DOI: http://dx.doi.org/10.26483/ijarcs.v9i2.5762

ISSN No. 0976-5697

Volume 9, No. 2, March-April 2018

International Journal of Advanced Research in Computer Science

RESEARCH PAPER

Available Online at www.ijarcs.info

A RESEARCH PAPER ON SMART WAY OF GRASPING THE LEVELS AND FAULTS IN FARMING BY USING WIRELESS SENSOR NETWORKS

B.Jayasree
Computer Science & Engineering,
Brindavan Institute of Technology &Science,
Kurnool,India

K.Mounika,
Computer Science & Engineering,
Brindavan Institute of Technology &Science ,
Kurnool,India

G P Dhanunjaya
Computer Science & Engineering
Brindavan Institute of Technology &Science
Kurnool,India

S.Abdul Yunus Basha
Asst.Professor
Computer Science & Engineering
Brindavan Institute of Technology &Science
Kurnool,India

***Abstract*:** Today, the farmers are suffering from the lack of rains and scarcity of water. The traditional farmland irrigation the main objective of this paper is to provide an automatic irrigation system thereby saving time, money & power of the farmer, as water supply is becoming scarce in today's world there is an urgency of adopting smart ways of irrigation. It also helps in conserving water by automatically providing water to the plants/field depending on the water requirements[1]. The objective of this system is to detect the moisture content of the soil and depending on the basis it generates the water with the automated technology of irrigation. Soil is recognized as one of the most valuable natural resource where soil pH property used to describe the degree of acidity or basicity which affects nutrient availability and ultimately plant growth. pH value of the soil is determined and accordingly crops or plants are suggested that can be grown in that field. Due to detection of soil pH value the chances of crops destruction becomes less, with this we can say that automatic irrigation system provides less effort and generates the good result.

Keywords: Aurdino Uno, pH detector, Moisture sensor Micro-Controller, ThingSpeak Server.

1. INTRODUCTION:

Farming is one of the donor to the local economies. Without development of farming there will be huge loss to the farmers as well as there will be no nourishment to the people. Production of crops not only confide in quality of input but also on the irrigation facilities. Irrigation plays a major role in the production of farming. without irrigation, farming is not possible in dry lands. Irrigation is the artificial appliance of water to soil. Irrigation is the process through which required amount of water can be supplied through fabrication means such as sprinklers etc. The main objective of irrigation system is to help agricultural crop growth, landscape maintenance. Farming is often slow down due to irregular, insufficient, water. Proper irrigation systems can secure perpetual agriculture, different crops in a year is possible through irrigation. Seeds cannot grow in dry soil as moisture in necessary for the mature of seeds. With the help of irrigation supply the required moisture content of soil for the growth of seeds can be sheltered. This will be upgrade the production of crops. In India from many years three or more crops are cultivated through irrigation facilities. Through the irrigation, it is possible to generate the required amount of hydrogen and oxygen which is used for the improvement of plant root. A plant can absorb mineral nutrients from the irrigated soil, thus irrigation is essential for the growth of plant. Thus, Irrigation contributes the development of economic growth and poverty reduction.

2. LITERATURE SURVEY:

With the escalation of Internet of Things your future Sunrise procedure might be something similar to the following scenario. The term "Internet of Things" was first used by Kevin Ashton at Procter and gamble in 1999, to describe an Internet based service architecture. IoT[5] describes a world where just about anything can be connected and communicates in intelligent fashion that ever before. Generally it refers internet enabled object interacting each other and collaborate to achieve specific goals. IoT makes life less laborious and convenient. It claims to develop people's lives.

