International Journal of Scientific Research in Science and Technology
Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)
doi : https://doi.org/10.32628/IJSRST218398

Smart Farming Using IOT

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Article Info
Volume 8, Issue 3
Page Number : 448-453

Publication Issue
May-June-2021

Article History
Accepted : 25 May 2021
Published : 31 May 2021

ABSTRACT

In this Project we are designing based on irrigation control using Raspberry Pi, which is designed to tackle the problems of agricultural sector regarding irrigation system with available water resources. In this project, monitoring agriculture field we have used different sensors like soil moisture sensor, temperature sensor and rain sensor with raspberry pi. These monitoring data can be observed on android App. System is worked on two modes,1. auto mode 2. manual mode. In android app we can observe values of all sensors for every 5 or 10 seconds with time and date. According to that values user can on-off the water pump using android app, because it is smart system, it takes its own decision for on-off water pump

Keywords: Raspberry Pi, Soil Moisture Sensor, Temperature Sensor and Smart Technology

I. INTRODUCTION

Automatic irrigation scheduling consistently has shown to be valuable in water use efficiency with reference to manual irrigation supported direct soil water measurements. Irrigation of plants is typically a really time-consuming activity which has got to be wiped out an inexpensive amount of your time it requires an outsized number of human resources.

All the steps were executed by humans traditionally. Nowadays, some systems use technology to scale back the amount of workers and to scale back the time required to water the plants. With such systems, the control is extremely limited and lots of of the resources are still wasted. Water is one among these resources which is employed excessively. Mass irrigation is that the method which is employed to water the plant. This method represents massive losses since the quantity of water given exceeds the plant's needs. The excess water gets discharged by the holes of the pots, or it percolates through the soil within the fields. In addition to the surplus cost of water, labor is becoming more and costlier . The proposed irrigation system are going to be very efficient in areas like house gardens, office premises, buildings etc. where watering plants at regular

interval matters. This system also presents a smart drip irrigation system to water plants using devices like raspberry pi. And also, the user gets the status time to time Before submitting your final paper, check that the format conforms to this template. Specifically, check the looks of the title and author block, the looks of section headings, document margins, column width, column spacing and other features.

II. Literature Survey

The approach proposes technological development in Wireless Sensor Networks made it is possible to use in monitoring and control of the greenhouse parameters in precision agriculture. within the world bus concept, the data transfer is particularly controlled by hybrid system (wired and wireless) to automate the system performances and throughput. ZigBee protocols supported IEEE 802.15.4 for wireless system are used (IJRRASE) Vol3 No.1. PP 7-12 March 2014. The paper aims at optimizing the water use for agricultural crops. An algorithm was developed with the edge values of temperature and soil moisture that was programmed into a microcontroller-based gateway to manage the water quantity. The system was powered by the photovoltaic panels and had a duplex communication link supported a cellular Internet interface that allowed for data inspection and irrigation scheduling to programmed through a web page Vol.63, No.1, January2014. As mentioned it reviews the state of art wireless sensor technology in agriculture. Based on the value of soil moisture sensor the water sprinkler works during the period of water scarcity. Once the field is sprinkled with adequate water, the water sprinkler is switched off Vol 5, PP 64-69 November 2014. It proposes a design for home automation system using ready-to-use, cost effective and energy efficient devices including raspberry pi, Arduino microcontrollers, xbee modules and relay boards. Use of those components leads to overall cost effective scalable and robust implementation of the system. Use of those components results in overall cost effective, scalable and robust implementation of the system. Drip irrigation system makes the efficient use of water and fertilizer. Free arduino flavor of arduino is employed during this design (ICCCA2015). Vol 9, PP 19, February 2015. It reviews the use of modernized techniques such as Internet of-Things (IoT), Sensors, Cloud-Computing, Mobile Computing, Big-Data analysis in agricultural sector. Soil and environment properties are sensed and periodically sent to Argo Cloud through IoT (Beagle Black Bone). Bigdata analysis on Argo Cloud data is done for fertilizer requirements, best crop sequences analysis, total production, current stock and market requirements Vol 6 (3),May-June 2015.

