

Low Cost and PI Based Smart Home Garden Watering System using IOT

D. Sowmya, R. Praveen Sam

Abstract— Now a day's every system operated with IOT and acts smartness. The smartness can acts as an important role. The smartness of devices can choose decisions automatically and give fast response. It gives comfort as well as diminish manual endeavors, time and conservative. The cutting edge home greenhouse framework has a basic occupation in controlling the use of water to ensure the idea of grain and to expand crop productivity. This paper proposes a splendid home patio nursery framework which screens and keeps up the ideal soil dampness content through customized watering. A shrewd home greenery enclosure framework ordinarily joins a store or water channels and a siphoning framework. The scaled down scale controller Raspberry pi containers goes about as significant job and goes about as an IOT portal to client and equipment. The equipment of the framework contains light ward resistor, level pointer and uninvolved infrared sensors. The whole framework watched and controlled Raspberry pi. Depends up on that got data the framework sits tight for reaction from client and procedure. In the event that any sensor condition changes as for the pre characterized conditions the Raspberry pi module sends page notices to client and alerts the buzzer. Finally the water content present in garden, operation of the motor directly monitor in web page and user get Email notifications when sensor conditions change. IOT provides better solutions to different problems and remote operations comfort with low cost.

Key Words: Raspberry Pi, LCD, Soil moisture, LDR, Passive Infrared sensor, DC Pump, Ultrasonic sensor, Buzzer.

1. INTRODUCTION

IOT rules the world. It is a technique of use the computers or mobile phones in monitoring and controlling the simple parameters of daily life. As water supply become turn out to be rare and polluted, our goal is need to flood increasingly efficient so as to optimize water use. In future water content in land combined with growing popularity of wireless sensor networks make business utilization of such systems applicable not only to irrigation and industry, however to homes also. Lot of people dislike their interest in gardening because it needs lot of manual efforts required for proper grow up the seedlings. Hence, a computerized and quantified system to deal with plants can be a vital tool. IOT is an upcoming innovation that makes utilization of web to control/screen electronic/mechanical gadget, vehicles and physical gadgets associated with the internet. IOT provides users to ability of control more than digital through a comfortable GUI through internet. This IOT give innovative solutions to different problems in existing technologies. IOT as advance technology than wireless sensor networks

Revised Manuscript Received on March 10, 2019.

D. Sowmya, M. Tech Student, G. Pulla Reddy Engineering College, Kurnool, AP, India. (E-mail: dadireddysowmya98@gmail.com)

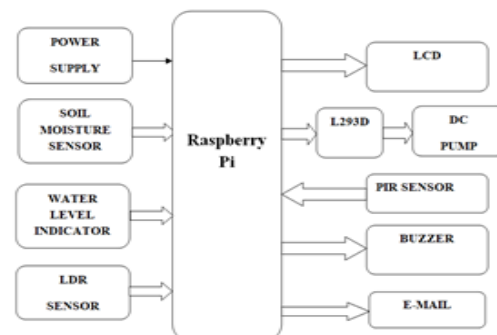
Dr. R. Praveen Sam, Professor, Department of CSE, G. Pulla Reddy Engineering College, Kurnool, AP, India
(E-mail:praveen_sam75@yahoo.com)

technology and miniaturization. All the physical devices are interacting with each other in IOT world. It provides communication between physical things in the world with real time world there by anywhere, anytime, any communications. IOT will help to the people to give solutions in smarter way which might be a smart home, smart industry, smart agriculture, or any smart.

2. SYSTEM DESIGN

The smart garden consists of Raspberry Pi as a hub to which various sorts of sensors, for instance, soil dampness, LDR, Passive Infrared and ultrasonic sensor are associated. The dimension of tank estimated by the ultrasonic sensor that ought to be put at the highest point of the tank utilizing reverberation separate estimation. The rest of the sensor like Light Dependent Resistor sensor is recognize lighting condition and PI sensor is utilized to distinguish living things. Every one of these sensors associated with Raspberry Pi which comprises of inbuilt Wi-Fi innovation. A GUI is keeping up database accessible in web which constant estimations of the sensor are refreshed each second. The client can discuss this framework with android application. In this application the client screens information from anyplace. Watering of greenhouse shifts with various kinds of soils. Because of this we have fix the sensors with pre decided conditions inside the modified programming. Whenever the gardener detects the needs of watering a garden a switch enabled in web will activate the motor.

