Arduino Based Smart Irrigation System Using IOT

[1]Saumil Chaniyara, [2]Meera Bhuva, [3]Prinsee Kotadiya, [4]Milan Pethani, [5]Bharat Tank

[1]B.Tech Student, [2]B.Tech Student, [3]B.Tech Student, [4]B.Tech Student, [5]Assistant Proffesor
[1]Dept. of Instrumentation & Control,
[1]Parul Institute of Technology Vadodara, India

Abstract : A mechanized water system framework for proficient water the executives and interloper recognition framework has been proposed. Soil parameters like soil dampness, pH, Humidity are estimated and the detected qualities are shown in Blynk Application. The interloper identification framework is finished with the assistance of PIR sensor where the flying creatures are repulsed from going into the field. The IOT Platform has been utilized to set up a correspondence connect between the rancher and the field. The present field status will be suggested to the rancher through updatation in the server. The rancher can get to the server about the field condition whenever, anyplace along these lines lessening the labor and time. Also, as Indian ranchers are confronting a gigantic issue because of continuous power disappointments. Sunlight based controlled programmed water system framework can be a reasonable option for ranchers in the current situation with vitality emergency. Consequently, for the power supply the Solar System will be utilized.

Keywords–Sensors, Arduino Node MCU, Intruder Detecting System,IOT.

I. INTRODUCTION

The foreseen masses of India being 1500 million by 2050 and cultivation remaining as the fundamental wellspring of work in nation regions, the accentuation should be on the development of efficiency. The motivation of this endeavor has begun from the countries where economy is in perspective on cultivating and the climatic conditions brief inadequate precipitation and deficiency of water. The extending solicitation of the sustenance supplies requires a quick change in sustenance creation advancement. In various countries where agribusiness has a basic impact in putting everything in order the economy and climatic conditions are isotropic, yet in the meantime we are not prepared to make much benefit out of country resources [6]. There is a basic need to make strategies in perspective on science and development for practical usage of water, including specific, agronomic, managerial and institutional changes. Plant water framework in perspective on Internet advancement relies upon item water essential rules. By using Internet development and sensor arrange advancement we can control water wastage and to intensify the legitimate progressions in water framework procedures [7]. The Internet of Things (IOT) is the place in a mobile phone can be used to screen the limit of a device. The Internet of Things (IOT) is stressed over interconnecting passing on items that are presented at different zones that are possibly difficult to reach from each other. Web of Things (IOT) is a kind of framework advancement, which recognizes the information from different sensors and makes anything to join the Internet to exchange information.

