

# IOT Based Fish Farming and its Applications

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**Abstract —** Fish are the most important species, which has a variety of biodiversity. Fish farming is the main occupation carried on fishes. To maintain the proper working of the occupation there are processes such as monitoring and taking measures to maintain the species of the fish. Our paper defines the connection between the IOT Internet of things and the real time world. The IOT system comprises different sensors, also the water characteristics such as temperature, water level, pH which is all displayed all on a web page. Wivivity modem allows the us to connect the IOT system via WIFI, web page LoraWan in all the process. For ahead work, we have plan to expand not only active services to various platforms, but also and other control and sensor modules to existing IOT system for certain types of fish.

**Keywords :** Fish Farming, Ponds, Monitoring, Temperature, pH

## Introduction

Now a day's lot of development occurs in fish farming, aquaculture. Because of automated technology there is improvement in the environment of fish ponds. Fish farming is one of the main occupations in rural area of India.

The objective of our paper is to implement automated fish farming using IOT technology, Second objective is

maintain and monitor all parameters of fish production.

The concept of our system is totally automated fish farming plant.

Existing systems has many drawbacks mentioned below, we are trying to overcome that.

1. Overall time consuming process.
2. Manually tracking required.
3. Monitoring by expert person.

The paper aims to bring an advanced IOT System used to monitor and maintain fish culture. The aim of bringing them closer to their natural form is more efficient ways using monitoring via connections and LoraWans

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## Analysis and Design

Our system comprises the Arudino Mega 2560 (6) board. It is the small board computers which consume a very low power and it is available easily in the market. The system is divided as an input unit , output unit and executive unit. The input unit comprises the input devices and the power supply. The output unit comprises the output devices that displays all the readings. The executive unit has the parameters such as temperature, pH turbidity and water level and also the elements such as LCD display and buzzer respectively represented. Sensors are always used to track the parameter of the environment. One can increase the quality of the fish production by adapting this system.

We have introduced the detail sensors and actuators of IOT system. Temperature is the parameter for the process and changes in the fish culture. It is the reason of the growth and the development of the water living bodies and species.

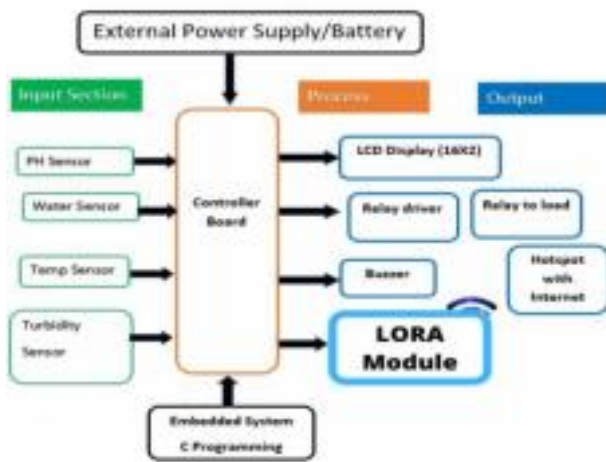


Fig1:

#### Block dia. of IOT based fish farming

It also controls the oxygen levels in the water. The default temperature of the fish is 25 degree C which can be varied by 2 degree C for river fishes. Therefore we monitored the temperature parameter and controlled it by all devices. The sensors used in here are all waterproof. For eg the temperature sensor used here is a DS18B20 digital sensor with an accuracy of 0.5 C data.

Replays are used because they have faster response time and are more durable to harassment by PID heating algorithms. The heater elements used in fish ponds has in built thermostat heaters, and this elements control the heater of system therefore risk of this elements increase, many time they are not working.

**1) Arduino UNO:** It is a microcontroller board, developed by Arduino.cc and based on Atmega328. Electronic devices are becoming more compact, convenient and cheaper to perform more functions than their predecessors, they have become more expensive with more space to cover. Do less work. Experiences always strive for innovation in automation, which requires minimal effort and maximum production.