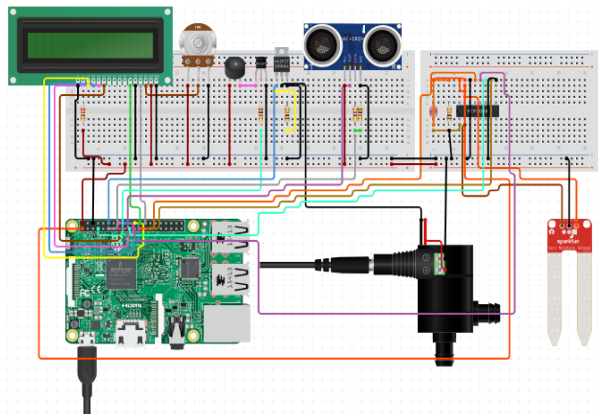
i) Block diagram:



The Smart garden enclosure framework keeps up in total activity of the porch nursery and all the sensor devices and DC siphon will be related with Raspberry Pi. The Raspberry Pi module constantly gets data from sensors and picks the with pre chosen conditions. In case the condition satisfies, by then controller send web notice to customer and hold up to get commitment from customer with a scope of time interval.

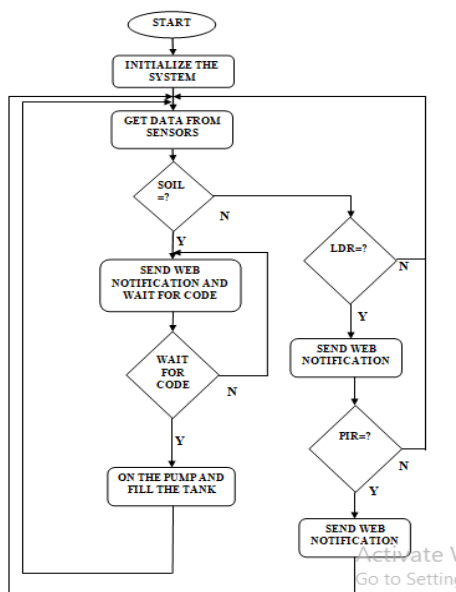
On the off chance that controller gets information from client, at that point procedure according to guidelines. On the off chance that framework gets any contribution with range of time interim, at that point consequently takes a keen choice and send web warning to client. For each adjustment in this framework bell will be alert and the status will be displayed on LCD display

ii) Schematic diagram:



iii) Flow chart:

The working flow graph of the system shown below.



iv) Hardware Description:

Raspberry Pi:

Raspberry Pi model is a small single board computer that developed by Raspberry Pi foundation. Raspberry Pi has several models (A or B) doesn't really matter, but keep in mind but keep in mind that you will connect to local network. Due to this we require a Wi-Fi dongle if we using the A model which doesn't have Ethernet port. In this project using a Raspberry Pi model B with inbuilt Wi-Fi module.

- It has a 64 bit quad core processor.
- The programming speed of Raspberry Pi 700 MHz to 1.4 GHz.
- The onboard memory ranges from 256 MB to 1GB RAM.
- This board has 4 USB ports.
- It has one HDMI port for video output It 3.5 mm tip ring

sleeve jack for audio output.

- It consists of inbuilt Wi-Fi, Bluetooth and Ethernet port.



Sensors:

Sensors are the devices that convert physical quantity into electrical signals. The list kinds of sensors utilized in this framework are clarified underneath.

- Ultrasonic sensor – used to quantify the dimension of water inside the tank
- Soil dampness sensor – used to discover water content in land
- Passive Infrared sensor – used to recognize live things
- LDR sensor – used to discover the lighting condition



DC pump:

It is a low cost submersible pump for watering the garden. This should be operated with the combination of motor driver L293D. The operating voltage of this motor is 2.5v to 6 v. It can take up to 120 liters for each hour with low current utilization of 220mA. Simply interface tube pipe to the engine outlet, submerge it in water and power it. Ensure that the water level is constantly higher than the pump.



LCD display:

Liquid Crystal Display another way it is called as LCD is used for display the all alphabets, Greek letters, special characters and mathematical symbols. The mostly used character based LCD displays are developed by Hitachi's with HD44780 controller. The available LCD's in market are 1 line, 2line and 4 lines.



v) Software

The product that utilized in this work as pursues:

Python: It utilized for programming Raspberry Pi in Python language.