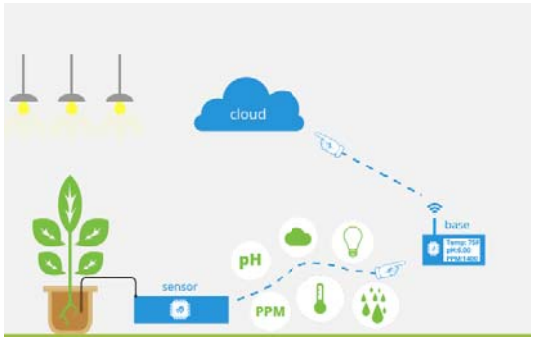
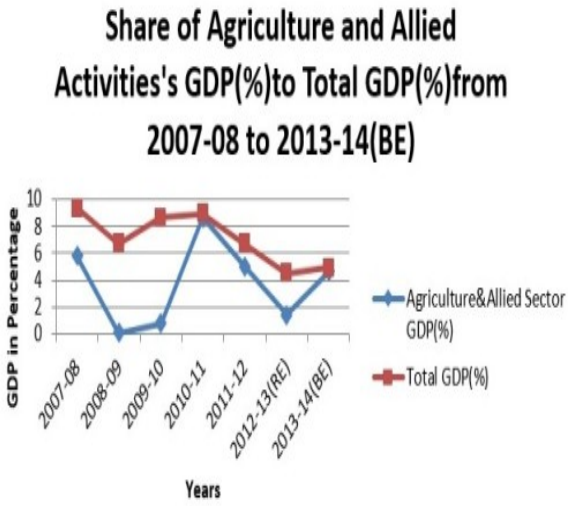


Fig 1: Example diagram of IoT

3. EXISTING SYSTEM:

Farming is one of the most essential back bone to the Indian economy. The contribution of farming and its federated sectors to India's GDP stood at 13.9% during 2013-14[2][3]. More than half of the Indian populace is relying on farming for its livelihood. In spite of the great noteworthiness to the

Indian economy to share of farming and its federated activities in India's GDP is sequentially declining over the years. Inadequacy of water is a major problem to the faced by the farmer's under the utilization of existing irrigation resources due to the insufficient of field channels and as far as agricultural productivity is concerned. Another major issue responsible for low farming productivity is that soil is adulterate by the increase of pollution in rivers and canals.



3.1 Disadvantages:

- By using existing system the farmers doesn't know which crop is suitable for a particular soil.
- A farmer doesn't know which crop get benefited in a particular season.
- Production of agriculture will be gradually decreased by using this.
- There will be huge loss to the farmers.
- Without knowing any information about the crops they spray pesticides on crops not only destroy the pests and contaminate the crops but also kill the beneficial insects.
- Water usage is also unplanned with some arid areas misusing the irrigation facilities provided by planting water intensive crop.
- Agricultural credit and farm mechanization for small and marginal farmers will continue to be difficult unless pooling of farm resources.

4. PROPOSED SYSTEM:

The main objective of this system is to provide an automatic irrigation and also used to detect the moisture content of the soil on its basis it generates water with the automated technology of irrigation. Based on pH value of the soil, we determine which types of crops are suitable to grown in that croplands. This system can suggest the farmer, about the perfect measures of the crop.

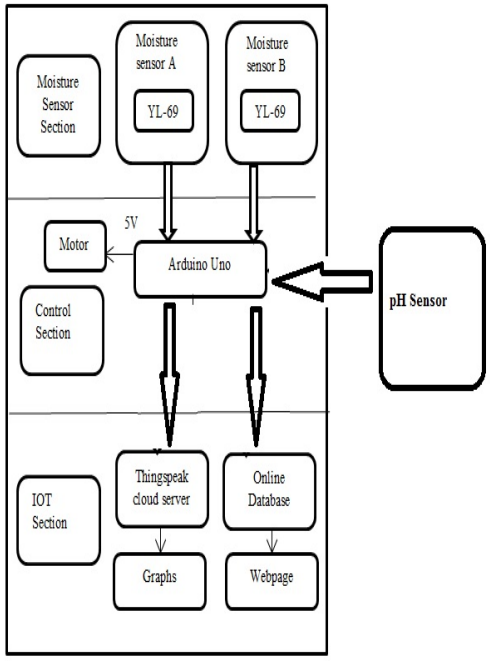


Fig: 3 Block Diagram of proposed system

4.1 Aurdino Uno:

Aurdino is an open source computer hardware and software project that designs and manufactures single board microcontrollers[4][10].

.

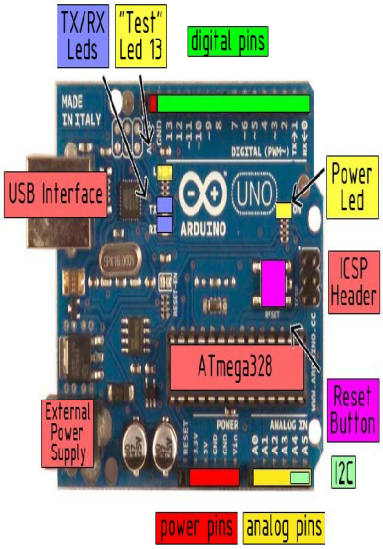


Fig 4 : Aurdino Uno

Aurdino Uno is a microcontroller board based on the ATmega. It has 14 digital input/output pin,6 analog pins,6 MHZ quartz crystal, USB connection, power jack and ICSP header and reset button.

