VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangama, Belagavi90018

A PROJECT REPORT

ON

"IoT Based Smart Pisciculture Monitoring System"

Submitted in partial fulfillment of
the requirements for the award of the degree of

Bachelor of Engineering
in
Computer Science and Engineering

Submitted by

Punith B S 4MC18CS101
Rohan B S 4MC18CS107
Rohan D 4MC18CS108

Under the guidance of
Mrs. Shruthi T R
Assistant Professor

Department of Computer Science and Engineering
Malnad College of Engineering
Hassan - 573201, Karnataka, India

2021-2022

Malnad College of Engineering

Department of Information Science and Engineering

Hassan - 573201, Karnataka, India

Certificate

This is to certify that project work entitled ""IoT Based Smart Pisciculture Monitoring System" is a bonafide work carried out by in partial fulfillment for the award

Punith B S	4MC18CS101
Rohan B S	4MC18CS107
Rohan D	4MC18CS108

of Bachelor of Engineering in Computer Science and Engineering of the Visvesvaraya Technological University, Belgavi during the year 2021-2022. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the Bachelor of Engineering Degree.

Signature of the Guide	Signature of the HOD	Signature of the Principal
Mrs. Shruthi T R	Dr. Geetha Kiran A	Dr. C V Venkatesh
Associate Professor	Prof. & HOD	Principal
Dept. of CSE, MCE	Dept. of CSE, MCE	MCE

Examiners

Name of the Examiner	Signature of the Examiner
1.	
2.	

ABSTRACT

Nowadays IoT is a breakthrough innovation where the object is able to present itself digitally. It is constantly bringing a new dimension of automation to various field which is modernized every things. IoT is also making an outstanding contribution to agriculture such as crop monitoring, soil management etc. Consequently, we have proposed a smart pisciculture monitoring system based on IoT. The project has specially focused on determining the quality of the water. In the system, we have used two sensors where pH and temperature sensor to determine pH and temperature value of water respectively. The proposed system display all information through mobile application.

ACKNOWLEDGEMENTS

Salutations to our beloved and highly esteemed institute “Malnad College Of Engineering” for having well qualified staff and labs furnished with necessary equipment.

The successful completion of any task would be incomplete without mentioning the people who have constantly guided and inspired for the project and the report generation.

We avail this opportunity to thank all those people who have helped us in the whole process of completion of this project and the report.

We would like to express our deepest gratitude to our mentor Mrs. Shruthi T R , Department of Computer Science & Engineering for her daily evaluation of the work and for providing us constant encouragement with her unflinching support and valuable guidance throughout this project. We are indebted to his as he has considered us worthy of this project and invested his faith in us. It was a great privilege to work under him. We will take away a lot more than just the technical knowledge from him.

We would also like to place our special thanks to Dr. C V Venkatesh, Principal, Malnad College Of Engineering for providing the opportunity and the facilities for the completion of our project.

TABLE OF CONTENTS

LIST OF FIGURES

Chapter 1

Introduction

Internet of Things is a system that connects objects to the Internet and can either be automated or people can control it without wire connection. The objects collect data from the surroundings through some sensors and send it to the cloud database and solve the problem. It becomes very important at present because the object present itself digitally, so everything is being modernized. India depends largely on fish food ,india also produces larg amout of fish food But, due to the lack of proper service, more fish die during the cultivation in every year. Many farmers cannot prepare ponds in the proper way for good fisheries in the absence of essential knowledge. In order to overcome the above mentioned problem, we have made a smart system which can detect Water Temperature and Water PH at every moment. We proposed system is an Arduino based automatic pond condition monitoring and controlling system. The device can determine the condition of the pond for the specific fish which is needed. It can also monitor via mobile application using cloud database. It help fishermen with some useful information which support them produce more fish. Such as the Temperature and pH for fish farming are the most important things. Farmers will know the about of PH level in water and pH from the device and can take necessary steps. Besides Fish farmers will also be able to know about temperature in the water through this device and protect their fish from harmful substances.

Chapter 2

Literature Survey

2.1 Background Study

The work is consistent with some of the earlier work. Fishermen in our country are not able to properly apply the increase in fish production, because the quality of water is not properly determined to increase fish production. As a result of the sudden death of fish in the pond, farmers face many losses such as raising or lowering the temperature of the water and lowering the pH value and the water level is not right. This kind of change is not suddenly realized by the farmers. Several suggestions have been made regarding thisissue. These accidents are unnecessary, lack of guidance for the fisheries, and not understanding the various problems of water, the accident increases the risk. No device was created to reduce the mortality rate of fish. To maintain the quality of the fish and to maintain the quality of the fish, in the fisheries farms, some liquid is tested. The problem is that the small fish farmers do not have this required laboratory. To reduce the death rate of fish, some analog devices have been created, which we get from some information. Under which the fish mortality will decrease and fish production can be increased.

