities of YiXing in china. The RGA-SVR out performs support vector regression and back propagation (BP), neural networks models using the root mean square [2] This paper includes reduction of energy resources for aqua farming. Here a device is used for controlling different environmental conditions using micro controllers from Texas instruments.



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It can gather information, examine and displaying it using LabVIEW software. Information can be obtained in terms of google spread sheets using updated sensor information in online or SMS gate service and sends alert messages when changes needed.

[3] This paper is using “Internet of Things” (IOT) for monitoring aquaculture environment and it measure general problems related to water and these methods such as a Realtime restriction, diverseness issue solving above problems by using Sampling Strategy (SDSS). It is used for reducing the Sampling rate to save energy. These are solved using IOT.

[4] This paper is recognition of live fishes in the open sea. A method is proposed for detecting the postures of aqua animals capturing using smart devices. By this strategy we can know the difference between same species as detecting cold, surface, size, structure etc. By this type of strategies, we can prevent the loss of food content. There are several percentages of evolutions in the way of finding different species with different sizes and structures.

[5] It involves different types of parameters and theoretical methods related to aquafarming. It consists of finding different structures and sizes and the amounts of quantities and their values. Here we can know types of water quality related methods for finding the availability of food such that aquaculture facility to raise lobsters. Some limits are established by using the information from control variables of a commercial aquaculture to the limits are finalized.

[6] This paper is watching the advancement affectability modest device for finding chlorophyll straightforwardness dependent on CF the amount of moisture because of dispersing observing the point at ocean water. Device is structured for identifying exceptionally lower amounts of moisture and CF’s methods for a numeric lock-in intensifier procedure, typical resounding info organize. The sensor is thinking about an appropriate format reasonable for light coupling. It is alluring as for business frameworks since it ensures impressive unwavering quality with low assembling expenses.

[7] This paper states aqua wealth displayable examination a way for expanding consideration insecure light, pervasive commotion, and low casing rate (LFR) video catching in the submerged condition by utilizing regular following techniques inconsistent. Here we are using aqua animal tracking system. It gives solid component-based article coordinating strategy, a numerous objective following calculation by means of altered Viterbi information affiliation is proposed to conquer poor movement and fish body tail remuneration is to discover precise fish length estimation.

[8] It is the study of monitoring salinity of water and different conditions and fish culture. Yield flag defined as heartbeat flow which is effectively for a large scope of transferring medium, for example, bundle point to point organizes and transfer a distance using a device. Advancement declares alignment technique which diminish the unique mistake emerging from devices. Adjustment estimated greatest recurrence blunder is 25.7%. Subsequently the outcomes have effectively checked all capacities and execution and affirmed connected with shrimp farming.

[9] This paper expresses a proficient visual flag handling framework to persistently control the sustaining procedure tanks containing aquatic animals. Goal is improving of shares and manage the food given to aqua animals. There is a system which is computerized for providing the amount of food to aqua animals. It includes two types 1. It is detection of food by the aqua animal is sequential and energetic or not. 2. Detection of amount of food waste occurred in the pond surface. Amount of giving food to aquatic animals is continuously monitored by using different devices.

[10] This paper suggests computerized monitoring system which involves a series of different smart devices for detection of different conditional values which involves transformation of information and managing of these conditions. Stable amount of water or not fused during observing framework. Wi-Fi interfaces the transfer of data between the user and the devices. From different software’s here we are using one of the available one for reducing of energy usage.

III. PROJECT DESCRIPTION

An IoT based Fish health monitoring system is which continuously checks the parameters for protecting health of fishes in pond. Parameters includes sensor data from sensors like pH sensor, Ultrasonic sensor, DHT11 sensor, Air quality sensor, water pumping motor, violation of any of these results an indication to farmer near pond by a buzzer.

Here for the fish health monitoring system we use the main board as Arduino Uno board and in that the C.P.U is Atmega328 micro controller. The sensors which we use are ultrasonic sensor, DHT11 sensor, Air quality sensors and we use LCD to display and here we use buzzer to give indication that something wrong thing is happen. In this Ultra sonic sensor will be used for the measuring the distance. By this we can get the water level of the fish pond.so that by using the level of water can be maintained properly for the survival of the fish.