III. System Requirements

Hardware Components:

1. Raspberry Pi
2. Liquid Crystal Display
3. Temperature Sensor
4. LDR Sensor
5. GSM Model SIM800L
6. Soil Moisture Sensor
7. Relay
8. AC Motor Pump

Software Requirements:

1. Embedded C
2. Raspberry OS
3. Linux C Programming
4. Express PCB

1. Raspberry Pi:

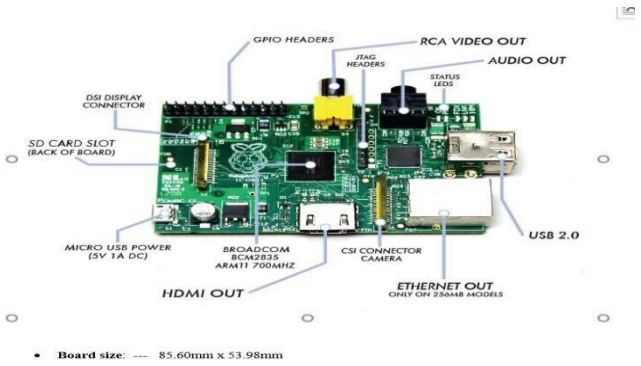


Fig 3.1: Raspberry Pi

The Raspberry Pi 3 Model B builds upon the features of its predecessing with a newer one, Faster processing on board to increase its speed. It also have a features of Wi-Fi and Bluetooth low energy capabilities to enhance the functionality and the ability to power more powerful devices over the USB ports.

Features of Raspberry Pi:

- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy(BLE) on board
- 100 Base Ethernet
- 40-pin extended GPIO
- 4 USB 2 ports
- 4 Pole stereo output and composite video port
- Full size HDMI

2. Liquid Crystal Display:

Fig 3.2: Liquid Crystal Display

Liquid crystal display a kind of display utilized in digital watches and lots of portable computers.

LCD displays utilize two sheets of polarizing material with a liquid solution between them. an electrical current skilled the liquid causes the crystals to align in order that light cannot pass through them. Each crystal, therefore, is sort of a shutter, either allowing light to pass through or blocking the light. The liquid crystals are often manipulated through an applied electric voltage in order that light is allowed to pass or is blocked.

3. Temperature Sensor

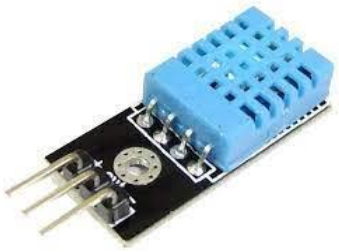


Fig 3.3: Temperature Sensor

Temperature sensors measure temperature with an electrical signal. These sensors have the power to live solids, liquids, or gases. All temperature sensors are made of two different metals that are wont to show a change in temperature.

4. LDR Sensor:

Fig 3.4: LDR Sensor

A Light Dependent Resistor (LDR) is also called a photoresistor or a cadmium sulfide(CdS) cell. It is also called a photoconductor. It is basically a photocell that works onthe principle of photoconductivity. The passive component is basically a resistor whose

resistance value decreases when the intensity of light decreases.

5. GSM Modem SIM800L:

Fig 3.5: GSM Modem SIM800L

A GSM modem may be a specialized sort of modem which accepts a SIM card, and operates over a subscription to a mobile operator, a touch sort of a mobile . From the mobile operator perspective, a GSM modem looks a touch sort of a mobile . When a GSM modem is connected to a computer, this permits the pc to use the GSM modem to communicate over the mobile network.

6. Soil Moisture Sensor:

Fig 3.6: Soil Moisture Sensor

Soil moisture sensor caliculate the volumetric water content within the soil. Since the direct gravimetric caliculation of free soil moisture required removing, drying, and weighing of a sample, soil moisture sensor measure the volumetric water content indirectly by using another property of the soil, like electric resistance , dielectric constant, or interaction with neutrons as a deputy for the moisture.

7. Relay:

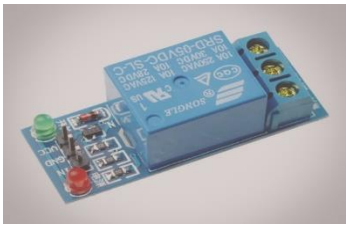


Fig 3.7: Relay

A relay is an electrically operated switch. It consists of a gaggle of input terminals for a single or multiple control signals, and a gaggle of operating contact terminals. The switch may have many number of contacts in multiple contact forms, like make contacts, break, contacts, or combinations thereof.

