



## Wireless Sensor Networking in Agriculture

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**Abstract.** Agriculture is the main dependent of India; nearly 70% of people were farming. Agriculture is the most needed source for all living things. But now-a-days agriculture is affected due to economic changes, climatic changes, water scarcity, and MNC's occupying agricultural fields to build companies. Now-a-days Wireless Sensor network (WSN) is used in many sectors to decrease human efforts. WSN is used in many sectors like Medical, Mobile phones, Transport, Military, etc. In this paper we have given a result to overcome factors affecting agriculture, we used WSN to make agriculture friendlier, to maintain the climatic changes. In this paper we have used many sensor to monitor the humidity, moisture level, temperature to increase the productivity of crops and develop agriculture more and more and to reduce the work of human. Here the sensors monitor the crops and send the information about the crop through transmitter to the receiver. Then it automatically provides the need for crops.

Keywords—Wireless sensor network (WSN), Transmitter, Receiver, MNC'.

### 1. Introduction

Nowadays, wireless sensor networks (WSN) are extensively utilized in agriculture tracking to enhance the great and productiveness of farming. Agriculture is main source for excrescence of providence. Multiple uninstructed people learn usage in farming. Unfortunately, cultivators apply classical system which reduces the gain of growth. But when the spontaneous complex is enforced in farming, it used to enlarge the profit of harvest. The utter most of the paper application Wireless sensor network to control the data of farm land utilizing detectors and is patched it to server applying some wireless protocols. All the collected data provides data and item played to enlarge the profit of harvest. The collected data ongoing in server is not enough to enlarge the excrescence of harvest. There are some different agents which affect the excrescence of harvest. The wild animals and birds can affect the crop it can't be downgraded. There are some different factors like insects and plagues can affect the farming. Some people involves in robbery when the excrescence of crop handed over for harvesting. The ware house of gathered crops is veritably delicate for cultivators. In this project the moisture level, humidity level of the crop is measured using soil moisturizes or and humidity (DHT22). Then the data are sent to the receiver through transmitter. Thus the crop is monitored using these sensors and transmitter. The nit automatically provides the need for the crop, for example if the water level is low it automatically dispenses the water to the crop. Thus our project works by automatic way. As a result, smart farming reduces farmer's workload and increase crop productivity.

### 2. Literature Survey

Integrated wireless sensor network as a solution for precision agriculture: Sanchezetal. Proposed a for delicacy farming Integrated wireless detector network as a result. Data collection, data transmission from end users, and supervisory tasks can be assimilated by this model. In the field, however, this model serves mostly to identify crops and secure them from interloppers. A video surveillance system is used to discover and identify intermeddles. In completed detention solutions and high energy consumption are still problems. In order to monitor crop biomass, several prototypes have been built. Infrared detectors are used to measure the discovery meddler, while camera detectors are then used to perfect identification.

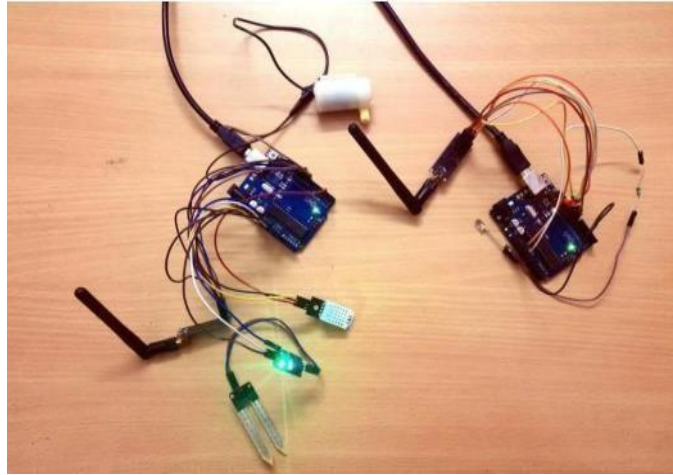
Multi chip module micro system for soil moisture measurement: A.Valenteeetal. Designed a micro system for measuring soil moisture using micro chips. He measured the volumetric heat capacity of a can vas by using the combater is heat pulsation method. Detectors such as this one have low production costs. A Nicklechro mere stance is used for resistive heating. The temperature detector are high veracity CMOS smart temperature detector.