2.2 Literature review

We studied the quality of water with fish in pond, studied various websites, projects, videos about the device. In our best knowledge, the device to monitor fish deaths has not yet been made in Bangladesh. However, this device has been made in some countries around us. Many of the sensors and techniques used are essentially made of contemporary water quality for illiteracy. In 2012 [1] IEEE 8th international conference was held from 8 to 10 October in Barcelona, Spain. It was about mobile computer rings, wireless, networking and communication. Nidal Nasser et al there are a simple wireless sensor network based water level and water quality monitoring system has been created for fish ponds. It is supplied with real time monitoring system fish death or disease for low level and unhealthy water. This device is mainly

used with RGB sensor. The Proposed system uses mobile applications and sensors to determine the Temperature, pH of the pond water. Data can be accessed remotely through mobile applications using the Internet. [2] In 2012, the Arvind Dattatreye Shaligram University of Pune developed a smart system for pond monitoring that controls ponds located at different locations from one place to another. One of the biggest advantages of our project is that it can be pond monitoring and controlling from anywhere IoT based mobile application.[3] In 2018, Department of Mechanical Engineering, University Kebangsaan Malaysia, Z.Harunet developed a project for observation fish pond water on IoT based by Arduino. It can monitor real-time water when the water is supplied by the pump. Our project will monitor real-time ponds. The above mentioned project detects water quality when water is supplied to the pond. But our project is to be able to monitor and control the quality of pond water from any place at any time. Because the quality of the water in the pond may change at any moment.

Chapter 3

System Requirements

3.1 Software Requirements

- Operating System : windows 8.1/10/11
- Arduino IDE
- Blync app

3.2 Hardware Requirements

- Arduino Uno
- NodeMcu
- Temperature Sensor
- PH Sensor

3.3 Others

- Power Supply (12v, 5v and 3.3v DC power supply).
- Breadboard
- Resisters
- Connecting Wires

Chapter 4

Project Design

The purpose of the design is to plan the solution of a problem specified by the requirements documents. This phase is the first step moving from problem to the solution domain. In other words, starting with what is needed design takes us to work how to satisfy the needs the design of the system is perhaps the most critical factor affecting the quality of the output and has a major impact on the later phases.

System design aims to identify the modules that should be in the system, their functions and interactions with each other to produce desired results.

4.1 System Architecture

The system architecture supports the argument about the structural properties of objects in the system. There is a conceptual design within the system that argues for the device's formal description and its behavior. A reference model that integrates all the components of a device together. Figure represents an external picture of the device in which every sensor, power supply is connected to the Arduino. The whole project showed a sample of mobile applications connected to the microcontroller and the Internet. Each board is connected to each other, showing the architecture of the Sensor, Arduino Uno, battery, power supply, cloud, router, mobile applications each connecting to each other.

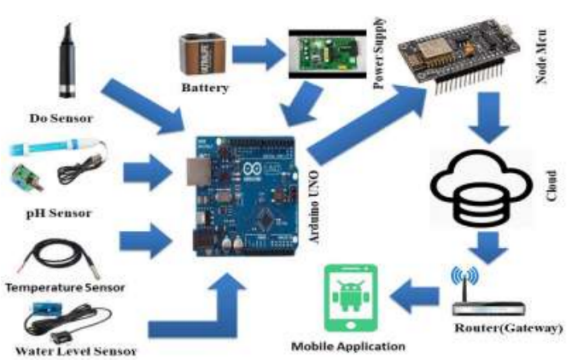

Figure 4.1: System architecture

4.2 Block Diagram

A block diagram is used for the hardware design process of the device. Device overview is designed by a feature of the block diagram is the focus of the device's input and output. This diagram refers to what happens from input to output.

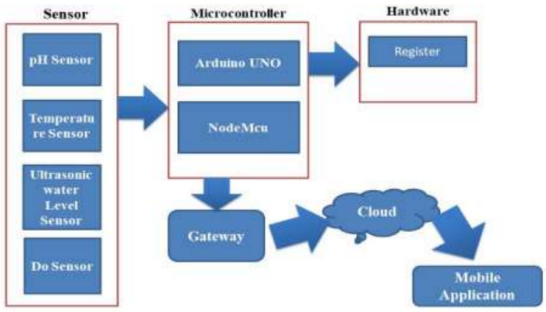

Figure 4.2: Block diagram

4.3 Circuit Diagram

A circuit diagram is the graphical interface of a device. In which a simple image of each of the device's components is used. The interconnections of each element are shown in this diagram. In the meantime the pin connections are shown.

