



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 4, April 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

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Smart Irrigation System Using IOT

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ABSTRACT: Agriculture is an integral part of Indian economy. Over 60% of Indian population based upon agriculture and one third of the income of nations arises from agricultural practices. Hence it plays a vital role in the development of the country. Various issues related to farming is continuously hampering the development of the country. Possible solution for these problems is to opt for modernized agriculture that comprises of modern trends. Hence, agriculture can be made smart using IoT and other technologies. Smart agriculture increases crop yield, decreases water wastage and imbalanced use of fertilizers The highlighting feature of this project is that it measures the different agricultural parameters affecting the yield and it also uses a GPS module to get the information about the location. Secondly it sends all the data to the cloud where it can be further analyzed. Thirdly this project also contains an android mobile app providing an easy access of information to the farmer. Moreover this project presents a smart irrigation system that optimizes water usage

KEYWORDS: Node MCU, DTH11 sensor, soil Moisture sensor, motor, iot Server etc.

I. INTRODUCTION

Agriculture is considered as the basis of life for us as it is the main source of food and other raw materials. It plays vital role in the growth of country's economy. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, many farmers still use the traditional methods of farming. In India most of the irrigation system are manually operated one's. These outdated techniques are replaced with automated techniques. This paper focuses primarily on reducing the wastage of water and minimizing the manual labor on field for irrigation [1]. Recent advances in soil water monitoring combined with the growing popularity of Wireless Sensor Networks make the commercial use of such systems applicable for agriculture and Gardening. The system designed is programmed to irrigate at regular time intervals for predefined periods of time. In this technique, soil moisture sensors are placed root zone of plant and near the module and gateway unit handles the sensor information and transmit data to the controller which in turns operates the of control the flow of water through the valves. To give proper attention to the land located far away from the human settlement, supervisory automatic control systems like multi-terminal control systems are used since in many processes, factors like soil, salinity, irrigation, temperature, light intensity, etc. needs repeated tasks and have to work in abnormal environmental conditions of the soil and to overcome the flaws in the existing system here we are irrigating the land based on the soil humidity and at the same time the status of the irrigation is updated wirelessly to the based IOT server.

II. RELATED WORK

Internet of things has capacity to transform the lives of people in the world in an efficient manner. The ever growing population would touch more than 3 billions in few years. So to feed such an immense population, agriculture industry need to embrace iot. The demand for more food has to address challenges that include excessive climate conditions, weather change and different environmental affects that results from farming practices. From survey of united nations – food and agriculture organisations, the world wide food production should be increased by 70% in 2050 for evolving population. Agriculture is the basis for the human species as it is the main source of food and it plays important role in the growth of country's economy. It also gives large ample employment opportunities to the people. The farmers are

still using traditional methods for agriculture, which results in low yielding of crops and fruits. So the crop yield can be improved by using automatic machineries. There is need to implement modern science and technology in the agriculture for increasing the yield. By using iot, we can expect. The increase in production with low cost by monitoring the efficiency of the soil, temperature and humidity monitoring, rain fall monitoring, fertilizers efficiency, monitoring storage capacity of water tanks and also theft detection in agriculture areas.

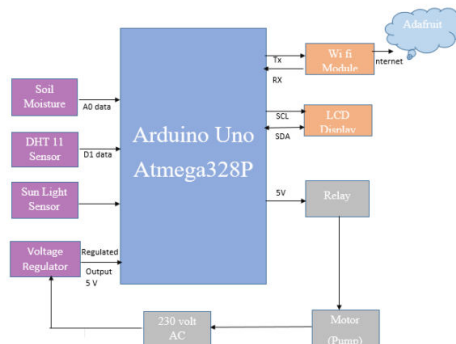
III. METHODOLOGY

In the field section, various sensors are deployed in the field like temperature sensor, moisture sensor, sun light sensor and dht 11 sensor. The data collected from these sensors are connected to the arduino through esp8266. In control section, the received data is verified with the threshold values. If the data exceeds the threshold value the buzzer is switched on and the led starts to blink. This alarm is sent as a message to the farmer and automatically the power is switched off after sensing. The values are generated in the web page and the farmer gets the detailed description of the values. Moisture sensor will sense availability of water in soil. If the water is less or more than need it will show it on mobile of user. Then if water is less then need then it will get water by pump. Sun light sensor will sense the sun intensity if it is observed that intensity is harmful to the crops then user will get to know and take precaution measures accordingly.