DHT11 sensor it will measure the parameters i.e., Temperature and Humidity. By this we can know the temperature and humidity of the pond by that we will know the Temperature and humidity of the fish pond.

Air quality sensor it will measures the quality of the air. By this we can know the quality of the air surrounded by the pond by that we will know the quality of the air surrounded by the fish pond. Here L.C.D is used to display the result and Buzzer is used for giving indications. We are creating an MIT application for user interaction and control, monitoring purpose.

MIT Application

In this paper we use MIT to create application which is provided to the farmer which displays the moisture content that is retrieved from the cloud along with the environment parameters like Temperature, Humidity. Application creation in MIT is user friendly because it gives us drag and drop where we need to provide the correct logic and need not to do coding as in android studio. It does not need any installations and it is completely cloud based.





Fig: MIT Application

MIT APP Inventor Overview

Go to <http://appinventor.mit.edu/ecplere/> and click on create apps button.

Next, click on start new project as shown in the above figure.



Fig:

MIT APP Inventor_1

Then a window will be popped up, enter your project name in that window and click on OK.



Fig: MIT APP Inventor_2

Then it will be automatically saved, go to my projects there you can see your project.



Fig: MIT APP Inventor_3

- There you can see an empty Designer where you can get the user interface. If you go to the Blocks tab, then you can provide logic over there. By using the options in the palette, you design interface of your application.
- You can design Buttons, Images, Sliders, Labels from the palette window.
- Properties like colour, size, Orientation and alignment can also be adjusted in the Designer window.
- This Block allows you to create visual functionality of the application including number of screens should the application contain.

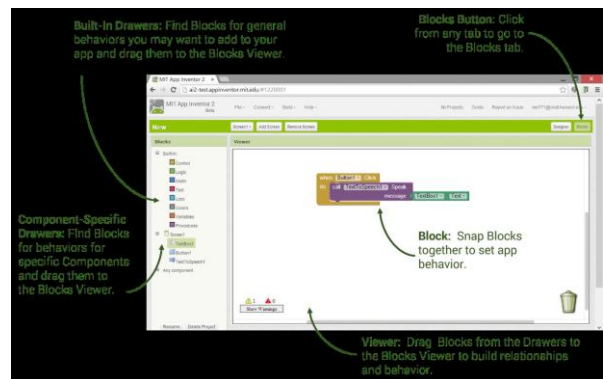


Fig: MIT APP Inventor_4

- Here you can see the blocks where you need to drag the blocks available on the left side and drop them on the right-side window. Here, you need to provide the logic.

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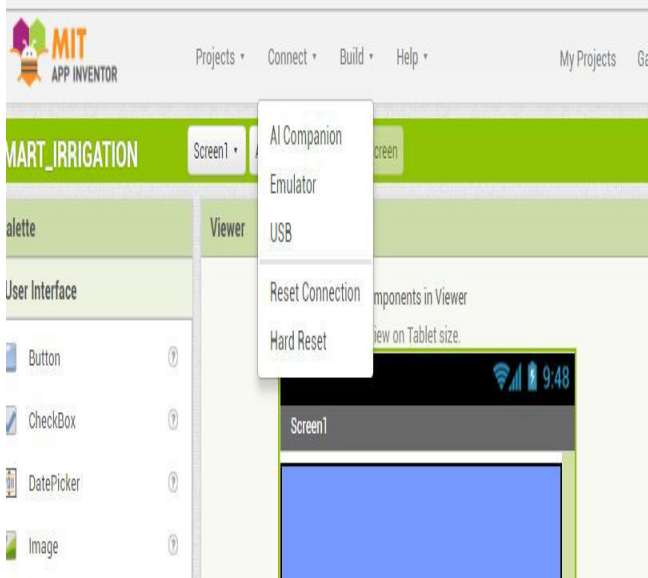


Fig: MIT APP Inventor_5

- There are three ways to connect this interface to the mobile phone. By clicking on AI Companion, you will get bar code which helps you to get the mobile application on to the Mobile.
- MIT app need to be installed on mobile phone from the play store in android. Where you can get scanner to scan the code provided in website.
- Through Emulator you can have application directly into your pc which is better than the first option because, you need not scan every time the code.
- Through USB connected to you Mobile you can run the application.

