iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** IV **Month of publication:** April 2019

DOI: https://doi.org/10.22214/ijraset.2019.4332

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue IV, Apr 2019- Available at www.ijraset.com

Water Quality Monitoring System using RC Boat with Wireless Sensor Network

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Abstract: ***The aim of this project is to implement the RC boat and get the real time water quality using different wireless sensors such as Ph sensor, Turbidity sensor, water temperature sensor and air temperature and humidity sensor etc. This paper presents the different sensors interfaced to the controller (raspberry pi 3) and uploads the data to the cloud based server (thingspeak). The proposed system contains the camera which shows the visual output to find the location of boat. The RC boat is operated on the 2.4 GHz frequency band.***

I. INTRODUCTION

The water quality monitoring is very important now a days. As there are various resources available but still no progress. In most cases the water gets contaminated due to different reasons and one of the major reason is industrial waste. This needs to be stopped somewhere. To cure this real time monitoring of water quality should be done. So the RC boat is used for continuously moving on water surface to identify water quality. The different sensors are interfaced to the controller viz. water temperature sensor, air temperature & humidity sensor, Ph sensor, Turbidity sensor, conductivity sensor. In addition, the camera is interfaced to controller for getting the live video of the present location of boat. The interfaced sensors are placed on boat and the real time data can be obtained once the boat moves over the water surface. This real time data is uploaded on to the cloud server. Once the data is uploaded the parameters are observed and analyzed.

II. PROPOSED METHODOLOGY

The sensors interfaced are Ph sensor, Turbidity sensor, Water Temperature sensor, Air Temperature and Humidity sensor to Raspberry Pi-3 B model. The different readings are taken and the output of each sensor is generated on the terminal window using Python script.
The readings of sensor generated on terminal are uploaded on Thingspeak cloud server and the real time parameters are uploaded.

III. BLOCK DIAGRAM

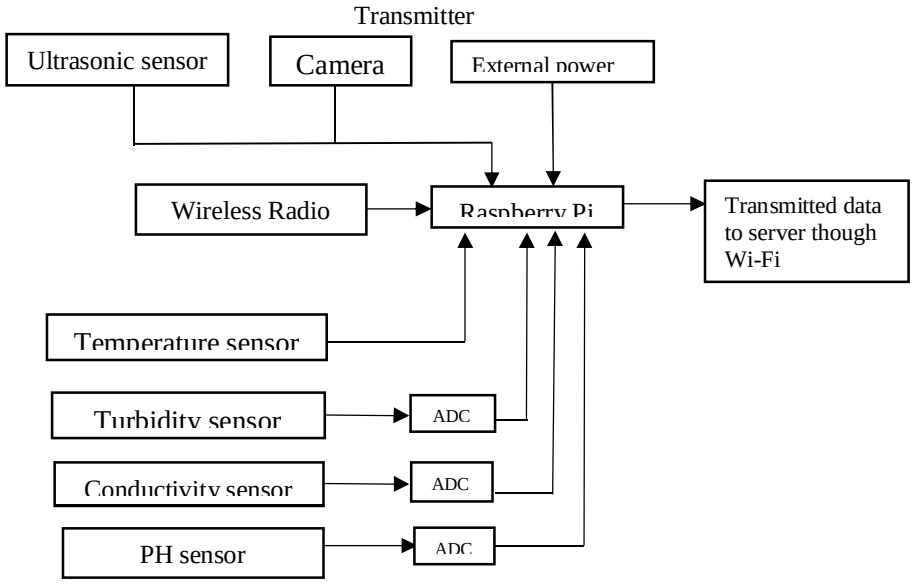


Fig – Block diagram of transmitter

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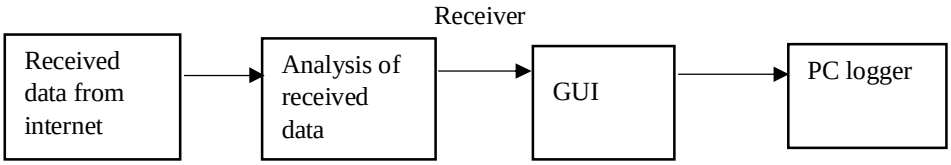


Fig – Block diagram of receiver

The transmitter and receiver are shown. The raspberry pi 3 B model is used and the different sensors interfaced are Air temperature and humidity sensor, water temperature sensor, ph sensor, turbidity sensor, ultrasonic sensor and camera. The sensor data is collected into the raspberry pi and this real time data is uploaded on the thingspeak cloud server. The camera output is observed on web browser. The ADC is used to convert the Ph sensor and Turbidity sensor analog signal to digital. The cloud server data is observed and saved the data to GUI in PC.

