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Smart Application in Agriculture using IOT

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Abstract-Agriculture is the basic source of livelihood for people of different lands and places where the main source of good yield and cultivation of weather conditions and versatile soil . Every year farmers are facing the problems of sudden rains in their areas without any correct weather forecast which leads to damage for already grown crops .The second major problem pertaining to the farmers is the lack of sufficient knowledge about the soil and suitability of crop. Monitoring the weather conditions at a particular place and making the information visible, which is an advanced and efficient solution for connecting the things and connecting people .The framework manages observing and controlling the ecological conditions like temperature, relative moistness and with sensors to send the data to the system and after that plot the sensor information as graphical measurements. The information refreshed from the executed framework can be open in the web from anyplace and anywhere.

Key terms: Arduino, Humidity Sensor, Soil Moisture Sensor, Temperature Sensor, Rain Sensor, Soil Temperature Sensor .

I. INTRODUCTION

As new technologies has been introduced and utilized in modern world, there is a need to bring advancement in the field of agriculture. Various researches have been undergone to improve crop cultivation and have been widely used. To improve the harvest profitability effectively, it is important to screen the natural conditions in and around the field. The parameters that has to be properly monitored to enhance the yield are soil characteristics, weather conditions, moisture, temperature, etc .To the extent idea for agriculture improvement is worried about, the farming information is a note worthy power advancing the farming improvement and change and a foundation of keeping up sound and continuing financial improvement[1].An IoT is a biological system comprises of web-empowered keen gadgets that utilization installed processors, sensors and correspondence equipment to gather, send and follow up on information they secure from their surroundings. IoT gadgets share the sensor information they gather by interfacing with an IoT passage or other edge gadget where information is either sent to the cloud to be broke down or examined locally. Now and again, these gadgets speak with other related gadgets and follow up on the data they get from each other. The gadgets do the majority of the work without human intercession, despite the fact that individuals can connect with the gadgets - for example, to set them up, give them directions or access the information.

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The availability, systems administration and correspondence conventions utilized with these web-empowered gadgets to a great extent rely upon the IoT applications sent. water security is the another challenge in environmental monitoring in which the growth of urbanization in different countries[5]. Internet of Things (IoT) is being used in several real time applications. The introduction of IoT along with the sensor network in agriculture the traditional way of farming. Online crop monitoring using IoT helps the farmers to stay connected to his field from anywhere and anytime. Different sensors are utilized to screen and gather data about the field conditions. By and large the about the ranch condition is sent to the rancher through GSM innovation.

II. II.SYSTEM DESCRIPTION

In this we will connect different kinds of sensors. Some of the sensors we used are temperature sensor is to know the weather temperature, humidity sensor is to know that how much humidity is present in that area. We use soil moisture sensor to know the level of moisture available for plant. This all sensors are connected to Arduino and this will provide the results by sending output through LED and buzzer with different level of measures, each sensor has a specific reading with these reading of geographical conductions and crop type we are adjusting the level of reading to notify the farmers

III. III.SYSTEM DETAILS

1. Soil Moisture Sensor (YL-69):

To quantify the volumetric substance of water, soil dampness sensor comprises of two tests. These two tests enables the current to go through soil and gets the estimation of protection from measure the estimation of dampness. The dirt will direct greater power when there is more water which implies that the obstruction is less and thus the dimension of dampness will be high. Then again if there will be less water, the dirt which is dry leads less power and it contains more obstruction. Along these lines the dimension of dampness will be less. Some of the advantages are simple method measurement, delivers the result quickly, very low in the cost and it offers the accurate result.

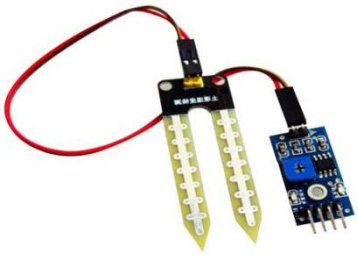

Fig1.Soil Moisture Sensor

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2. Rain Drop Sensor:

A down pour sensor is an exchanging gadget actuated by precipitation. There are two primary applications for downpour sensors. The first is a water preservation gadget associated with a programmed water system framework that makes the framework shut down in case of precipitation. The second is a gadget used to shield the inside of a car from downpour and to help the programmed method of windscreen wipers. An extra application in expert satellite correspondences receiving wires is to trigger a downpour blower on the opening of the radio wire feed, to expel water beads from the mylar spread that keeps pressurized and dry air inside the wave-guides. Downpour sensors for water system frameworks are accessible in both remote and hard-wired forms, most utilizing hygroscopic plates that swell within the sight of downpour and therapist down again as they dry out — an electrical switch is thusly discouraged or discharged by the hygroscopic circle stack, and the rate of drying is commonly balanced by controlling the ventilation achieving the stack. In any case, some electrical sort sensors are additionally showcased that utilization tipping can or conductance type tests to quantify precipitation. Remote and wired forms both utilize comparative components to incidentally suspend watering by the water system controller — explicitly they are associated with the water system controller's sensor terminals, or are introduced in arrangement with the solenoid valve regular circuit to such an extent that they keep the opening of any valves when downpour has been detected. Some water system downpour sensors likewise contain a stop sensor to shield the framework from working in frosty temperatures, especially where water system frameworks are still utilized over the winter.