a. Technical Specifications:

Microcontroller ATmega	328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pin	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB of which 0.5 KB used by boot loader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

4.2 Moisture Sensor:

Soil Moisture sensor[9] is used to compute the gravimetric water content of soil. This makes it ideal for performing experiments such as horticulture, environmental science, agriculture science etc. soil moisture sensor used to measure the loss of moisture long time due to dehydration and plant uptake. Evaluates the minimum soil moisture contents from various species of plants. Monitors soil moisture content to control irrigation in agriculture.

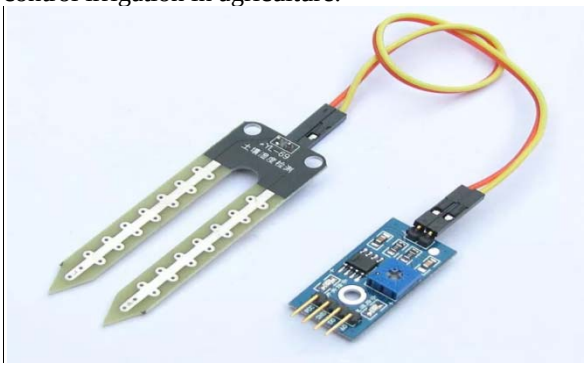


Fig 5: Moisture Sensor

Fig 6: Graph for Moisture Sensor

Item	Condition	Min	Typical	Max	Unit
Voltage	-	3.3	/	5	V
Current	-	0	/	35	mA
Output Voltage	Supply Voltage 5 V	0	~	4.2	V
Output Value	Sensor in dry soil	0	~	300	/
	Sensor in humid soil	300	~	700	/
	Sensor in water	700	~	950	/

Table 1: Specifications of Moisture sensor

4.3 pH Sensor:

pH sensor used to measure soil measure level, pH level, and light level. It provides scientifically accurate information and it promotes healthy growth of plants. It needs to be plugged in, pushed in to loose patch of soil and the results will be read. It doesn't do three measures at a time, it does individually. these can sense changes of the soil. This doesn't requires any battery. This will indicate soil accurately and sufficiently[7][11].

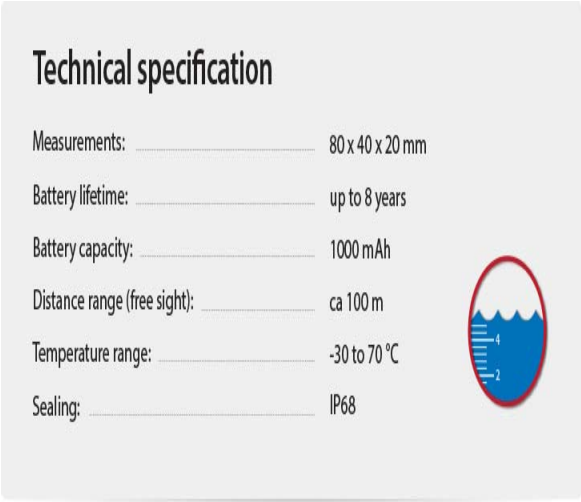


Fig 7: Specification of pH Sensor

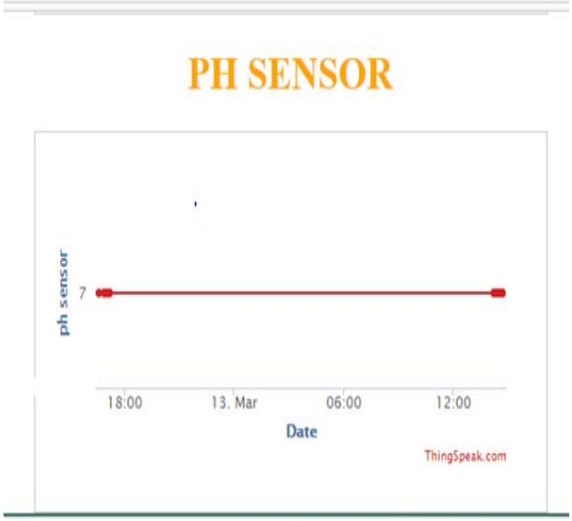


Fig 8: Graph for pH Sensor.