III. TABLE 1. COMPONENTS OF PROJECT

Component Names	Quantity
Hardware	
Arduino Uno	1
Voltage Sensor/Voltage divider	1
LCD	1
Base Sheet 25*35 cm	1
soil moisture sensor	1
Water Pump	1
Node MCU:	1
DHT11 Sensor	1
Sun Light Sensor	1
Software	
Arduino Ide (Integrated Development Environment)	1
Adafruit	1

FIG. 1. SHOW THE BLOCK DIAGRAM FOR THE IMPLEMENTATION OF OUR IOT BASED SMART IRRIGATION PROJECT .

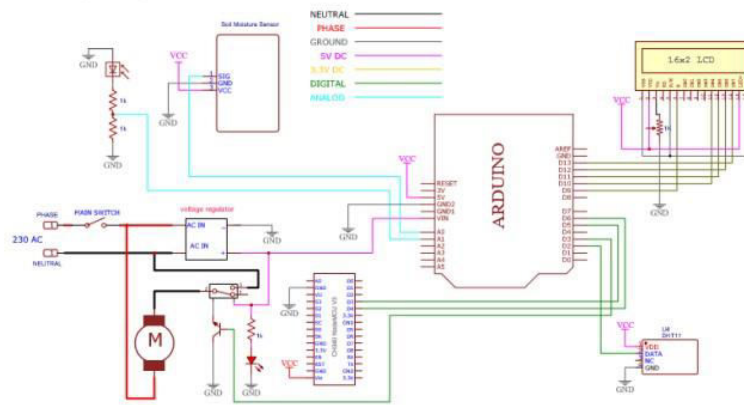




The basic building blocks of an IoT System are Sensors, Processors and applications. So the block diagram below is the proposed model of our project which shows the interconnection of these blocks. The sensors are interfaced with Arduino Uno, data from the sensor is displayed on the mobile app of the user. Mobile app provides an access to the continuous data from sensors and accordingly helps farmer to take action to fulfil the requirements of the soil. 5 volt regulator is used to energize arduino system including the sensors.ESP 8266 module which will provide wifi functionality to system. Arduino uno is the most important part of the entire system which is used to run the entire system.It works as the brain of the setup.Small solar cell is used as a light sensor.Relay is used to control the water pump And LED is also attached to see it's status Soil moisture sensor is used to measure the quantity of water available in the soil.LCD is used print humidity,moisture,motor status and light intensity.DHT 11 sensor is used to detect weather connection.Water pump is used to supply water.

IV. EXPERIMENTAL RESULTS

I. Design Stages:



II. Hardware Tools:

a) Arduino Uno:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.



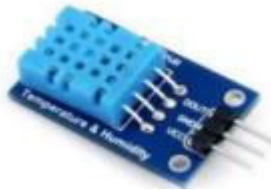
b) Node MCU:

It is an open sources firmware and development kits to build IoT products. It includes firmware that run on ESP8266 WiFiSoC and hardware that has an ESP-12 module. The kit has analog (A0). It also has digital (D0-D8) pins on the board. It even assists serial ports communications such as SPI, UART, I2C etc.



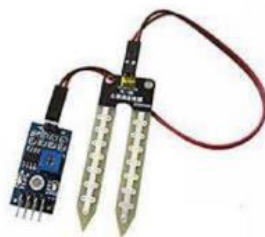
c) DHT11 Sensor:

This sensor is basically a cost efficient digital humidity & temperature sensor. This sensor supplies digital output and therefore can be directly connected to data pins of microcontroller in spite of using ADC. It also consists of eight bit microcontroller to provide values of temperature & humidity in the form of data that is serial. It has 4 pins they are VCC, GND, DATA and NC. It operates from 3.3-5 volts power supply. This sensor has exceptional quality, anti-interference capability, economical performance and fast reaction benefits. Humidity is calculated by means of measuring the conductivity of liquid substrate that alters with exchange in humidity and temperature is calculated by the usage of a thermistor. The function called read() is used to take readings from the sensor which is included in library.



d) Soil Moisture Sensor:

Moisture sensor has 3 pins – one is for voltage input, second for ground and third is for analog input. Moisture content of the soil (volume %) is measured by this sensor. The analog value need to be mapped in the range of 0-100 as moisture content is evaluated in percentage. The property used by this sensor is electrical resistance of soil. There are 2 probes in this sensor that permits the current to pass through the soil. After that it gets the value of resistance to measure the water content level. This implies that higher the water content higher is the conduction of electricity which means lesser resistance. If the soil is dry then the conduction in the soil is poor, this leads to increase in level of resistance. Hence it uses the property of resistance to



e) Sun Light Sensor:

A solar cell, or photovoltaic cell, is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect, which is a physical and chemical phenomenon. It is a form of photoelectric cell, defined as a device whose electrical characteristics, such as current, voltage, or resistance, vary when exposed to light. Individual solar cell devices are often the electrical building blocks of photovoltaic modules, known colloquially as solar panels.