Fig2:

#### Arduino uno

**2) Ph sensor:** PH sensors is used to measure acidity and alkalinity or caustic of water. PH sensors numerically expressed in value from 0 to 14. As alkalinity increases scale increases and scale is decreases as acidity increases. The pH value is equal to the hydrogen-ion

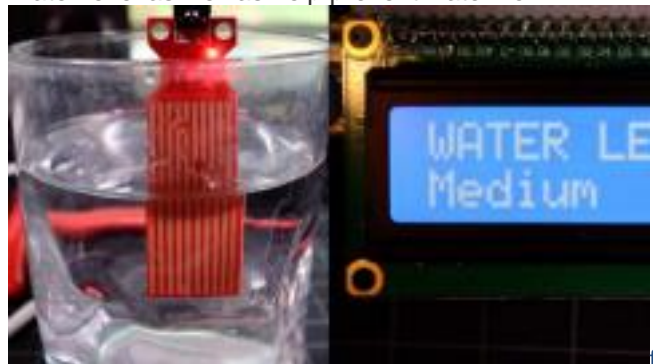
concentrations or the negative logarithm of the hydrogen-ion reaction.



Fig3: Ph sensor

**3) Water sensor:** Level sensors are used to identify level of flowing resources. Such materials include liquid, paste, graduals and powder form. This level measurement is carried out in the container or ponds or lake. Which is useful for determine the amount of material contain in the water.

The water level sensor in this project will indicate the water level as well as help prevent water flow.



4: Water level sensor

**4) Turbidity sensor:** The turbidity sensor will helps to determine how much waste is present in the water, because increasing in waste or dust will affects the fish life.



Fig 5:

#### Turbidity sensor 1

**5) Temperature sensor:** A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes. The dead rate of fishes increases in winter because of cold water. So to prevent this we used temp. sensor which will senses the temp. and as per the temperature reading heater will turn on or off.



Fig 7: Lora Module

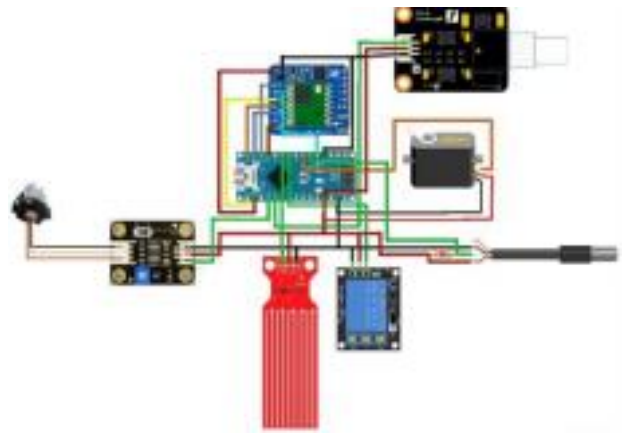


Fig 8: Whole circuit **Output 1:**

**Result:** We have developed the fish farming applications as considering it on a large scale. We have known and tracked the parameters like temperature , ph , turbidity and water level sensors. We have also added the feeding system for fishes. An web page is created which hold on the output and real time reading

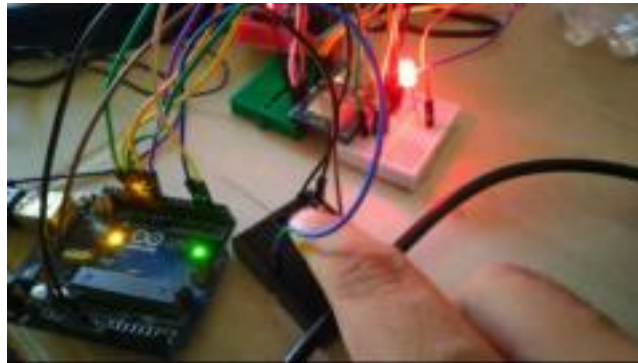


Fig 6: Temperature sensor



**6) LORA module:** Lora means long distance communication, easy to use with RFM9x Lora Radio Circuit Python and AdaFruit Circuit Python RFM9x Module. This module allows you to easily write Python code that sends and receives data packets along with the radio.

#### **Output 2:**

farming and we have worked with a solution prioritizing it. The original idea proposed in this project works well and can be implemented on a large scale as well. Following this system saves time and we do not have to worry about fish and their habitats.

#### **Acknowledgement:**

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#### **Conclusion:**

The main objective of our project is to facilitate fish

Control of Aquarium Water Management System  
using Programmable Logic Controller (PLC).

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