NIR spectroscopy based calibration model to acquire soil spectra in diffuse reflectance mode: Kuangetal. Evolved a NIR spectroscopy predicated soil ranges in circumlocutory reflectance mode estimation model to acquire. In this miniature, dissimilar arrangements and distributions of spikes are explored. We apply the proposed model to 425 soil samples to estimate its effectiveness. The results stated that the proposed MC, model, OC, and TN are revealed by the model in an accurate and complete manner.

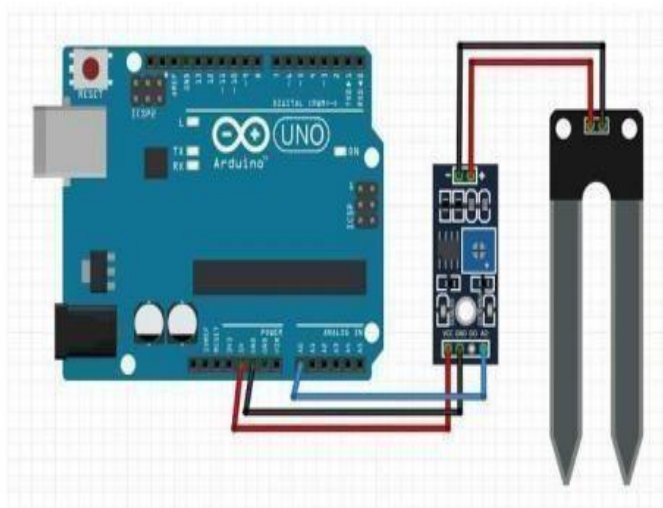
Polymer coated capacitive sensor for soil moisture sensor detection: H. Elleretal. Impedance evolved a capacitive soil humidity measure with capacitive ejector detector. It is concluded by an f fork like shape. Figure for the ground. It existed the best the impedance is scaled by applying twin T Bridge. The twin T Bridge is applied to fill in bulky range of permittivity of congenital soil. An anatomizing of measured soil permittivity flashed a dominant in fluency of fluid water content on dielectric permittivity.

Irrigation management and enhancement of tolerance for the crops: Levy etal. Proffered a system for forbearance for the crops Irrigation operation and enhancement of. According to traditional beliefs, the yield of a crop can be affected by lack of water, deficiency, heat, and saltiness. All these factors are deconstructed with the aid of the proposed method, and the necessary amount of water is delivered to the crops through the suggested network through the proposed protocol. Furthermore, it has been observed that drip irrigation and micro irrigation can help cultivators save water.

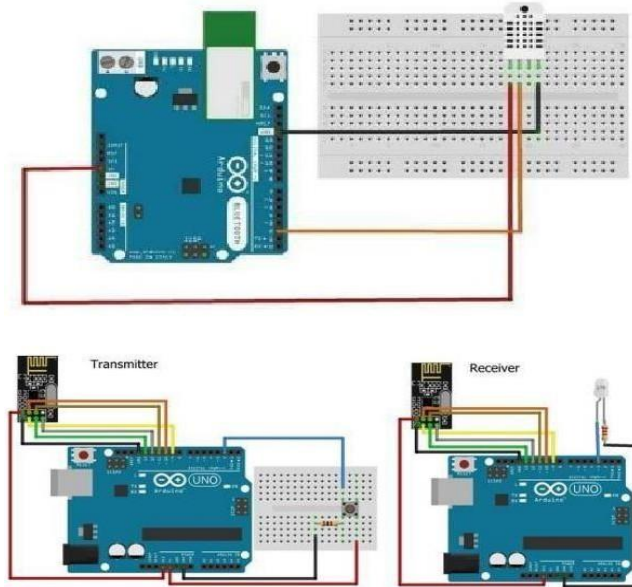
### 3. Design Methodology



The Smart Farming System combines hardware and software components. Embedded systems are used in the hard ware and the software is creating dosing the Arduino IDE. Temperature and humidity sensors are among the sensors used. The data gathered by the sensors is for awarded to the server. UNO Arduino It is then relayed to a receiver through a transmitter.



