

SMART IRRIGATION SYSTEM USING IOT

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Abstract—An automatic irrigation network has been suggested for effective water storage and intruder detection. Soil parameters such as soil temperature, pH, ph are measured and the LCD shows the pressure sensor and the sensed values. The intruder monitoring device is achieved using a PIR sensor under which the birds are repelled from reaching the area. The GSM module was used to create a connection between the farmer and the field. The current state of the field will be intimated via SMS to the farmer and also posted in the web page. The farmer may access the server at any time regarding the state of the field, thus the man power and time everywhere.

Key-words: Microcontroller, Sensors, intruder, detecting system, IOT

1. INTRODUCTION:

India is one of the world's major freshwater consumers and our nation consumes huge volumes of freshwater when opposed to other nations. There is a large volume of water used in irrigation rather than in the domestic and commercial sectors. As a soil, 65 per cent of gross precipitation belongs. Today water has been one of the most essential outlets on Earth and widely utilized in the area of agriculture. As the soil-moisture sensor and temperature sensor are mounted in the plants' root region, this knowledge can be transmitted by the device through the wireless network. Farming is the foundation of all developing nations. This utilizes 85 percent of the globally usable fresh water supply, and this figure remains influential in water use owing to population increases and rising food production. Because of this, effective water control is the main problem in many arid and semi-arid cropping systems. There is a need for an integrated irrigation network to improve water usage for farm crops. Overcoming irrigation and under irrigation is the need for an integrated irrigation network.

This paper introduces an automatic irrigation system that is effective, relatively inexpensive, and quick. When built, this machine has less operating expenses, and is simple to use. By utilizing the camera with the correct cell phone program, we can accurately track the real field condition remotely, and measurements such as soil moisture and temperature are used to provide updates on changes taking place in the field.

It is more favorable than the conventional methods of cultivation.

2. RELATED WORK:

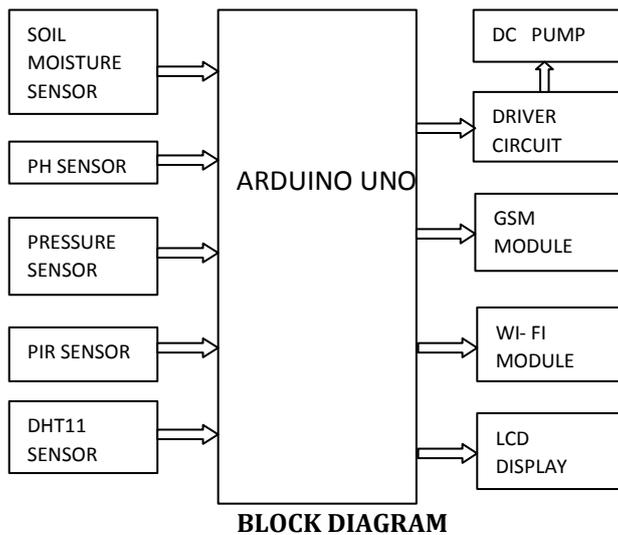
Many researchers have noticed, after intensive study in the agricultural sector, that the agricultural region and its production are decreasing by the day. We may improve productivity as well as raising manual work by utilizing specific technologies in the field of agriculture. Chandan kumar Sahu has suggested a "Low Cost Smart Irrigation Management Program" program. This requires a range of wireless sensors mounted in different directions of the farm sector. The sensor is connected with a wireless network system and the data transmitted by the microcontroller "ATMEGA318," which is on the development board "ARDUINO-UNO." development board [1].

Sonali D.Gainwar and Dinesh V. Rojatkar (2015) have presented a paper in which parameters of soil such as pH, humidity, moisture and temperature are calculated to achieve high soil yield. This machine is completely automatic, turning the motor pump ON / OFF according to the amount of soil moisture. The present position in the field is not intimated for the farmer[2].

V. R. Balaji et M. Sudha (2016) presented a paper in which, while photovoltaic cells do not depend on electricity, the device derives power from sunlight. The soil moisture sensor was used and it is used to ON / OFF the motor pump depending on the sensed values PIC microcontroller. This system does not include the weatherforecasting[3].

3. PROPOSED SYSTEM:

Agricultural sector faces multiple challenges nowadays owing to a shortage of water supplies. Intelligent irrigation network has been used to help the farmers resolve the difficulties. Numerous sensors such as pH, soil moisture, DHT11, PIR (intruder detection system), and pressure sensors are attached to the arduino microcontroller input pins in this device. The sensed sensor values are shown in LCD. If the sensed value reaches the threshold values specified in the system, the relay circuit automatically switches the pump ON / OFF and it is connected to the driver circuit which helps to turn the voltage.



