© 2018 IJSRST | Volume 4 | Issue 10 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X
Themed Section: Science and Technology

A Wireless Sensor Monitoring Node Based for Paddy Field Environment Using IoT

Maruvapalli Vimala
M. Tech, Digital Systems and Computer Electronics Engineering, JNTUA College of engineering, Ananthapuram, Andhra Pradesh, India

ABSTRACT

This work is helpful in paddy field to monitor real time information about soil moisture, humidity, temperature, ph value of water, detect gases. In existing system we have various types of sensor networks for monitoring environmental parameters, by using various types of wireless technologies like zigbee, GSM etc… These technologies suitable only for some meters only. It is not suitable for long distance monitoring. Zigbee communicates only up to 100 meters and GSM for only for sending SMS to particular number or user when user in network area. So they are not suitable to monitor from long distance wirelessly, it is limited to up to some meters only.To overcome this problem we move to IOT.In IOT we can directly connected to cloud server by using GPRS technology we can monitor the several nodes information at a time, and it is also possible to see every one or individual. By using Arduino micro controller and DHT11 sensor we can detect real time temperature,humidity of environment.By using MQ2 we can detect fertilizer and by using soil moisture sensor we can detect moisture substance in the soil and by using ph sensor measure how much acidic/bases present in the water.These five parameters were uploaded to cloud server by suing GPRS technology.When moisture content is low and ph value of water is normal turn on the AC motor to pump the water.When moisture content is high and ph value of water is acid /base turn off the AC motor.

Keywords : Arduino microcontroller, IoT, GPRS, MQ2sensor, DHT11.

I. INTRODUCTION

Food crops are most important in the world. In that rice is the important one, which are the grain crop that needs lot of water. It is the basic to control the water level veracious according to the water condition rule of rice in different stages, and it can also enormously the waste of water resource, sprinkling costs, and make the planting in the paddy field is more scientific. In current years, because of lagging quality and lack of fidelity, environmental factors such as soil flooding cannot get timely and scientific management, which can lead to difficulty to the production of rice and makes diseases and pets more and more serious. Therefore, acquisition and timely delivery of the information of paddy field has become a basic link to ensure the quality of rice growing environment.

The research h of fast procurement technique of paddy field data is an effective way to improve the rigor of agriculture. How to collect and transmit these data accurately and immediately is an important topic in the field of horticulture production. Based on this topic, some performance have been made for the real time monitoring system Paddy field according to the characteristics of the acquisition process such as long monitoring period and large environmental disturbance .proposed an integrared, multi-sensors system for continuous

monitoring of water dynamics in rice fields under different flooding regimes,which has achieved the function of monitoring for three plots with different water management strategy.

A wireless sensor monitoring node is presented for paddy field environment. In this monitoring node, the more parameters such as moisture, temperature, humidity, etc Collected from the paddy field environment Collected data are uploaded to remote monitoring software through GPRS module. Moreover,in this node,real-time data are displayed by LCD in collection part.

Figure 1: Paddy Field Monitoring

II. RESEARCH BACKGROUND

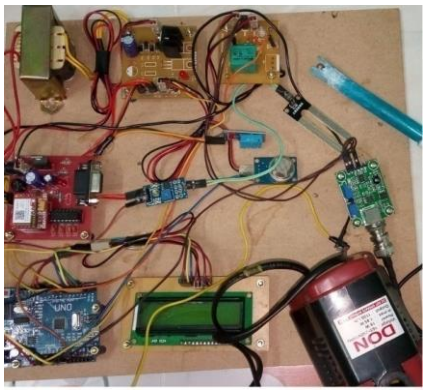
Past research on the improvement of remote checking framework for nurseries center around diminishing the power cost by structuring low power utilization of the hub for the application and drawing out the actuator life however continuing promising Performance results. They proposed design and use of ZigBee-based work organize consolidate with occasion based control system. They found that the design demonstrates low power utilization of the hub for the application in the normal of 17.4μA while occasion based control reduced.The number of changes by more than 80 % in Comparison with a customary time-based controller. Accomplished estimation and control with lower control, bring down expense and lower inactivity by utilizing enhanced LEACH grouping calculation as an apparatus for dissecting idleness and vitality utilization for three level system models of the remote observing and control framework dependent on the multi-length in a similar design. Hyun mimic the execution of sensor hub running with low power task in nursery condition to the effect of harvest's development when hindrance exists in entomb hub's correspondence point. They found that, Different execution separately contingent upon the steering convention. In particular, conventions have a tendency to be more broad while hubs will be littler, all the more great, more vitality productive, general, and less expensive later on. They grow low power Sensor hubs with vitality sparing of correspondence convention. In this way, they increase higher power effectiveness of WSN. The sensor hubs indicate low vitality wastage, short correspondence range and self composed.