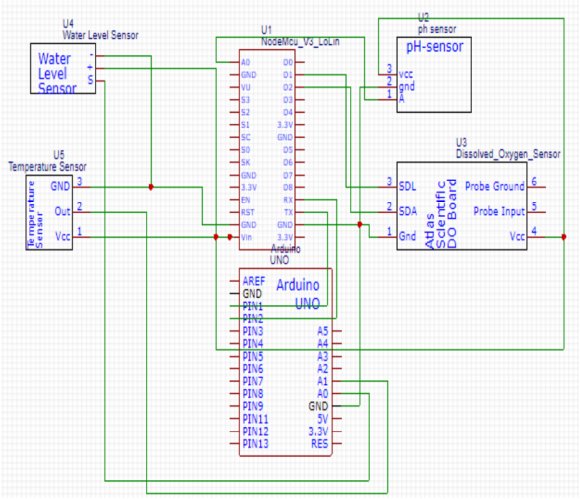

Figure 4.3: Circuit Diagram

Chapter 5

Results

5.1 snapshots

Figure 5.1: PH Value page

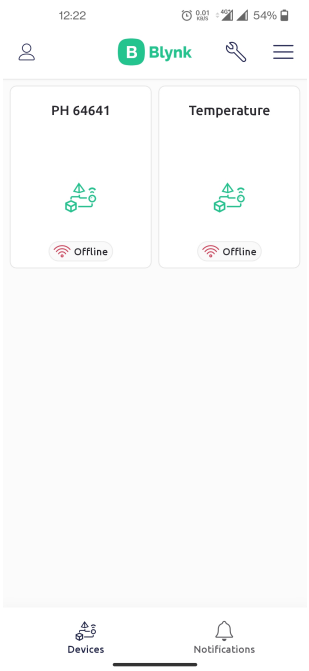

Figure 5.2: Blynk Templet

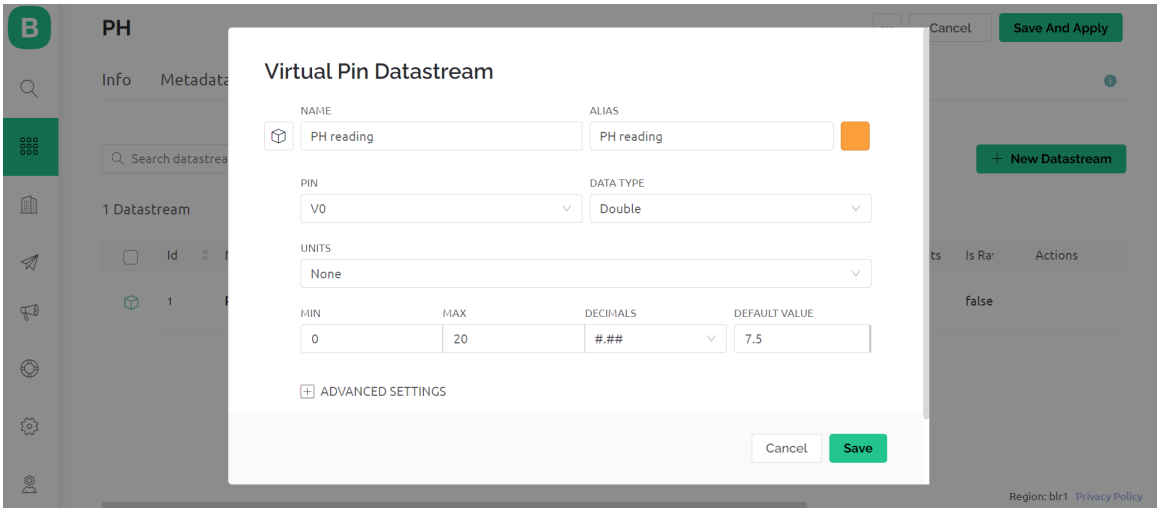

Figure 5.3: web datastream

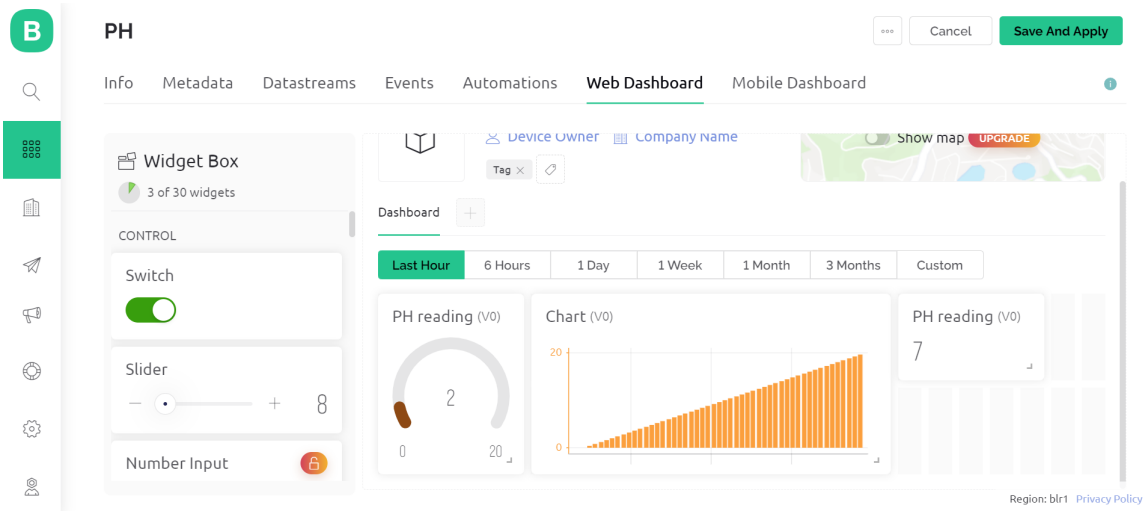

Figure 5.4: PH web

Chapter 6

Conclusion

6.1 Conclusion

The proposed Pond Monitoring System Device is completely IoT based. This is a time-consuming device that will help fish farmers to produce more fish. The owner can learn about the environment of his/her cultivated pond and various elements in the water and take necessary steps through the Android application. Farmers will also know which fish is more suitable in its pond. Finally, the project will bring about a breakthrough in fish farming.

6.2 Future Scope

The proposed device can be further enhanced in the future by adding capabilities and functional components. For example, Poisonous gas can be produced at any time in the pond so it is necessary to use a sensor to detect it. NH3 sensor may be used in the future to know the probability of natural food being produced in ponds.

APPENDIX A

Arduino code

The following is the Arduino code .

```
#define BLYNK_TEMPLATE_ID "TMPLK2pS7eYy"
#define BLYNK_DEVICE_NAME "PH"

#define BLYNK_FIRMWARE_VERSION        "0.1.0"
#define BLYNK_PRINT Serial
#define USE_NODE_MCU_BOARD

#include "BlynkEdgent.h"

