International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 05 | May-2018 www.irjet.net p-ISSN: 2395-0072

Advanced Irrigation System using Arduino with Raspberry Pi

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Abstract - *agriculture is the foundation of Indian economy. Farming includes the development of the dirt to develop plants and ascending of creatures for human needs. However, step by step farming gets diminished because of deforestation and individuals don't have enthusiasm for this field since they won't get legitimate things and cost. So to stay away from these things numerous advances were presented in this field. Some of them are sprinkler, savvy water system framework and so on. The proposed framework is the Smart water system framework utilizing raspberry pi. Raspberry pi is the principle part utilized as a part of this proposed framework to control the entire framework. This framework can decrease the labor. The proposed water system framework utilizes arduino which is simple and savvy innovation. The fundamental use of the framework is to screen the land condition and soil condition without utilizing any labor. So one can know the status of the land and can work the engine from the other place.*

Key Words: **arduino, agriculture, framework, dirt, raspberry pi etc.,**

1. INTRODUCTION

Agribusiness is essential part in everyday life. Without sustenance and all human can't survive so agriculture includes the development of soil to develop plants and furthermore it diminishes the joblessness issue. agriculture is the foundation of Indian economy. These days labor towards agriculture gets decreased because of this cutting edge life so the formers number gets diminished step by step. So to enhance this field without requiring labor, numerous advances were presented. The proposed framework is one of the approach used to enhance this field by giving water to the land to grow up the plants when the dirt is dry. Rural division is the greatest client of the water at that point took after by the local and afterward the modern area. So the rural land must expect water to develop the plants. At the point when the precipitation is sporadic or in summer days, to supply water this water system framework is require which decreases labor, vitality and time.

Water system is only applying water to the plants at required interims. Water system basically keeps up the scenes and to develop the plants. Water system is required when the precipitation is sporadic. In prior days, when the precipitation is unpredictable and when the dirt is exceptionally dry then formers used to apply water by physically utilizing labor. So to beat that issue, I will execute this framework which may supportive minimal more to our formers.

The proposed framework is Smart water system framework which might be useful for formers to know the agricultural land status from different spots. It gives the water to the plants as well as diminishes vitality, and spares time. The proposed philosophy comprises of arduino and raspberry pi. The raspberry pi is the core of the framework which controls the entire framework. Framework once introduced has less upkeep cost and is anything but difficult to utilize [1].

1.1 Arduino Uno Microcontroller

The Arduino Uno is a microcontroller board in view of the ATmega328 (datasheet). It has 14 computerized input/yield pins (of which 6 can be utilized as PWM yields), 6 simple information sources, a 16 MHz gem oscillator, a USB association, a power jack, an ICSP header, and a reset catch. It contains everything expected to help the microcontroller; basically interface it to a PC with a USB link or power it with an AC-to-DC connector or battery to begin. The Uno varies from every single going before board in that it doesn't utilize the FTDI USB-to-serial driver chip. Rather, it includes the Atmega8U2 modified as a USB-to-serial converter.

1.2 Raspberry-Pi 3:

The Raspberry Pi is a small, powerful and lightweight ARM based computer which can do many of the things a desktop PC can do.

The powerful graphics capabilities and HDMI video output make it ideal for multimedia applications such as media centers and narrowcasting solutions. The Raspberry Pi is based on a Broadcom BCM2835 chip. It does not feature a built-in hard disk or solid-state drive, instead relying on an SD card for booting and long-term storage.

2. SYSTEM DESIGN

Block diagram mainly consists of temperature sensor, humidity sensor, water level sensor, LDR sensor, arduino, raspberry pi, wi-fi devices, GSM modem, relays and power supply unit as shown in fig 1. The power supply unit must be designed such that the supply must be dc. Usually we have direct supply of 230v ac. But almost all devices works at dc supply of 5v, 12v or 3.3v. So to convert from ac 230v to dc, step down transformer is used which reduces the voltage level. The rectifier circuit converts ac to dc and filter circuit filters the signal and produces required supply value and is connected to the devices like controllers.

