

## Smart Agricultural System

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**Abstract:-** The main aim of this paper is to provide information about irrigation of plants which helps in saving money. Agriculture is the backbone of Indian economy. About fifty percent of Indian population depends on agricultural sector to meet their day-to-day expenses. Currently, India requires technological up gradation to meet the demand for irrigation purpose. Soil moisture sensor and DHT11 i.e. Temperature sensor and humidity sensor are connected to internal ports of micro controller, whenever there is a fluctuation in temperature and humidity of the environment these sensors sense the change in temperature and humidity and gives an interrupt signal to the micro-controller along with this alert is generated whenever the water level of the plant goes down. This is made possible by sending the received data to the android device using Bluetooth module. The entire System is controlled and executed by Arduino Uno Board (ATMEGA328) microcontroller.

**Keywords:** Economy, Smart Irrigation System, Soil Moisture Sensor, DHT11 sensor, Arduino Uno Board, Bluetooth module, Android device.

### 1. Introduction:

Unlike traditional irrigation controllers that operate on a preset programmed schedule and timers, smart irrigation controllers monitor temperature, humidity, soil moisture. Still many farmers use the traditional methods of farming which results in low yielding of crops.

But wherever automation had been implemented and human beings replaced by automatic machineries, the yield has been improved. So there is need to implement modern science and technology in the agriculture sector for increase the yield.

India's major source of income is from agriculture sector and it add to 14.6% of GDP and about 55% of employment. Since most of the cultivable land in India receives very moderate amount of rainfall, it is not possible to depend only on the rainfall for irrigating the crops. Hence Irrigation plays a vital role in maintaining the moisture content of the soil for crops to grow. The project focuses on efficient use of water and to boost the cultivation in order to increase the economy. This enables farmers to utilize the technology to meet the increasing demand and to efficiently make use of adequate resources available.

The System is a Bluetooth Technology, where the moisture sensor constantly monitors the moisture level as well as

DHT11 sensor monitors temperature and humidity. The Arduino board plays the role of a microcontroller. Where that is coded to accept the readings of the sensor as input. Meanwhile, the readings are continuously transferred to the smart phone using Bluetooth module linked to the arduino.

### 2. Literature Survey:

In paper, soil moisture sensor is placed in the root zone of field. The sensor sends information about soil and transmits the data to the microcontroller. An algorithm was developed to measure threshold value of soil moisture sensor that was programmed into a microcontroller to monitor the moisture content of the soil.

This paper designs a model of automatic agricultural system which is based on microcontroller ATMEGA328. DHT11 that sense the temperature and humidity and soil moisture sensors are placed in the field. The data collected from the sensor are sent to the user's mobile using the Bluetooth connection between the Arduino Uno board and the mobile.

### 3. Existing system:

Manual care is required to look after the plant which includes personal attention to keep the plant alive like looking after the right amount of sunlight, water, fertilizers and other important aspects to keep the plant in good care.

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### 4. Proposed System:

Android phone working system enables one to look after the plant in a technical way that is through an application on a personal cell phone which makes it efficient for use and gives ease even when one is manually not present near the plant even provides you with a notification when water level of a plant goes down.

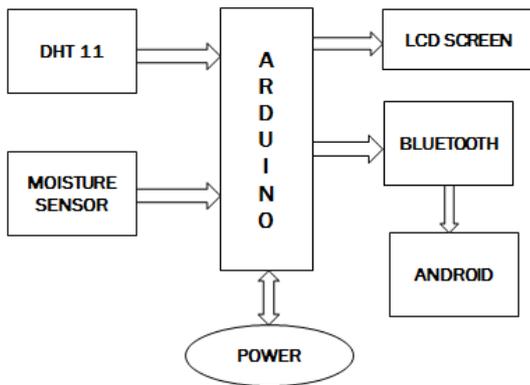


Fig1. Proposed System

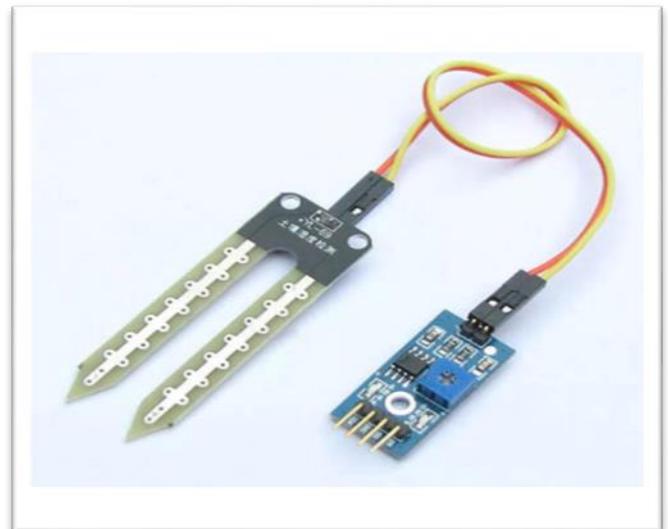


Fig3. Soil Moisture Sensor

**5. Component Description:**

**5.1. Arduino Uno Board:**

The Arduino is an open source of computer hardware, software and user community. It is a single board microcontroller. It has 14 digital input/output pins, 6 analog inputs, 16 MHz quartz crystal, USB connection, a power jack, an ICSP header and a reset button. Connect the board to the system using USB. Arduino Software is used to code the microcontroller.