8. AC Motor Pump:

Fig 3.8: AC Motor Pump

The pumping of water could also be a basic and practical technique, far more practical than scooping it up with one's hands on lifting it during a hand-held bucket. this is often true whether the water is drawn from a fresh source, moved to a needed location, purified, used for irrigation, washing, or sewage treatment for evacuating water from an undesirable location.

IV. Methodology

Our motto is to develop an smart farming using IOT. We are designing based on irrigation control using Raspberry Pi, which is designed to tackle the problems of agriculture sector regarding irrigation system with a available water resources.

4.1 Software Requirement:

Embedded C may be a set of language extensions for the C programing language by the C Standards

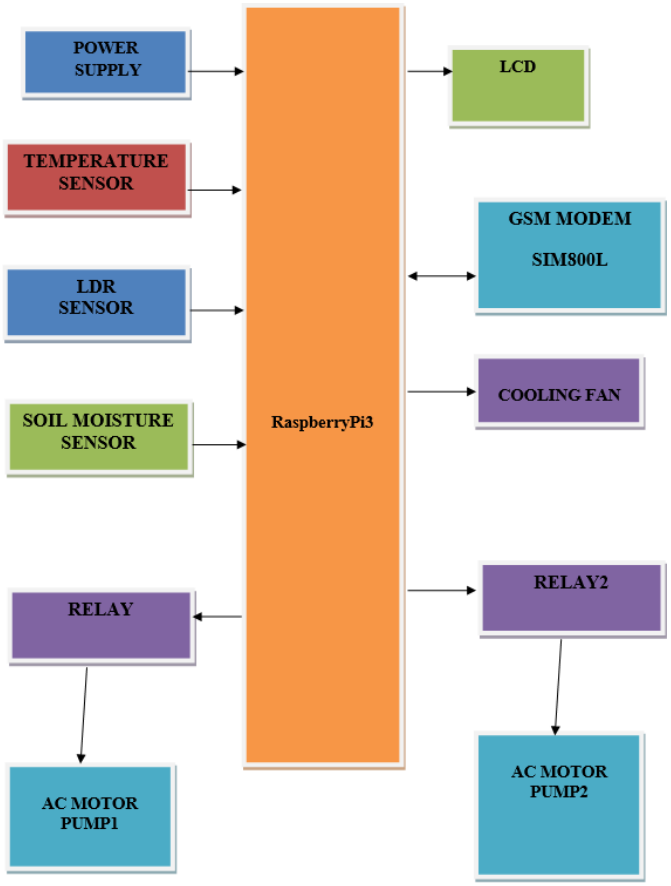
Committee to affect commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language so as to support exotic features like fixed-point arithmetic, multiple distinct memory banks, and basic I/O operation. In2008, the C Standards Committee extended the C language to deal with these issues by providing a standard standard for all implementations to and here to. It includes sort of features not available in normal C such as a fixed point arithmetic named address spaces and basic I/O hardware addressing. Embedded C Programming is that the soul of the processor function inside each and every embedded system we encounter in our lifestyle , like mobile , washer, and digital camera. Each processor is associated with an embedded software.

The first and foremost thing is that the embedded software that decide functioning of the embedded system. Embedded C language is most often won't to program the microcontroller. Earlier, many embedded applications were developed using assembly level programming. However, they did not provide portability. This disadvantage was overcome by the advent of various high level languages like C, Pascal, and COBOL.

V. RESULTS

The IOT farming application are making it workable for farmer to gather the Important Information leading to improvement in the quality of their crop. In this report, the answer for analyzing smart agriculture has been exhibited. This system can go about as an early alert structure for best-in-class risk, a watching system continually giving a record of the farms. It ensures that using IOT can not only improve adequate specialized learning programming skill and equipment segment but also renders its practical usage for society.

VI. BLOCK DIAGRAM



VII. CONCLUSION

The experimental output obtained from the proposed work tells us the information about the time and date of measurement, atmosphere temperature, humidity value during that time and soil moisture. This experiment to shows on mobile what we have to do on the fields according to the temperature.

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Cite this article as :

Ms. Sunitha M, Kishore Kumar Reddy K, Venkateswara Reddy G, Paramesh Reddy B, Bhooma Reddy A, "Smart Farming Using IOT", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 8 Issue 3, pp. 448-453, May-June 2021. Available at doi : https://doi.org/10.32628/IJSRST218398
Journal URL : https://ijsrst.com/IJSRST218398