II. SYSTEM CONFIGURATION

The arduino base Smart water system gadget the utilization of IOT is demonstrated in figure1. To play out the activity sun based board required for sun battery-powered cell (quality supply). This cell is associated with Arduino. Arduino software engineer loader for putting in our application in Arduino, it also connected with soil dampness sensor, PH sensor ,weight sensor ,PIR sensor, DHT11 sensor, LCD appear, GSM module, Driver circuit ,DC siphon. The Soil Moisture sensor is connected to measure the clamminess content present inside the residue, In sensor stick is connected to clearly ponder current soil sogginess motivator to check whether it is above utmost or on the other hand never again. The angle voltage might be controlled with assistance of potentiometer. PH sensor is use to measure destructiveness or alkalinity of water affiliation that is directed by means of the general amount of hydrogen (H+) or hydroxyl (Gracious) particles present. The DHT11 sensor is experience the temperature and mugginess, this sensor exhibits low power utilization and up-to twenty meter flag transmission is suitable. The pressure sensor estimating hint of differentialpressure, the PCB will transduce it to differential pressure sign in this manner it might be utilized for climate guaging. The PIR sensor recognizes the development with the variety of Infrared radiation, It can cowl up to 10 meters at an edge of ±15 degrees. The GSM module helps active and approaching voice calls, simple message machine (SMS or content messaging), and records correspondence (through GPRS).The Arduino GSM watch is a GSM modem. Arduino LCD Set Up and Programming Guide. Thusly, a sixteen×2 LCD show screen can show up to 32 characters right this minute. It is potential to uncover more than 32 characters with investigating be that as it may. At the point when the sensors feel the dirt circumstance as dry, at that point the comparator sends the order to the Arduino, and also it sends instructing to the thought process constrain circuit at that point, it reminds the engine to DC siphon water to the plants.
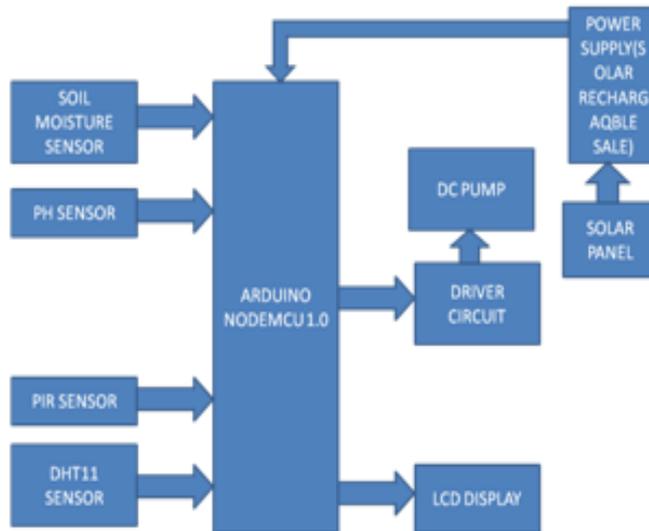
III.DESIGN OF SYSTEM

figure1. block diagram

(A)Arduino NodeMCU1.0:

NodeMCU is an open source IOT stage. It incorporate firmwares which keep running on the ESP8266 from Espressif Systems, and equipment.. The expression "NodeMCU" as a matter of course alludes to the firmware as opposed to the advancement units. The firmware utilizes the Lua scripting language[11].

figure2. arduino nodemcu[21]

(B) Soil Moisture Sensor:

Soil Moisture sensor is used to check the soddenness content present in the earth. At whatever point the dirt moistness regard scrutinized by the sensor is over the edge regard, low dimension (0V) will be the propelled yield and if it is underneath the edge level, irregular state (5V) will be the electronic yield. The propelled stick is used to direct peruse current soil sogginess motivator to check whether it is above farthest point or on the other hand not. The edge voltage can be controlled with assistance of potentiometer.

figure3. soil moisture sensor

(C) pH Sensor:

PH is the proportion of corrosiveness or alkalinity of water arrangement which is dictated by the relative number of hydrogen (H+) or hydroxyl (Gracious) particles present. The pH esteem (underneath 7) is said to be acidic and (over 7) is said to be essential. The pH of an answer can changes with temperature separately.

figure4. ph sensor

(D) DHT11:

This sensor is utilized for estimating temperature and moistness. It utilizes a capacitive dampness sensor and a thermistor to gauge the encompassing air. This sensor is financially savvy, gives low power utilization and up-to 20-meter flag transmission is conceivable.
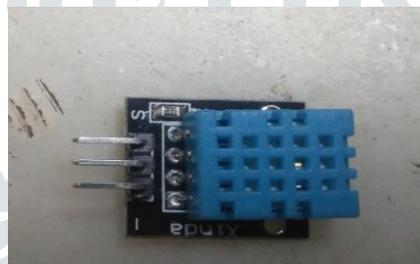

figure5. dht11 sensor

(E)PIR Sensor:

It is a Passive Infrared sensor which distinguishes the movement with the variety of Infrared radiation. It can conceal to 10 meters at an edge of ±15 degrees. PIR is as same as open air light with the movement locator and responds to developments made by articles that transmit heat.

figure6. pir sensor

(F) LCD Display:

Arduino LCD Set Up and Programming Guide. Along these lines, a 16×2 LCD screen can appear at 32 characters pronto. It is possible to appear more than 32 characters with investigating be that as it may.