III. EXISTING SYSTEM

In past we have several types of sensor networks for monitoring environmental parameters, by using several types of wireless technologies like ZigBee, GSM etc… These technologies are suitable only for some range and limited parameters only. This is the main drawback in existing system.

IV. PROPOSED SYSTEM

Solution of existing system Internet of Things (IoT). A system is connected physical objects that are reachable through the Internet.



In IoT with built-in-sensors, i.e. substances that have been assigned an IP address and have the capability to gather and transmit data over a network without manual assist. In this project we are using IoT to monitor humidity levels.

Block diagram of the system:

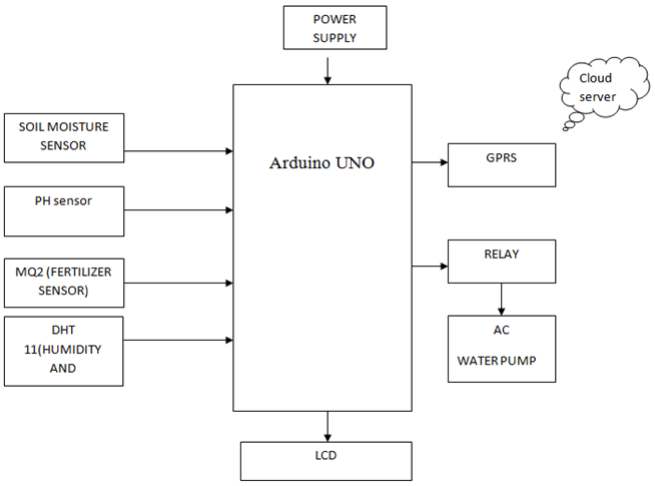
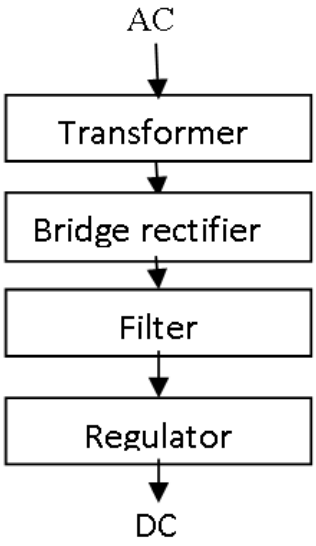


Figure 2 : Block diagram of proposed system

V. HARD WARE REQUIREMENTS

5.1 Power supply:

Flow chart of power supply:



5.2 Arduino:

The Arduino is simple to operate compare to other micro controllers because it is open source. Which means its cost is low and development software is free. Arduino programming is compatible in both C and C++ languages.

Figure 3 : Arduino micro controller

Arduino features:
It is 8-Bit Microcontroller.
It have two 8-bit Timer/Counters.
Operating frequency 12 MHz-20 MHz

5.3 RELAY

Relays are basic switches which are worked both electrically and mechanically. Transfers comprise of an n electromagnet and furthermore an arrangement of contacts. The exchanging instrument is completed with the assistance of the electromagnet.

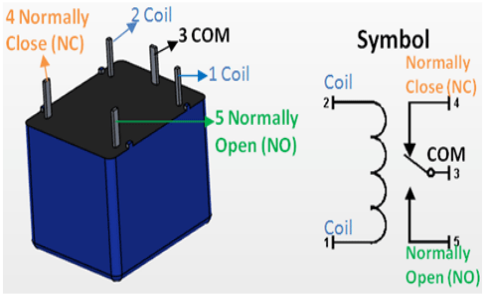


Figure 4 : Relay

5.4 MQ-2 Gas sensors:

MQ-2 sensor is used to detect gasses like LPG, alcohol, Hydrogen. This sensor have digital pin which is used to detect the particular gas without micro controller.