IV. SYSTEM REQUIREMENTS

For development of effective production of sea food like fishes, shrimps, crabs etc, we need to detect diseases affecting them and for this we should implement approaches to stop the destruction. In most ponds, the health of aqua animals should be taken into consideration to generate good quality food production and food quality, water quality plays major role in getting significant amount. But changes in region, weather, growing conditions etc decides the production. Hence, it is important to monitor continuously to get enough quality at accurate time. A Wireless Sensor network is one of the best solutions in this generation. Different sensors are placed inside pond for monitoring and collecting data continuously.

Following requirements for monitoring continuously:

1) Methodical:

- The work is continuously done at same place and analysis process is accurate.
- Work is performed perfectly by following each methodical approach.

2) Reactive:

- The information is easily accessible by the user any time.
- Information is to be logical and understandable.

3) Collective:

- Allows client reaction dependent on the information gathered to dissect imminent issues.
- Provides the capacity to respond expeditiously to the issues experienced.

4) Anticipating:

- Data can be utilized for arranging and basic leadership in what's to come

V. HARDWARE REQUIREMENTS

Ultrasonic sensor:

It is a device which generates sounds which reflects if an hurdle and the amount of time taken and the speed are the factors for finding the output. It has 4-pins, ground, vcc, Trig and Echo.



Air pollution sensors:

It is a device which used for showing the amount of dangerous gases present in atmosphere. Atmosphere is the place where different types of gases mixed together so that this device used for collecting information related to dangerous gages percentage. It is very important for not only for household but also for industrial and many fields where gases can make the difference.



LCD (Liquid Crystal Display):

LCD is basically a device which shows output on screen. LCD by default is configured with 4-bit data interface. The library Liquid Crystal. It contains functions associated with LCD. The HD44780 contains 2x8 bits registers. There are registers for transferring of instructions and also for displaying data.



Buzzer:

It is a device which gives an indication to the farmer near pond by producing a sound. So that we can conform that there is a violation of parameter occurred and necessary measures must be implemented. Sound is produced in the range of 2 to 4KHZ Arduino has functions associated with buzzer to work with tone () and no Tone (). These have parameters as pin no, frequency, time to which it should sound.



Wi-Fi module:

It is wireless sensor network related device used for transferring of information from device to device with speed and we can operate some of the smart devices with the help of wi-fi module. It is medium where the bridge is formed for the exchange of information using computer network concepts like sender and receiver response time plays a crucial role in this process.

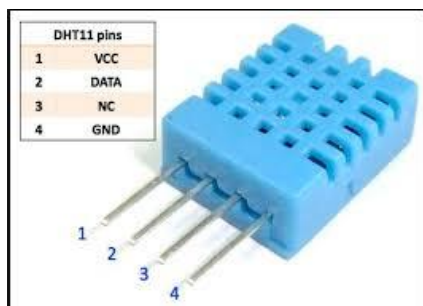


DHT 11 Sensor:

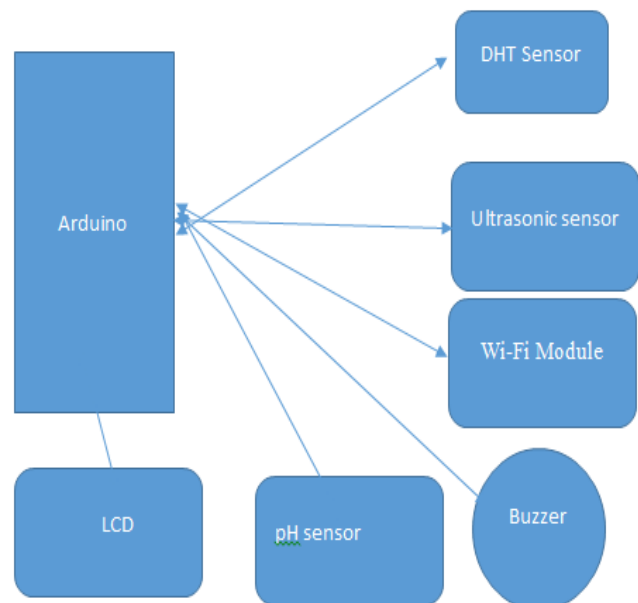
It is a device used for measuring temperature and humidity levels. It consists three terminals such as VCC, input signal, ground.