IV. SENSORS AND READINGS

A. PH Sensor Readings

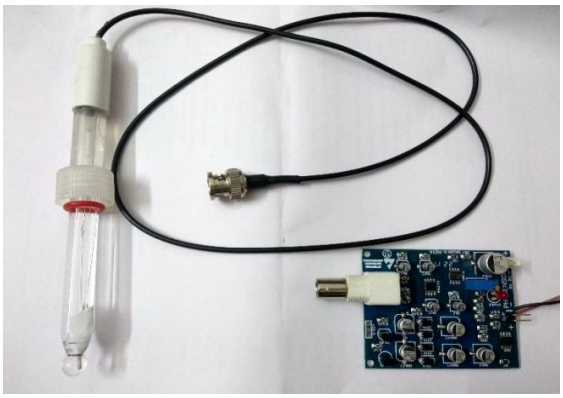


Fig – Ph sensor

TABLE I
PH SENSOR READINGS

Sr. no.	Type of water sample	Actual Readings (Ph range)
1	Simple Water	6.9 – 7.2
2	Ph 9	8.5 – 9.3
3	Ph 4	3.5 – 4.5

B. Turbidity Sensor Readings

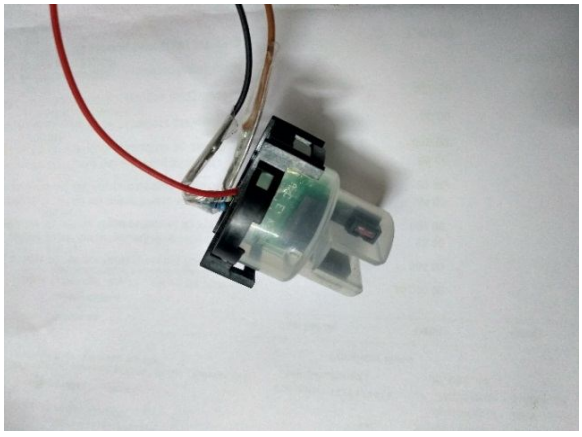


Fig – Ph sensor

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TABLE III
TURBIDITY SENSOR READINGS

Sr. no.	Type of water sample	Actual Readings (NTU)
1	Simple Water	400 – 420
2	Mud Water	120 – 160
3	Waste Water	250 - 350

C. Water Temperature Sensor (DS18b20) Reading

TABLE IIIII
WATER TEMPERATURE SENSOR READINGS

Sr. no.	Type of water sample	Actual Readings (degree Celsius)
1	Normal Temperature	22 – 24
2	Hot Water	25 – 60
3	Cold Water	25 - 0

D. Air Temperature and Humidity Sensor (dht11) Reading

TABLE IVV
Air temperature and humidity sensor readings

Sr. no.	Different mediums of air	Temperature (Degree Celsius)	Humidity (Percentage)
1	Normal	22 – 30	50 – 60
2	Closed/covered sensor	22 – 15	60 – 100
3	Fire stick	25 – 60	60 – 20

V. OVERALL SYSTEM

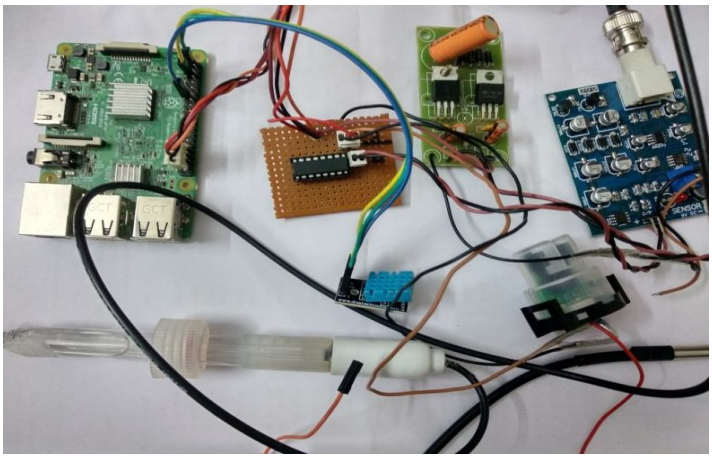


Fig – Full system

VI. CONCLUSION

In this project the remote operated boat is provided which finds the real time water quality. This project is done to acquire the best and worst real time water quality using the RC boat which leads to find the area where the bad pollutants are present and are getting added. Different sensors find the parameters of the water which tends to grade the quality of water.