For measuring the gas in ppm the analog pin is used.

Figure 5 : Gas sensor

Applications:
Domestic gas leakage detector
Industrial Combustible gas detector

5.5 DHT11 SENSOR:

DHT stands for digital humidity and temperature. It is used to measure the temperature and humidity in environment. This sensor consists of resistive element for measuring the temperature in environment.

Figure 6 : Relay

5.6 Soil Moisture Sensor:

A soil moisture sensor is a water control adomment for traditional automatic flooding controllers with the potential for eradicate excessive flooding cycles.

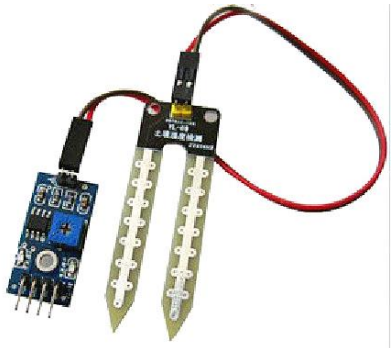


Figure 7 : Soil Moisture Sensor

Soil moisture sensor measure the water contain in soil.A soil moisture probe is made up of multiple soil moisture sensors. One common type of soil moisture sensor in commercial use & a frequency domain sensors such as a capacitance sensor. Another sensor the neutron moisture gauge, utilize the modulator properties of water for neutron.

By simply inserting the soil moisture sensors in the soil to be tested and volumetric water content of soil is reported in percent. Soil moisture sensors are used to conduct experiments in bionomics, environmental science and agricultural science , horticulture , biology and more.

5.7 PH Sensor

The Model PHE-45P pH Sensor measures the pH of damp solutions in industrial and municipal process applications. It is designed to perform in the rigid of environments, including applications that poison conventional pH sensors. All seals are dual o-ring using multiple sealing materials. The sensor is designed for use with the Omega PHTX-45 Monitor/Analyzer

Figure 8 : PH sensor

5.8 LCD

LCD stands for liquid crystal display which is used to display the text or numbers on the LCD screen.A 16x2 LCD display is very basic module and is very frequently used in various devices and circuits.

Pin diagram

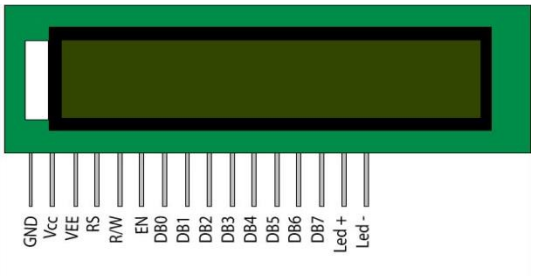


Figure 9 : LCD display

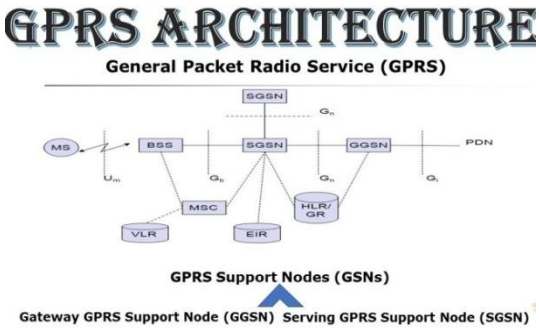
5.9 Water Pumping Motor

The motor– pump subsystem incorporates the engine, the pump, and the couplings. The sorts and qualities of pumps and engines utilized for PV pumping applications are exhibited in the accompanying areas. Diverse kinds of coupling are utilized for water pumping purposes relying upon the sort of use and the water request. Different sorts of pumps and engines are accessible for water pumping application relying upon the everyday water prerequisite, the pumping head, the suction head (for surface mounted units), and the water asset.