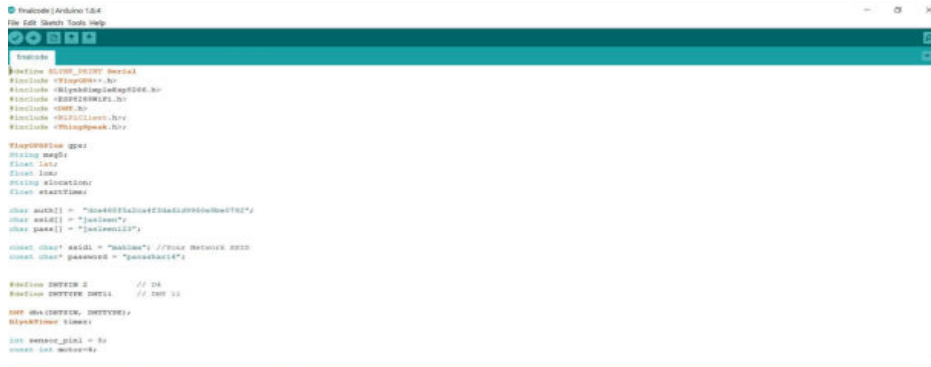
f) Motor:

It is a micro submersible pump which works on dc 3-6v with cost efficient and portable. It is able to take around 120 litres for every hour with extremely low current utilization. Water level should be higher as if the motor is used without water it can harm the parts of this device due to overheating. There are many applications such as controlled fountain water flow, hydroponic systems, controlled garden watering system.

III. Software Tools

a) Arduino Ide (Integrated Development Environment):

g) Arduino IDE is an open source programming which is basically used to write & compile code using a module that is Arduino. This is an official programming software which makes compiling of code simple so a typical man can understand the learning procedure. This software is readily available for all operating systems like MAC, windows, Linux. Arduino Mega, Arduino Uno, Arduino Leonardo and more are range of Arduino modules that are available. It basically has a text editor which is used for writing code, a text console, a message area, a toolbar with buttons for some of the common functions. Sketches are called as the programs that are written using this software. Coding on this software mostly uses functions of c/c++.



b) Adafruit:

Adafruit.io is a cloud service that just means we run it for you and you don't have to manage it. You can connect to it over the Internet. It's meant primarily for storing and then retrieving data but it can do a lot more.



V. CONCLUSION

The proposed model explores the use of IoT (Internet of things) in the agriculture sector. This model aims at increasing the crop yield by helping in predicting better crop sequence for a particular soil. Thing speak helps in real time sampling of the soil and hence the data acquired can be further used for analysing the crop. We have also taken



many readings of the soil moisture, temperature and humidity of the environment for various days at different times of the day. Data on the cloud also helps the agriculturists in improving the yield, evaluating the manures, illness in the fields. This system is cost effective and feasible. It also focuses on optimizing the use of water resources which combats issues like water scarcity and ensures sustainability. This model focuses on the utilization of IoT in agriculture and the solutions proposed in this paper will improve farming methods, increase productivity and lead to effective use of limited resources

REFERENCES

- [1] Rajalakshmi.P, Mrs.S.Devi Mahalakshmi“*IOT Based Crop-Field Monitoring And Irrigation Automation*” 10th International conference on Intelligent systems and control (ISCO), 7-8 Jan 2016 published in IEEE Xplore Nov 2016.
 - [2]S.Sivachandran, K.Balakrishnan, K.Navin, “*Real Time Embedded Based Soil Analyser*”, International Research Journal of Engineering and Technology (IRJET). Volume: 3 Issue 3 | March 2014
 - [3]Anand Nayyar, Er. Vikram Puri, “*IoT Based Smart Sensors Agriculture Stick for Live Temperature and Moisture Monitoring using Arduino, Cloud Computing & Solar Technology*” May 2015.
 - [4]Chandan Kumar Sahu, Pramitee Behera, “*A Low Cost Smart Irrigation Control System*”, IEEE sponsored 2nd International Conference on Electronics and Communication System (ICECS2015)
 - [5]Laxmi C. Gavade, A.D Bhoi , “*N, P, K Detection and Control for Agriculture Applications using PIC Controller*”, International Research Journal of Engineering and Technology (IRJET). Volume: 6 Issue: 4 | April 2017
 - [6]N. Suma, S.R. Samson, S.Saranya, “*IoT Based Smart Agriculture Monitoring System*” International Journal on Recent and Innovation Trends in Computing and Communication Vol. 5 Issue: 2, pp 177181, India, 2017.
- [1]



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