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VII. ACKNOWLEDGMENT

A special thanks to all the members of chemistry department of KIT's College of Engineering Kolhapur, they helped by providing the different standard Ph value samples for testing Ph sensor and also provided different useful equipment's for this research and implementation. I would like to thank the cutting technician for helping in cutting foam material to make rc boat.

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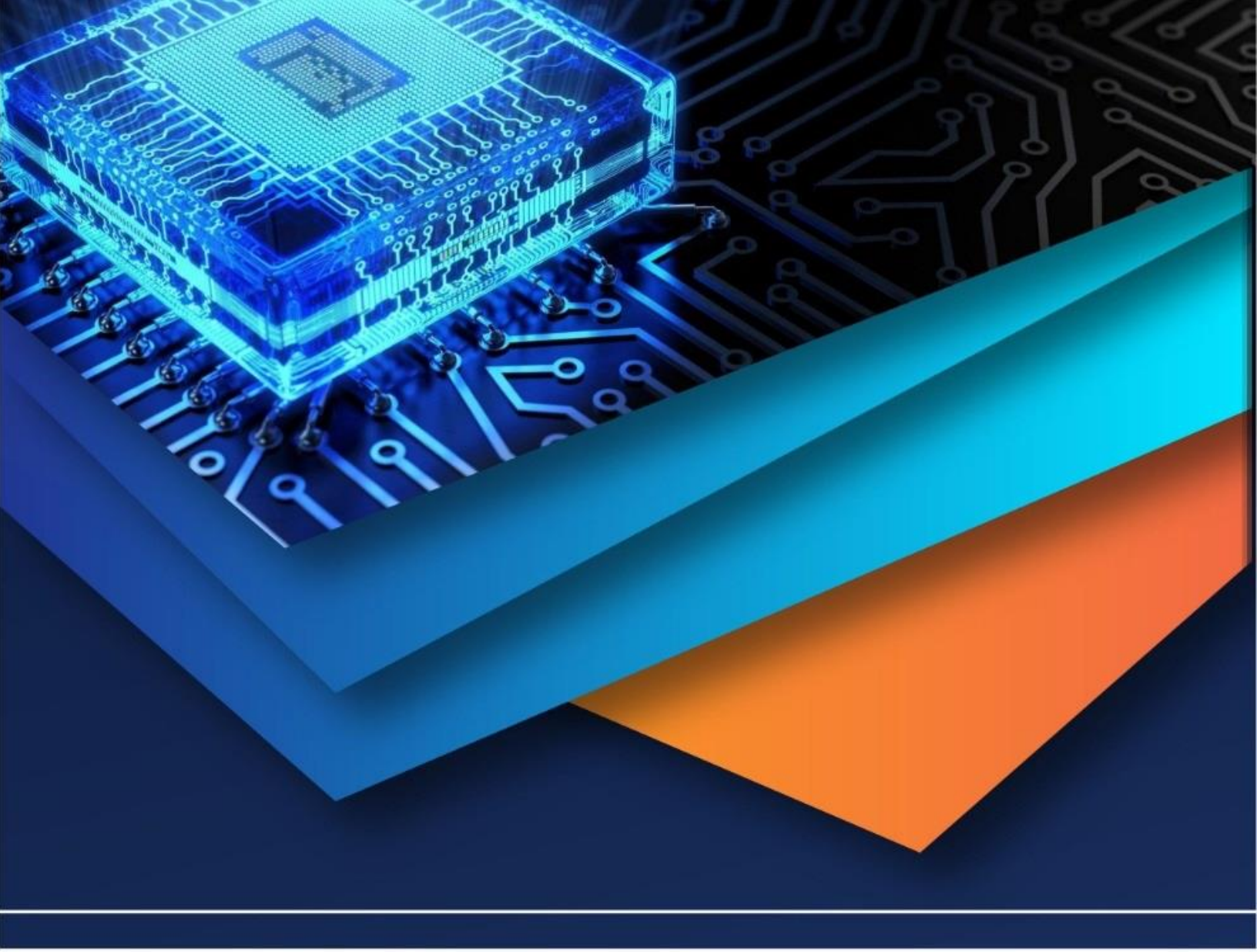
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