The functioning is mostly depending on measuring air and changes it into a digital information to data pin.

We can measure the values for every 2secs only if the readings of sensors are 2 secs old.



VI. SYSTEM HARDWARE DESIGN



pH sensor:

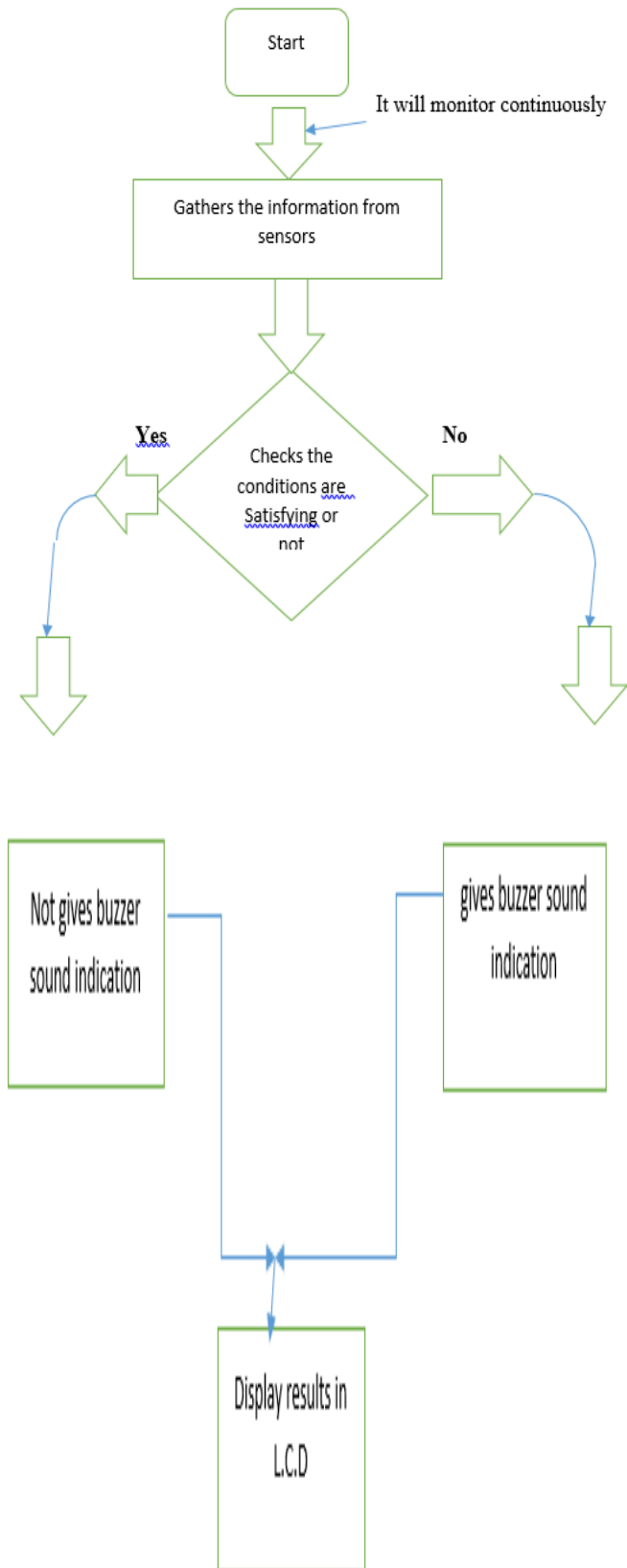
It is a device used for finding the available water is pure water or not by comparing the hydrogen quantity and deciding the water is pure or waste water which involves acidic or basic with the values like pH value is 7 then it is neutral, if pH value is lower than 7 then it is acidic and if pH value greater than 7 it is basic.