Fig 9: Table of pH Sensor.

4.3.1: General relation of pH to the availability of plant nutrients in the soil :

These graph describe the availability of nutrients present in the soil and whenever the pH value of the soil is neutral maximum plant nutrients are available in the soil. If the pH value of the soil is less than seven then we can say that it is strongly acidic, if the pH value of the soil is greater than seven then we can say that it is strongly alkaline.

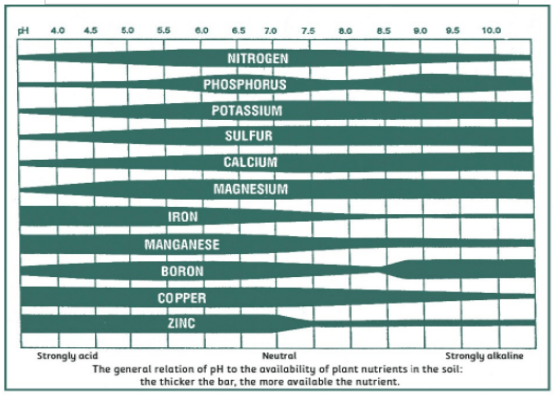


Fig 10: Relation of pH Availability.

4.4: IoT Section:

Internet of Things describes an upcoming trend where a more number of encapsulated devices are connected to the internet. These connected devices communicate with people and generally provide sensor data to the cloud store house. IoT solutions are build for vertical appliances such as environment health control, home automation.

4.5: Dc Motor Sprinkler:

Fig 11: Dc motor Sprinkler.

Dc motor is composed of many types and sizes. A motor consists of rotor and permanent magnetic field stator. DC motors are generally used in changeable speed and Torque. Motion and controls cover a broad area that are used to generate control motion.Dc Motor is accomplished to equip the magnetic intercommunication between a current carrying conductor and an external magnetic field to generate rotational motion.

4.6: Thing Speak:

Thing Speak[6] was originally inaugurated by ioBridge in 2010 as a service in support of IoT applications. It is IOT analytics platform services that concede you to aggregate, and analyze live. Datastreams in the cloud. Thing Speak provides existing visualizations of data assigned by your devices to Thing Speak. Thing Speak is generally used for prototyping. It will run IoT analytics automatically based on schedules. The things generally comprise of an embedded operating system and an ability to communicate with the neighboring things.

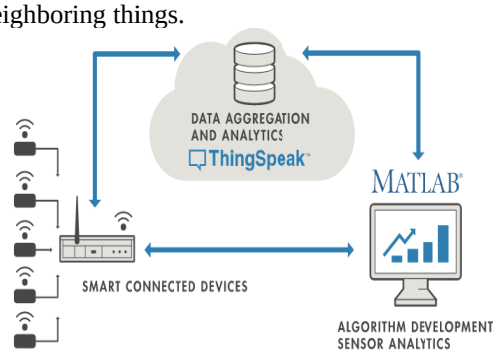


Fig 12: Example diagram for Thing Speak

5. Working process:

The procedure of this paper describes about the Smart way of grasping the levels and faults.

- The main objective of this paper is to provide an automatic irrigation system[8] there by saving time, money and power of the farmer.
- This system is used to detect the moisture content of the soil and depending on the basis it generates water with the automted technology of irrigation.
- soil is recognized as one of the most valuable natural source where soil PH property used to describe the degree of acidity.
- PH value of the soil is determined and accordingly crops or plants are suggested that can be grown in that field.

6. Methodology:

In this paper, we describe about the level of moisture sensor. when we want to read the levels of moisture sensor first, we should give the wifi connectivity to the aurdino, then we can read the data from sensor. Then after that we should initialize the thing speak server with the help of this we can contemplate level of the moisture sensor, by this we can know in which condition the moisture sensor in the soil is present either it in dry condition or wet condition. when it is in dry condition then automatically the motor will be ON, when it is wet condition the motor will be OFF Based upon the condition it will update the graph.