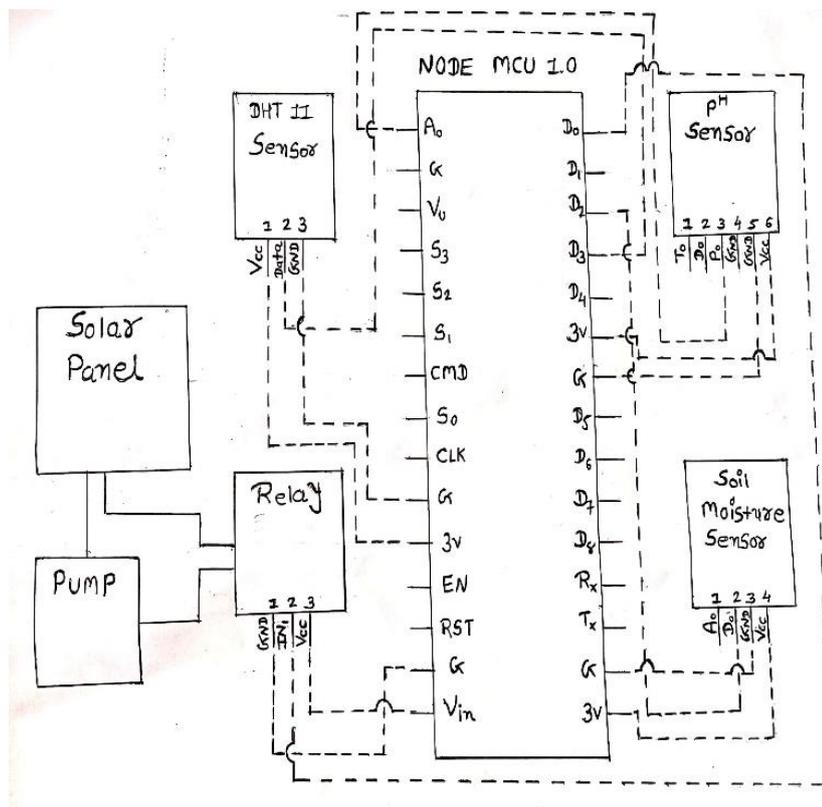figure7. lcd display

VI. Circuit diagram

figure8. circuit diagram

Here the figure8 describes about the connections of three different sensors and a DC pump with the help of relay to arduino node MCU where the pump is powered through a solar. As Node MCU is a WiFi built in module there is no need of any external wifi, also as it contains only one analog pin i.e. A0 and the more pins are the digital ones. Therefore as pH is connected to the analog pin for better output, whereas the other are with digital. So the soil moisture sensor is connected to the digital pin D2, the dht11 with pin D3, and relay with D0 pin. And the rest pins are as connected to the ground and vcc pins to rest node mcu ports. Here relay is worked as a switch for controlling the pump to switch it on and off.

V. Result analysis

In the wake of doing the associations of the considerable number of sensors and executing their individual codes all together we get the last outcomes.
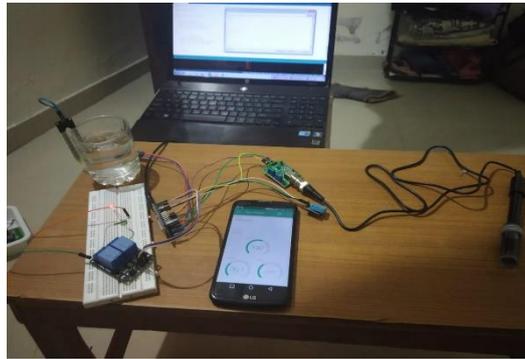
The following is the final implementation:

figure9. present connections

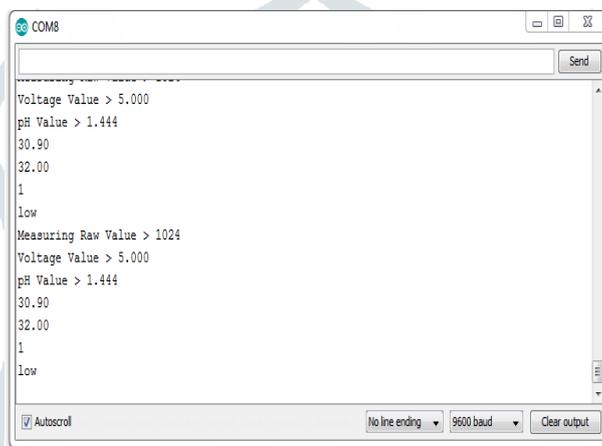The result of serial terminal Arduino IDE:

Figure10. arduino ide software

The Arduino incorporated improvement condition (IDE) is a cross-stage application (for Windows, macOS, Linux) that is written in the programming language Java. It is utilized to compose and transfer projects to Arduino board. And as the figure 10 shows the Com8 on title bar which says that the node mcu is connected to the com port 8 of the pc or laptop. And as a result the values are mentioned in this screen i.e. pH value, moisture value, even the values of humidity and temperature.

Blynk application's module interface screen:
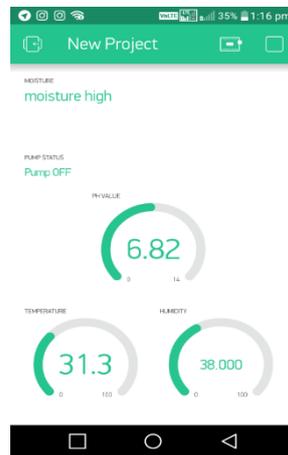

Figure11. (pump on)

Figure12. (pump off)

The above figure11 and figure12 display the result on the screen of Blynk Application, where Blynk is another stage that enables you to rapidly assemble interfaces for controlling and observing your equipment ventures from your iOS and Android gadget. And this figures indicate the 5 different status i.e. Moisture level(low or high), Pump status(on or off), pH value(value between 0-14), Temperature(range 0-100deg. Celsius), Humidity(range 0-100) respectively.

V. Conclusion

We finish up here by watching all the exploration papers of according to the direction of resources that this task displays the structure of an IOT based programmed water system framework. This task created agribusiness field and increment the development of sustenance generation. The programmed water system framework is to streamlines the utilization of water by diminishing wastage and lessen the human intercession for ranchers.

The framework for the most part screens the conduct of soil dampness, air mugginess, and air temperature and perceives how it adds to assess the requirements of water in a plant. The rancher gets a notice on his advanced mobile phone and he can turn on the water siphon with a catch click. Estimating parameters, for example, soil dampness, temperature, moistness, and pH esteems and the framework additionally incorporates gatecrasher distinguishing framework.

The framework for the most part screens the conduct of soil dampness, air mugginess, and air temperature and perceives how it adds to assess the requirements of water in a plant. The rancher gets a notice on his advanced mobile phone and he can turn on the water siphon with a catch click. Estimating parameters, forexample, soil dampness, temperature, moistness, and pH esteems and the framework additionally incorporates gatecrasher distinguishing framework.

Computerized water system framework has a gigantic interest and future extension too.A rancher spares time, cash and water assets by utilizing AIS (robotized water system framework). The guideline can be reached out to make completely robotized greenery enclosures and farmland.

REFERENCES

[1]PavankumarNaik, ArunKumbi, VishwanathHiregoudar, Chaitra N K, Pavitra H K, Sushma B S, Sushmita J H , Praveen Kuntanahal , *"Arduino Based Smart Irrigation System"*,International Journal of Advanced Research in Computer and Communication Engineering ISO 3297:2007 Certified Vol. 7, Issue 3, March 2018.

[2]Ms. DeweshvreeRane, BDCE, Sevagram, Wardha, India, *"Arduino Based Automatic Irrigation System Using IOT"*,International Journal of Scientific Research in Computer Science, Engineering and Information Technology ©,2017.

[3]Madhu Vanthi.K1, Kavipriya.R2, DivyaPriya.D3, M.Ambika4, *" Survey On Automated Irrigation Systems Using Wireless Sensor Networks"*,International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 , Apr-2016.

[4]Priyadharsnee.K, 2Dr.S.Rathi, *"Review Paper Based On Automatic Irrigation System Based On RF Module"*,ISSN 2348 – 9928 IJAICT , January 2015.