User Interfaces or Different Software Packages:

1. SYSTEM SOFTWARE DESIGN



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2.WORKING PROCESS

Step 1:

→ Arduino gathers the Data from all sensors like Temperature, Humidity, quality of air etc.

Step2:

→ It checks weather the required conditions are satisfied or not.

Step3:

→ If required conditions are satisfied, then just it displays the information not giving any buzzer sound.

→ If required conditions are not satisfied, then it displays the information and gives a buzzer sound.

Step4:

→ After that it continuously check and repeat the process.

VII. OUTPUT IMAGES

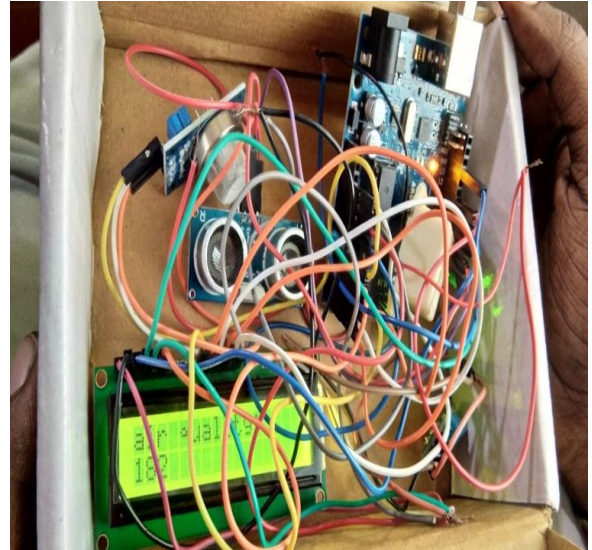


Fig: Output picture_1

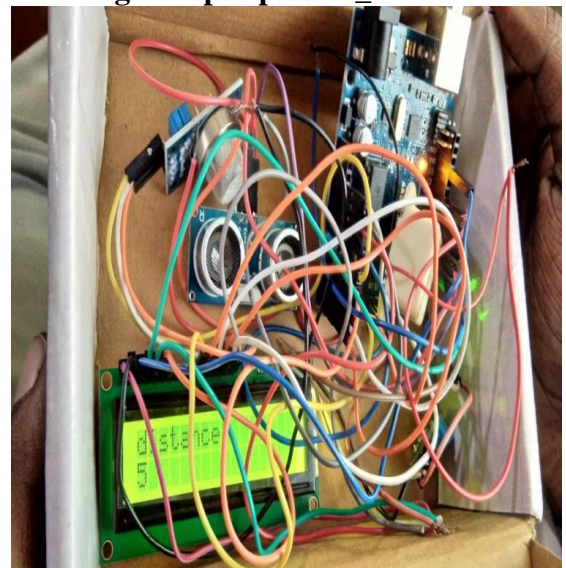


Fig: Output picture_2

VIII. FUTURE SCOPE

This project can further be extended using IoT and make it as Smart Fish Health monitoring system. Whenever a user the data regarding fish pond then we can send SMS alert or an email to the admin of the Fish pond. Here the information collected in the form of SMS is forwarded to the online platform using Wireless sensor networks.



The information collected above will be saved in the cloud if it is not having necessary conditions for health of fish.

IX. CONCLUSION

Fish Health Monitoring System based on IoT will setup near the pond then it will continuously take the parameters readings in the water and if any of the parameter is less based on the given conditions it will give the intimation to the farmers and I will indicate near the pond by giving buzzer sound and displaying the parameters in the LCD near the pond so farmer can easily identify the parameters which are less by giving intimation then farmer will take necessary precautions to save the health of the fishes.

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