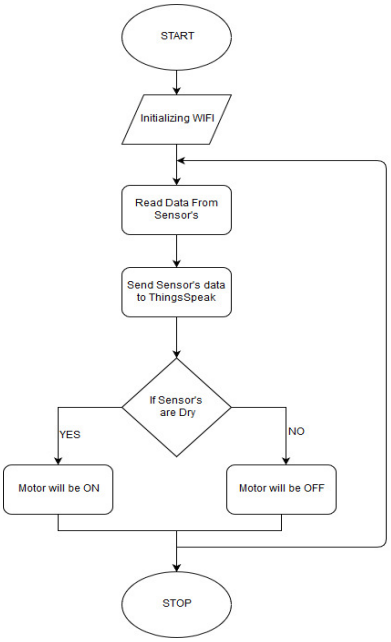


Fig13:Flowchart of the System

7. Results:

The values obtained through sensors enable the system to switch the sprinkler ON and OFF. A farmer can remotely monitor the irrigation process n the farm.

Fig 14: Result for Moisture Sensor

Based upon the Ph[9] value and type of soil nutrients we can grow the particular crop in particular soil.

SMART IRRIGATION TYPE OF CROP BASED ON SOIL NUTRIENTS AND PH VALUE				
S.No	PH value	Type of Soil Nutrients	Name of the Soil	Name of the Crop
1	6.6	Iron	RedSoil	Red Gram Bengal Gram Green Gram Ground nut Castor Seed
2	7.5 to 8.5	 Calcium Potassium Magnesium	BlackSoil	Cotton Tobacco chilly Oil seeds Jowar Ragi Maize
3	7	Phosparic Acid	Alluvial Soil	Paddy SugarCane Mustard Jute Pea Ragi Millets
4	5.5 to 6.5	Low nutrient Contents	Sandy Soil	Coconut Cashew Casuarainas
5	4.4 to 7.9	Nitrogen	Desert Soils	Millets Barley
6	>8.5	------	Saline and Alkaline Soils	Not suitable for crop Cultivation
7	<4.0	High Acidic Nature High Sallt Quantity	Marshy and Peaty Soils	Not suitable for crop Cultivation
8	4.5 to 5	Iron	Laterite Soils	Tea Coffee Rubber Coconut Cashews Cotton Rice
9	5.5 to 7	High salt Content	Arid Soils	Wheat Cotton Corn Pulses Barley
10	4.5 to 5	Acidic Nature	Forest Mountain soils	Tea Spices Wheat Maize Barley Coffee Tropical Fruits

Fig 15: Describes the type of crop based on soil nutrients and pH value

8. CONCLUSION:

The objective of the system is to detect the moisture content of the soil and on the basis it generates the water with the automated technology of irrigation, the human intervention can be minimized. Based on the pH value of the soil we determined which types of crops are suitable in that field.

9. ACKNOWLEDGEMENT:

We would like to thank our guide Assist Prof S. Abdul Yunus Basha who supported us through the different phases of the project. Also, we are grateful to Brindavan Institute of Technology and Science for providing the resources which led us for successful implementation of the paper.

10. REFERENCES:

[1] Technical issues in modernizing farm irrigation systems by Bruno Molle.

[2] Marvin T. Batte, “Changing computer use in agriculture: evidence from Ohio”, Computers and Electronics in Agriculture, Elsevier science publishers, vol. 47, 1–13, 2005

[3] Csótó, Magyar, “Information flow in agriculture – through new channels for improved effectiveness”, Journal of Agricultural Informatics 1 (2), 25–34, 2010

[4] P. D. Minns, C Programming For the PC the MAC and the Arduino Microcontroller System. Author House, 2013

[5] Sumeet. S. Bedekar, Monoj. A. Mechkul, and Sonali. R. Deshpande “IoT based Automated Irrigation System”, IJSRD - International Journal for Scientific Research& Development| Vol. 3, Issue 04, 2015 | ISSN (online): 2321-0613

[6] Thingspeak : https:// thingspeak.com/

[7]. V. Raut, S. Shelke, "Wireless acquisition system for water quality monitoring", 2016 Conference on Advances in signal Processing (CASP), pp. 371-374, 2016.

[8]. S.K Luthra, M.J Kaledhaikar, O.P Singh, N.K Tyagi “design and development of an auto irrigation System” Elsevier journal of Agricultural water Management 33(1997) 169-181

[9]. Rafael Munoz-Carpena and Michael D. Dukes “Automatic Irrigation Based on Soil moisture for vegetable crops” available online at http://edis.ifas.ufl.edu accessed on October, 2015

[10] Arduino, "Arduino uno." Last visited on 06/09/2014

[11] Karen Rose, Scott Eldridge, Lyman Chapin, "The Internet of Things: An Overview Understanding the Issues and Challenges of a More Connected World", Internet Society, 2015.