Figure 10 : AC pumping motor

GPRS:

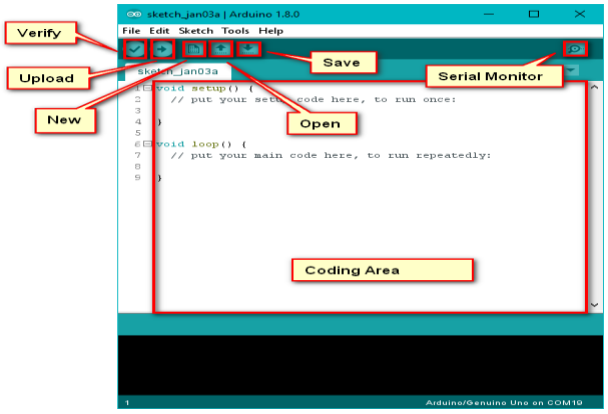
General Packet Radio Service is a packet-switching era that enables records transfers via cell networks. it is used for cell internet, MMS and different facts communications. In idea the speed limit of GPRS is 115 kbps, however in most networks it is round 35 kbps. Informally, GPRS is likewise referred to as 2.5G



VI. Software

Arduinoide

To program the Arduino you can use the Arduino IDE (Integrated Development Environment), which is a piece of free software that enables you to program in the language that the Arduino understands. Like c or c++ languages.



VII. WORKING OF THE PROJECT;

This project also monitors the humidity and temperature level in environment. Here humidity is detected using humidity sensor DHT11 and detected humidity value is sends to cloud server using GPRS technology. Using cloud server we can monitor the humidity from anywhere in the world through internet. These four parameters are uploaded to cloud server by using GPRS.When temperature is high, moisture is low and humidity is low it turn on the AC

motor to pump water. When humidity or moisture content is high it turn off the AC motor.

Application of the system:

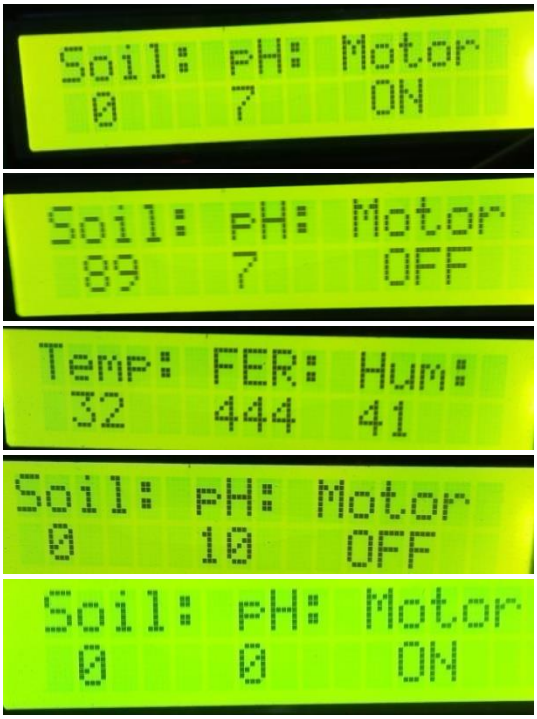
Monitoring the humidity temperature and soil level in nature.

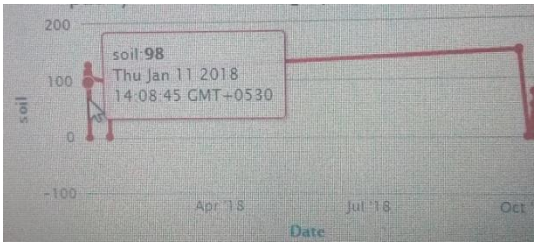
To find the humidity, temperature and moisture in fields.

Advantages of system:

- Low power consumption
- More reliable
- More compatible

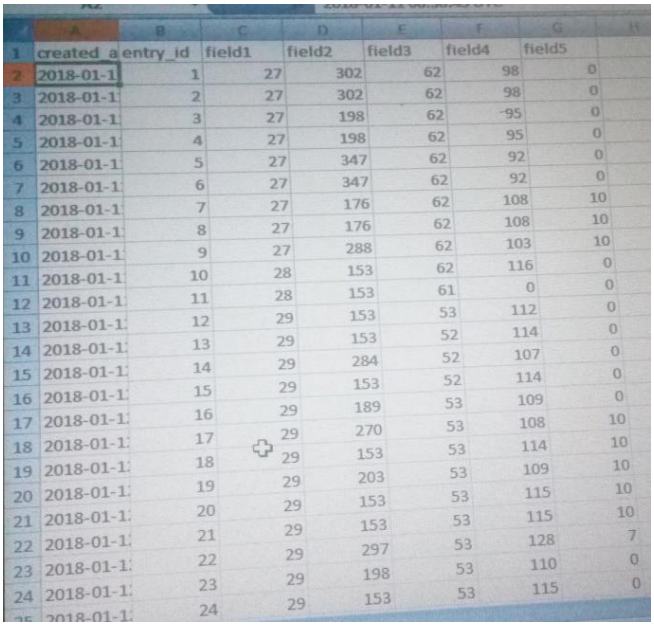
VIII. RESULTS





IX. CONCLUSION

This project is used for Paddy field monitoring. Every two hours it continuously data is updated in server.Which lasts for five minutes every time..When ph water is normal , moisture is low it turn on the AC motors pump water. When moisture is high and ph of water is acid or base it turn off the AC motor.After processing Data are uploaded to remote monitoring software through GPRS module.



	A	B	C	D	E	F	G
1	created_a	entry_id	field1	field2	field3	field4	field5
2	2018-01-1	1	27	302	62	98	0
3	2018-01-1	2	27	302	62	98	0
4	2018-01-1	3	27	198	62	-95	0
5	2018-01-1	4	27	198	62	95	0
6	2018-01-1	5	27	347	62	92	0
7	2018-01-1	6	27	347	62	92	0
8	2018-01-1	7	27	176	62	108	10
9	2018-01-1	8	27	176	62	108	10
10	2018-01-1	9	27	288	62	103	10
11	2018-01-1	10	28	153	62	116	0
12	2018-01-1	11	28	153	61	0	0
13	2018-01-1	12	29	153	53	112	0
14	2018-01-1	13	29	153	52	114	0
15	2018-01-1	14	29	284	52	107	0
16	2018-01-1	15	29	153	52	114	0
17	2018-01-1	16	29	189	53	109	0
18	2018-01-1	17	29	270	53	108	10
19	2018-01-1	18	29	153	53	114	10
20	2018-01-1	19	29	203	53	109	10
21	2018-01-1	20	29	153	53	115	10
22	2018-01-1	21	29	153	53	115	10
23	2018-01-1	22	29	297	53	128	7
24	2018-01-1	23	29	198	53	110	0
	2018-01-1	24	29	153	53	115	0

X. REFERENCES

[1]. L. Ranghetti, L. Busetto, A Crema, "Testing estimation of water surface in Italian rice district from MODIS satellite data". International Journal of Applied Earth

Observation & Geoinformation, vol. 52, no.7, pp. 284-295, Oct. 2016

[2]. M. Campos-Taberner , F. J. García-Haro and R. Confalonieri, "Multitemporal Monitoring of Plant Area Index in the Valencia Rice District with PocketLAI". Remote Sensing, vol. 8, no. 3, pp. 192-209, Mar. 2016

[3]. EA Chiaradia, A. Facchi, D. Masseroni and D. Ferrari, "An integrated, multisensor system for the continuous monitoring of water dynamics in rice fields under different irrigation regimes". Environmental Monitoring and Assessment, vol. 187, no. 9, pp. 586-603, Sep. 2015

[4]. H. Luo, G. Li and W. Peng, "Real-time remote monitoring system for aquaculture water quality". International Journal of Agricultural & Biological Engineering, vol. 8, no. 16, pp. 136-143, Dec. 2015

[5]. I. Heimann, V. B. Bright and M. W. Mcleod, "Source attribution of air pollution by spatial scale separation using high spatial density networks of low cost air quality sensors". Atmospheric Environment, vol. 113, no. 11, pp. 10-19, Jul. 2015

[6]. Z. Can and M. Demirbas, "Smartphone-based data collection from wireless sensor networks in an urban environment". Journal of Network & Computer Applications, vol. 58, no. 13, pp. 208-216, Dec. 2015

[7]. C. H. Ngai and P. Gunningberg, "Quality-of-information-aware data collection for mobile sensor networks". Pervasive & Mobile Computing, vol. 11, no. 6, pp. 203-216, Apr. 2014

[8]. J. V. Capella, A. Bonastre and R. Ors, "A step forward in the in-line river monitoring of nitrate by means of a wireless sensor network".