#define SensorPin A0           Arduino Analog Input 0
unsigned long int avgValue;
float b;
int buf[10],temp;


int f;  // for float value to string converstion
float val; // also works with double.
char buff2[10];
String valueString = "";
String Value = "";

void PH_Value()
{
  for(int i=0;i<10;i++)
  {
    buf[i]=analogRead(SensorPin);
    delay(10);
  }
```

```
  for(int i=0;i<9;i++)
  {
    for(int j=i+1;j<10;j++)
    {
      if(buf[i]>buf[j])
      {
        temp=buf[i];
        buf[i]=buf[j];
        buf[j]=temp;
      }
    }
  }
  avgValue=0;
  for(int i=2;i<8;i++)
  avgValue+=buf[i];
  float phValue=(float)avgValue*3.3/1024/6;
  phValue=3.5*phValue;

  Value =  dtostrf(phValue, 4, 2, buff2);
  valueString = valueString + Value +",";
  Serial.print(Value);
  Serial.print("    ");
  Serial.println(valueString);
  valueString = "";
  delay(1000);
  Blynk.virtualWrite(V0, Value);
}

void setup()
{
  Serial.begin(9600);
  BlynkEdgent.begin();
  delay(2000);
}

void loop()
{
  BlynkEdgent.run();
  PH_Value();
}
```

Reference

1. 2012 IEEE 8th international con- ference was held from 8 to 10 October in Barcelona, Spain

2. 2012, the Arvind Dattatreye Shaligram University of Pune developed a smart system for pond monitoring

3.In 2018, Department of Mechanical Engineering, University Kebangsaan Malaysia, Z.Harunet developed a project for ob- servation fish pond water on IoT based by Arduino.

4. https://www.javatpoint.com/iot-internet-of-things