[5]Ms Shwetha P.S, *"An IOT Based Smart Irrigation System"*, International Journal of Scientific & Engineering Research , May-2017.

[6]A Sumalatha, G Eswar Kumar, *"Energy Efficient Solar Powered Automatic Irrigation System"*, International Journal of Engineering and Management Research, May-June 2017.

[7]PavankumarNaik, ArunKumbi, VishwanathHiregoudar, Chaitra N K , Pavitra H K, Sushma B S, Sushmita J H , Praveen Kuntanahal, *" Arduino Based Automatic Irrigation System Using IOT"*, International Journal of Scientific Research in Computer Science, Engineering and Information Technology, May-June-2017.

[8]SanjayKumawat, MayurBhamare, ApurvaNagare, AshwiniKapadnis,*"Sensor Based Automatic Irrigation System and Soil pH Detection using Image Processing"*, International Research Journal of Engineering and Technology (IRJET), Apr -2017.

[9]SaurabhSuman, Shanu Kumar, Ratnajeet Sarkar, Gautam Ghosh, *" Solar Powered Automatic Irrigation System on Sensing Moisture Content Using Arduino and GSM"*, International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE), June 2017.

[10]BishnuDeo Kumar, Prachi Srivastava, Reetika Agrawal, VanyaTiwari,*"Microcontroller Based Automatic Plant Irrigation System"*, International Research Journal of Engineering and Technology (IRJET), May -2017.

[11]R.Nandhini, S.Poovizhi,Priyanka Jose, R.Ranjitha, Dr.S.Anila, *"Arduino Based Smart Iirrigation System Using IOT"*,3rd National Conference on Intelligent Information and Computing Technologies, IICT '17, March 2017.

[12]ArifGori, Manglesh Singh, OjasThanawala, AnupamVishwa karma,
 Prof. AshfaquShaikh,*"Smart Irrigation System using IOT"*,International Journal of Advanced Research in Computer and Communication Engineering, September 2017.

 [13]ChandankumarSahu , PramiteeBehera,*"A low cost smart irrigation control system"*, Ieee sponsored 2nd international conference on electronics and communication system (icecs 2015),february 2015.

[14]SrishtiRawal,*"IOT based Smart Irrigation System"*,International Journal of Computer Applications (0975 – 8887) , February 2017.

[15]Sandeep Kaur, Deepali,*"A survey on automatic irrigation system using wireless sensor network"*, international journal of current engineering and scientific research (ijcesr) volume-4, 2017

[16]Karan Kansara1, Vishal Zaveri1, Shreyans Shah1, Sandip Delwadkar2, KaushalJani,*"Sensor based Automated Irrigation System with IOT"*,International Journal of Computer Science and Information Technologies, 2015.

[17]DishayKissoon ,HinoucchaDeerpaul , AvinashMungur,*"A Smart Irrigation and Monitoring System"*,International Journal of Computer Applications (0975 – 8887),April-2017.

[18]Aniket H.Hade, Dr. M.K.Sengupta,*"Automatic Control of Drip Irrigation System & Monitoring Of by Soil Wireless"*, IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) ,Apr- 2014.

[19]S. Harishankar1, R. Sathish Kumar2, Sudharsan K.P,U. Vignesh and T.Viveknath, *"Solar Powered Smart Irrigation System"*,Research India Publications, 2014.

[20]YuthikaShekhar,EktaDagur,SourabhMishra,Rijo   Jackson   TomandVeeramanikandan.M,SureshSankaranarayanan, *"Intelligent IoT Based Automated Irrigation System"*,International Journal of Applied Engineering Research ISSN 0973-4562,2017.

[21]https://www.google.com/search?q=node+mcu&client=firefox-b-d&source=lnms&tbm=isch&sa=X
&ved=0ahUKEwjFzqCfgLfhAhUQcCsKHVLOC9sQ_AUIDigB&biw=1366&bih=632#imgrc=i3K8D9w3olRIHM