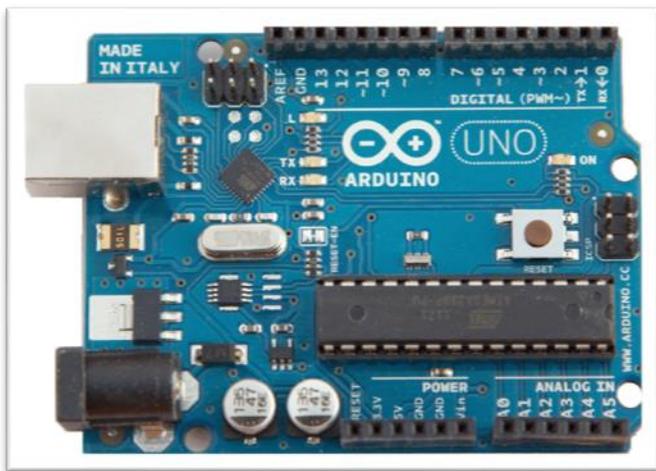


Fig2. Arduino Uno Microcontroller

**DHT11 sensor:**

The DHT11 is a basic, ultra-low-cost digital temperature sensor and humidity sensor. It uses a humidity sensor and a temperature sensor to measure the surrounding air, and spits out a digital signal on the data pin no analog input pins needed. It is fairly simple to use, but requires exact timing to grab data.



Fig4. DHT11 Sensor

**5.2 Soil Moisture Sensor:**

Moisture sensor estimates the level of water content in the soil by measuring the dielectric permittivity of the soil. The sensor contains board LM393 comparator, power indicator LED and digital switching indicator.

**Bluetooth Module:**

The Bluetooth module HC-05 is a master/slave module. The data collected by the moisture sensor is transferred to the android application in the smart phone via bluetooth module. It works on serial communication.

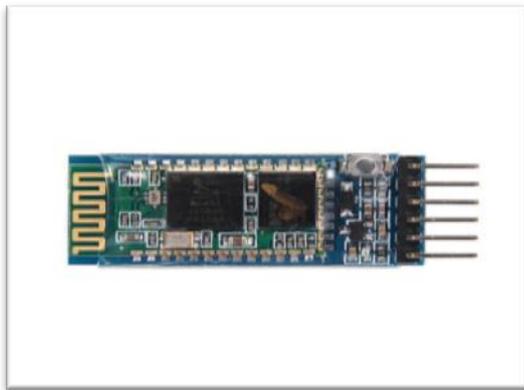


Fig5. Bluetooth Module

**2. Results and Discussions:**

The system used in this project provides us with the readings of the temperature of the atmosphere along with the humidity content of the soil. These data are used to keep a track of the requirements if the field and to keep a check on the requirements if the field and to keep a check on the proper functioning of the system.

This system which we used in this project will help the farmers to reduce their work pressure. This system will be helpful to the farmers to save their precious time and can also helps to yields more crops. Certainly, it will be helpful for the farmers in improving their economic condition. The automatic operational capability of this system requires the minimum quantity of water for the irrigation work and extends its contribution to help the farmer.

**Conclusion:**

The purpose of designing of Automatic Plant Irrigation System is successfully achieved and fulfils the desired objectives which is increase in the yield of the crop and betterment of the farmer.

**References:**

[1] S. V. Devika, Sk. Sharfuddin, Sk. Kaurenes, Jayanth Thota, Khalsa Shaik, "Arduino Based Automatic Plant Watering System", Devika et al., International Journal of Advanced Research in Computer Science and Software Engineering 4(10), October -2014, pp. 449-456 Volume 4, Issue 10, October 2014

[2] Dawahare Rane, P.R. Undercar, D.M. Khatri, "Review Paper Based on Automatic Irrigation System Based on RF Module", IJAICT Volume 1, Issue 9, January 2015

[3] Archana P, Priya R, "DESIGN AND IMPLEMENTATION OF AUTOMATIC PLANT WATERING SYSTEM", International Journal of Advanced Engineering and Global Technology Vol-04, Issue-01, January 2016, ISSN No: 2309-4893

[4] S. Darshan, Tsinghai, Sheena Mohan, Soundarya, Sukanya Deskin, "Smart Irrigation System", IOSR Journal of Electronics and Communication Engineering (IOSRJECE) e-ISSN: 2278-2834, p-ISSN: 2278-8735. Volume 10, Issue 3, Ver. II (May-Jun.2015), PP 32-36

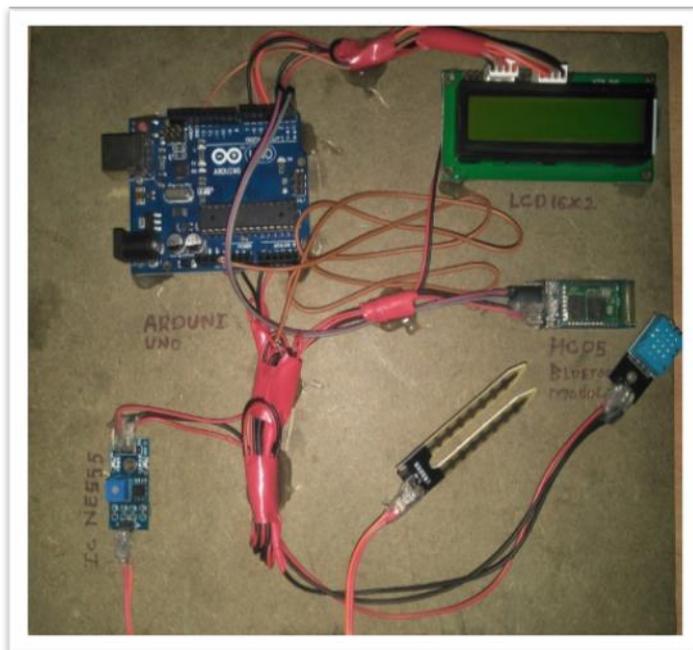


Fig6. Hardware Setup