Fig2.Rain Drop Sensor

3. Humidity Sensor(DHT11):

A humidity sensor measures, faculties and reports both air and dampness temperature. The term moistness alludes to the substance of dampness in gases(air). Resistive moistness sensor: This sensor is made of materials with low resistivity and the adjustments in resistivity happens with changes in mugginess. The connection between the opposition and moistness is reverse exponential connection. The material which contains low resistivity is kept over the two anodes. Between the cathodes the resistivity changes when layer at the best retains water and with the assistance of a basic electric circuit this change can be estimated. Some the advantages of humidity sensor are very durable, small size and low cost and works well in high temperatures.

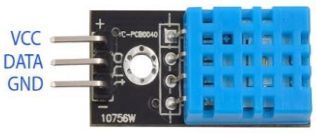

Fig3.Humidity Sensor

4. Soil Temperature Sensor (DS18D20):

Temperature sensor is a gadget, to quantify the temperature through an electrical flag it requires a thermocouple or RTD (Resistance Temperature Detectors). The thermocouple is set up by two disparate metals which create the electrical voltage by implication relative to change the temperature. The RTD is a variable resistance, it will change the electrical opposition in a round about way corresponding to changes in the temperature in an exact, and about straight way. The working of the sensor is that the estimation of the temperature sensor is about the hotness or coolness of an article. The working base of the sensors is the voltage that perused over the diode. On the off chance that the voltage builds, at that point the temperature rises and there is a voltage drop between the transistor terminals of base and producer, they are recorded by the sensors. In the event that the distinction in voltage is enhanced, the simple flag is created by the gadget and it is specifically relative to the temperature. Some of the advantages are high output, accuracy over small things and fast response time high sensitivity to small temperature changes.

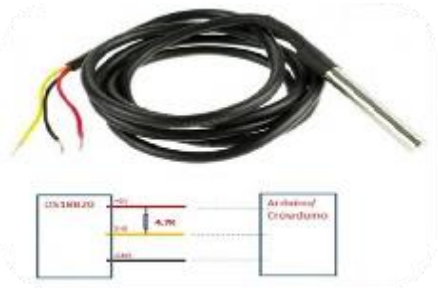

Fig4.Soil Temperature Sensor

5. Temperature Sensor lm35:

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient centigrade scaling. The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly proportional to the centigrade temperature. This sensor absorbs energy between 4 um to 16um from an object[2]. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient centigrade scaling. The lm35 series are precision integrated-circuit temperature devices with an output voltage linearly proportional to the centigrade temperature.

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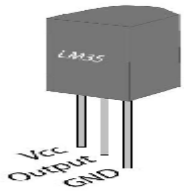

Fig5.Temperature Sensor

6. Arduino Uno:

Arduino is an open-source stage utilized for structure hardware ventures. Arduino comprises of both a physical programmable circuit board (frequently alluded to as a micro controller) and a bit of programming, or IDE (Integrated Development Environment) that keeps running on your PC, used to compose and transfer PC code to the physical board.

The Arduino stage has turned out to be very prevalent with individuals simply beginning with hardware, and in light of current circumstances. Dissimilar to most past programmable circuit sheets, the Arduino does not require a different bit of equipment (called a developer) so as to stack new code onto the board - you can just utilize a USB link. Furthermore, the Arduino IDE utilizes a disentangled variant of C++, making it less demanding to figure out how to program. At last, Arduino gives a standard structure factor that breaks out the elements of the miniaturized scale controller into a progressively available bundle.

The Arduino equipment and programming was intended for craftsmen, architects, specialists, programmers, novices, and anybody keen on making intelligent articles or situations. Arduino can connect with catches, LED's, engines, speakers, GPS units, cameras, the web, and even your advanced mobile phone or your TV! This adaptability joined with the way that the Arduino programming is free, the equipment sheets are really shoddy, and both the product and equipment are anything but difficult to learn has prompted an extensive network of clients who have contributed code and discharged directions for an enormous assortment of Arduino-based tasks.