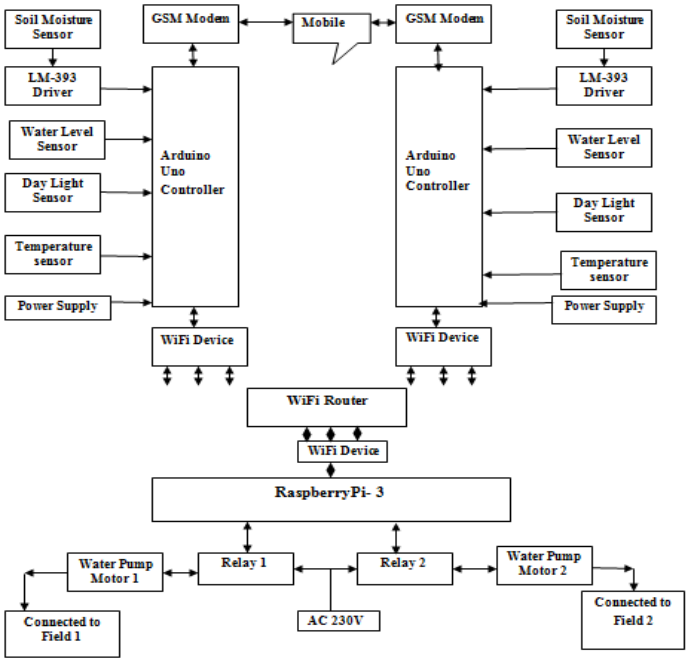

fig 1:Block diagram

WORKING

The system consists of sensors to monitor the status of the land. The temperature sensor is used in this system to monitor the temperature value continuously. Then the value is send to the arduino which converts the analog into digital by using its ADC pins. Then the value is send to the raspberry pi through wi-fi device. Without any disturbance one can easily know the status through the wi-fi devices. Then relay switches on and automatically water pump turns on if the temperature is high.

The system consists of water level sensor which monitors the water level in tank. If the water level is less than the range then the floating switch turns on and sensor sends the signal to arduino then the raspberry pi receives the signal and turns on the pump automatically.

The soil moisture sensor is used to monitor moisture level of soil. If it is within the range of 250 to 850 then the condition of soil is wet so no need to water to the plants. If it exceeds the value 850 then the condition is dry then the sensor sends the value and arduino converts the analog to digital then through wi fi raspberry pi receives the signal and then water pump turns on automatically. The motor driver is used for this soil moisture sensor.

Similarly the daylight sensor senses and sends the signal. Then corresponding switch turns on. So by using the wi fi router one can connect other wifi device to it and the connect it to the other land or field. The process is repeated and continuous. By using this system, one can monitor and take immediate remedies from other places. So this reduces the manpower and it is very efficient.

The monitored data can be sent to the mobile as SMS through GSM modem. Former can get the information and environmental condition through the GSM. The data from arduino is send to the raspberry pi through wifi devices. The wifi device connected to router and through router the receiver side raspberry pi is connect and get the information. The raspberry pi turns on and off the pump according to the values monitored through sensors.

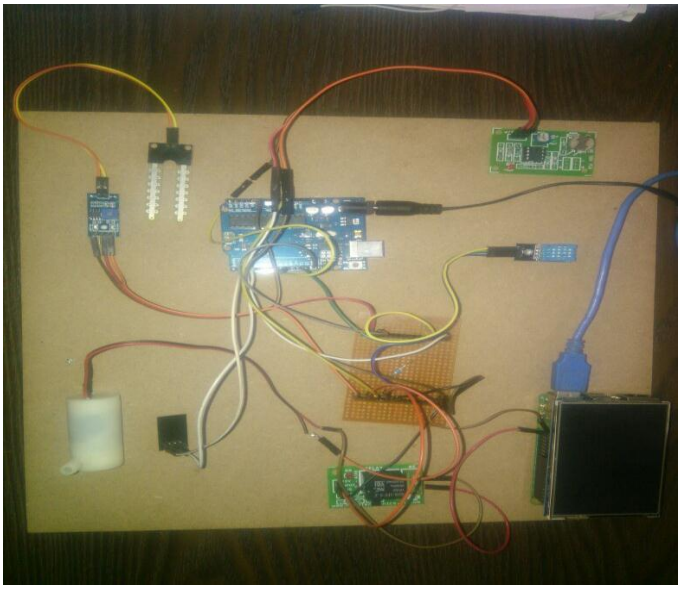

Fig 2: Experimental setup

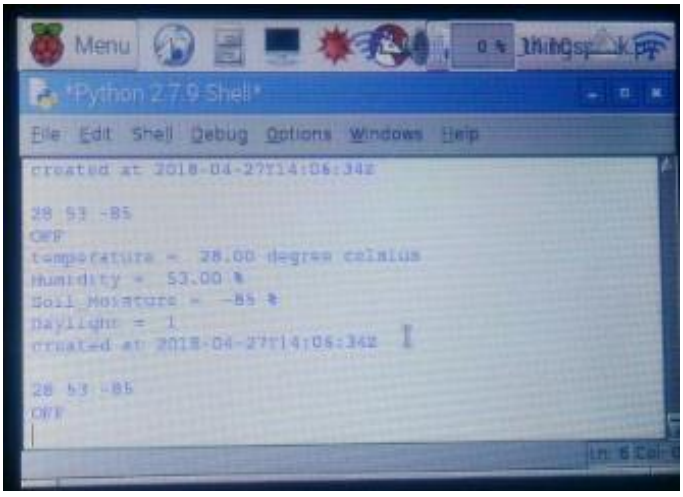

Fig 3: Results on raspberry pi

3. CONCLUSIONS

The system is implemented successively to achieve the irrigation process. The system is implemented in such a way that the irrigation can be achieved automatically. The system consists of raspberry pi which does all the process of the system automatically. The raspberry pi is used in this system because it acts as controller, microcomputer and is the main component to control the whole system. The sensors values only send and converted in arduino but the converted values

can be send to the raspberry pi through wifi devices. The raspberry pi will turn on the water pump automatically and the same will be displayed. The status of the sensors can also get through mobile app which is created for this system.

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