PHP program: PHP record reliant on C program is made to make a relationship between Android application and Raspberry Pi. Raspberry Pi can be gotten to by creating its IP address or adjacent hostname in web server.

Android software:

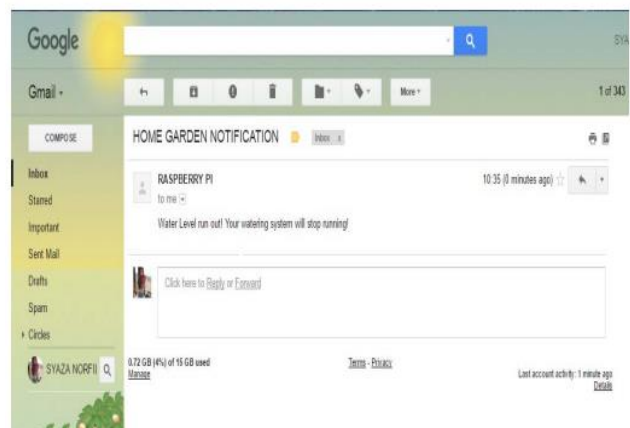
In past works, numerous scientists have built up the android application for Raspberry Pi with Eclipse devices. Nonetheless, Android Developer Tools has been devalued from Eclipse toward the end of year 2015. The advantage of utilizing Android Studio straightforwardly is it gives the most recent tools to building application on each kind of Android API and gives the best quality application. Java code program is utilized to run the Android Studio.

3. RESULTS

The real time view of the system shown below. The Raspberry Pi module always collects data from these sensors and determines the pre-defined conditions. If the conditions satisfy then send web notification to the user and the Raspberry Pi wait for input from user with a specific time. If controller receives input from user then process as per instructions. If system does get any input with specific time interval then automatically takes decision and send web notification to user.



The results of E mail configuration as shown below.



The mobile application for using for smart home garden system as shown below.

4. CONCLUSION

The usage of Smart Garden framework utilizing the Internet of Things has been checked to appealingly work by interfacing assorted parameters of the dirt to the cloud and was successfully controlled remotely through an adaptable application. The framework arranged not simply screens the sensor data, similar to light and level yet what's more prompts distinctive parameters as indicated by our prerequisite, for example, on the off chance that the water level in tank is diminished to a base regard, at that point the

Siphon switch is turned on normally to the water dimension of the tank achieves the most extreme dimension. The underlying cost and the foundation of this framework are shabby and subsequently it might be actualized wherever. With the enhancement of sensor innovation, the framework can be lifted to the accompanying dimension which urges the customers to utilize their enthusiasm for a budgetary way. On the off chance that dirt supplement sensors can be introduced, by then the framework can be changed to supply composts to the greenhouse precisely. This framework spares labor and efficiently utilizes the water assets available ultimately to more benefit.

REFERENCES

1. Bennis, H. Fouchal, O. Zytoune, D. Aboutajdine, "Dribble Irrigation System utilizing Wireless Sensor Networks" Proceedings of the Federated Conference on Computer Science and Information Systems, ACSIS, Vol. 5, 2015
2. T.Thamaraimanalan , S.P.Vivekk, G.Satheeshkumar and P.Saravanan "brilliant greenhouse checking framework" Volume 2, Issue 2, Pages 186-192, April-June 2018
3. Er. Vineet Biswal, Er. Hari M.Singh, Dr. W. Jeberson, Er. Anchit S.Dhar, "A Smart Houseplant Watering and Monitoring System" International Journal of Science, Engineering and Technology Research (IJSETR), Volume 4, Issue 7, July 2015
4. Sandhya.B.R, Pallavi.M, Chandrashekar.M, "IoT Based Smart Home Garden Watering System Using Raspberry Pi 3" International Journal of Innovative Research in Science, Engineering and Technology.
5. Aditya Gupta, Sudhir Mishra, Neeraj Bokde, Kishore Kulat, "Need of Smart Water Systems In India" International Journal of Applied Engineering Research ISSN 0973-4562 Volume 11, Number 4 (2016) pp 2216-2223.
6. P. Tulasi Santhosh Kumar, K.N Balaji Kumar, "Usage of Multi Zone Smart Gardening System" International Journal of Advanced Research in Computer and Communication Engineering ISO 3297:2007 Certified Vol. 5, Issue 10, October 2016.