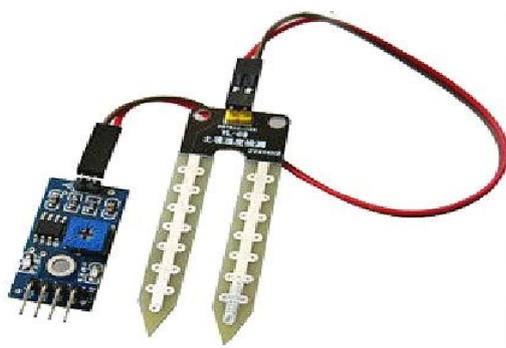
1. ARDUINO UNO

The Microcontroller used here is an Arduino UNO. The UNO is an ATMEGA 328P based microcontroller unit. The ATMEGA 328P has 32kB of flash memory to hold information. The board has 14 optical pins for input and output, 6 analog inputs, 16 MHz quartz crystal, USB, ICSP cable, and a reset switch. The UNO can be configured using tools from Arduino.

2. SENSORS

a) SOIL MOISTURE SENSOR

The sensor Soil Moisture is used to determine the moisture level of the soil. If the sensor detects the soil moisture value above the threshold point, the digital output will be low level (0V) and, if it is below the threshold level, the digital output will be high level (5V). Using the wireless button, the present soil moisture value is read explicitly to see whether it is above threshold or not. With the help of a potentiometer the threshold voltage may be controlled.



soil moisture sensor

b) PH SENSOR

PH is the indicator of water solution acidity or alkalinity and is calculated by the total amount of ions found in hydrogen

(H+) or hydroxyl (OH-). The pH meaning (below 7) is said to be acidic, and is said to be simple (above 7). A solution's pH may differ with temperature, respectively.

c) DHT11 SENSOR

DHT11 sensor is used to calculate humidity and temperature. To test ambient air it requires a capacitive humidity sensor and a thermistor. This sensor is cost-effective, offers low power consumption and it can relay up to 20 meters of signal.

d) PRESSURE SENSOR

The differential pressure transmitter is used to calculate differential pressure track, PCB can turn it into a differential pressure signal, enabling it to be used for weather forecasting.

e) PIR SENSOR

It is a Passive Infrared sensor which detects movement with Infrared radiation variation. At an angle of ±15 degrees it will extend up to 10 metres. As with the motion detector, PIR is the same as outdoor light and responds to motions produced by artifacts that radiate heat.

3. WI-FI MODULE

The ESP8266 Wi-Fi module is a self-contained SOC (System on Chip) with embedded TCP / IP (Transmission Control Protocol / Internet Protocol) protocol stack that can provide connectivity to any WiFi network through any microcontroller. Each ESP8266 module comes with pre-programmed sense, to get Wi-Fi capabilities it can simply be hooked up to Arduino computer. This module has a strong enough on-board mechanism and a large storage space that enables it to be combined with the sensors and other different devices for the application.

4. GSM MODULE

GSM (Global Mobile Communication System) is a framework established by the European Telecommunication Standards Institute (ETSI) to define the protocols used by mobile phones for second-generation (2 G) wireless cellular networks. GSM defines a wireless, circuit-switched network designed for complete duplex voice telephony and often extended to provide internet communications, GPRS (General Packet Radio Services) packet internet transport. In realistic words, the maximum distance promoting GSM requirements is 35 kilometers (22mi).



Fig (a) GSM Module

4. Result:

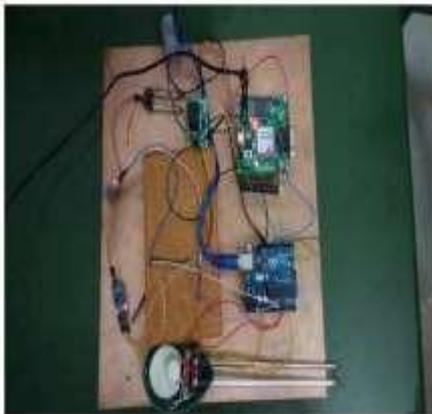


Fig (b) Hardware Setup



Fig (c) Data Display in Web

5. Conclusion

This smart irrigation system's key goal is to make it more advanced, user-friendly, time-saving and more effective than the current network. Measuring four parameters such as soil moisture, temperature, humidity and pH values and the device often provides monitoring method for intruders. Farmer will learn the existence of the crop field at any moment, wherever, thanks to server updates.

6. References

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