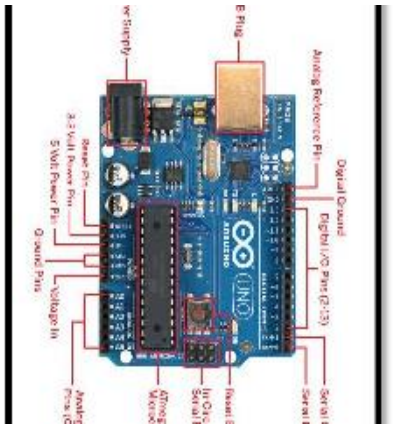

Fig6.Arduino Uno

Block diagram

In the proposed system, Crop monitoring is done where sensors are used to collect information in the agricultural field. The different sensors used are temperature, humidity sensor, soil moisture sensor, raindrop sensor,soil temperature and pressure. The information collected by the sensors is sent to the Arduino Uno.we proposed an architecture of sensors and arduino[4].

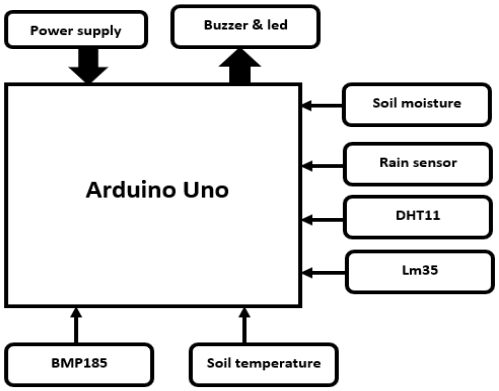

Fig7.Block Diagram of Field Monitoring System

Working model:

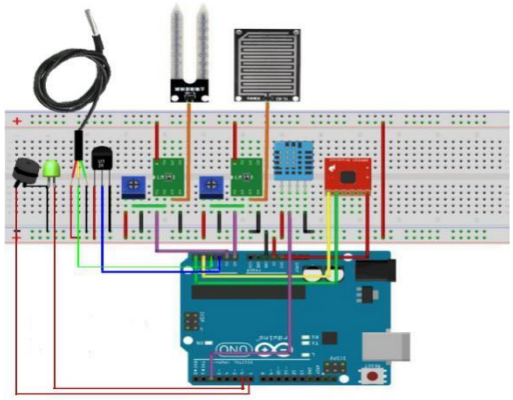

Fig8.Working model for Field Monitoring System

IV. RESULTS

After sensing the data from different sensor devices, which are placed in particular area of interest. The sensed data will be automatically sent to the system attached, when a proper connection is established with device. We can monitor and control the system using a display

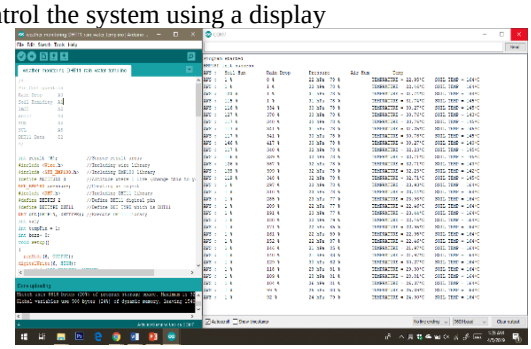

Fig9. Output values on the desktop

We use soil moisture sensor to know the level of moisture available for plant. This all sensors are connected to Arduino and this will provide the results by sending output through LED and buzzer with different level of measures, each sensor has a specific reading with these reading of geographical conductions and crop type we are adjusting the level of reading to notify the farmers.the farmers will be able to know the information through messages and web pages[3].

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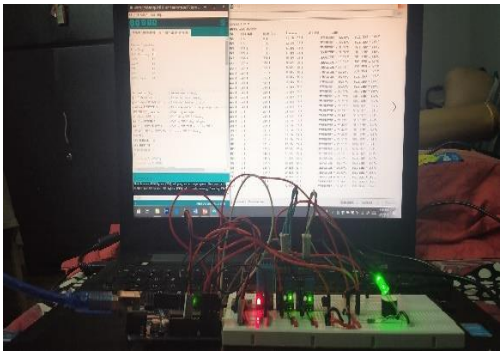

Fig10.Output through buzzer and light for Field Monitoring System

V.CONCLUSION

IoT agricultural applications are making it possible for ranchers and farmers to collect meaningful data. Large land owners and small farmers must understand the potential of IoT market for agriculture by installing smart technologies to increase competitiveness and sustainability in their productions. With the population growing rapidly, the demand can be successfully met if the ranchers, as well as small farmers, implement agricultural IoT solutions in a prosperous manner.

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