For this, the sensors (temperature and humidity sensor, soil moisture sensor) are first connected to the Arduino as per the connection diagram. The motor is also connected to the Arduino which dispenses water to the soil when the soil moisture level drops. Then the NRF 24L01(transmitter) is connected. The program for the first Arduino board is uploaded to it with the help of the software Arduino ide.



Now the NRF24L01 (receiver) is connected to the second Arduino as per the connection diagram. The program for the receiver is uploaded to the second Arduino board with the help of the software Arduinoide. Now, the output will be shown on the serial monitor when the second board is connected. The value of soil moisture changes when the moisture content of the soil changes. When there is a climatic change the values of temperature and humid changes. Through the help of this we can make suitable arrangements for the crops to grow.

#### 4. Hardware Description

**Arduinouno:** The Arduino Uno is an open source microcontroller board developed by Arduino and based on the Microchip ATmega 328P microprocessor. It is equipped with digital and analog input/output (I/O) connectors that can be connected to multiple expansion cards. It has 6 analog I/O pins and can be programmed with the Arduino IDE (Integrated Development Environment). It supports voltages between 7 and 20 volts and can be powered by a cord or an external 9V battery.

**Soil moisture sensor:** The soil moisture sensor module records the moisture content of the soil. It outputs the moisture content after measuring the volumetric water content in the soil. The module contains both digital and analog outputs as well as a potentiometer for setting the threshold value.

**Humidity And Temperature Sensor DHT22/AM2302:** Digital signal calibrated by AM2302. It uses proprietary digital signal acquisition technique and humidity sensor technology to ensure its reliability and stability. It features an 8-bit single-chip microprocessor coupled to its sensor devices. The model is temperature-corrected and calibrated in a precise calibration chamber. If the calibration coefficient is stored in programmed form in OTP memory, the sensor will recall the coefficient from memory when it detects something.

**TRANSRECIEVERNRF24L01:** The NRF24L01 is a single-chip radio transceiver operating in the 2.4-2.5GHz ISM band worldwide. A fully integrated frequency synthesizer, power amplifier, crystal oscillator and receiver make up the transceiver. An SPI interface allows easy programming of frequency channels and protocol settings.

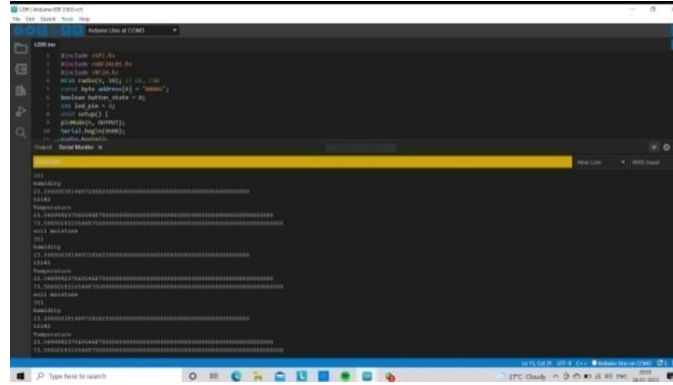
#### 5. Objectives

- To introduce students to Arduino technology and help them learn more about it.
- To increase students' fundamental wondering competencies with the aid of developing modern innovations. It is useful for humans.

TABLE 1. Specification table

S.no	Material	Value
1	Arduino	5V
2	Soil moisture sensor	3.3~5.5VCD
3	DHT2	3.3-6v
4	Transceiver NRF24L01	2.400-2.4835GHz

## 6. Result



The result of the soil moisture, humidity and temperature. The Temperature and humidity measurement taken from different places the measurement of humidity is also an important element of weather reports because the presence of Humidity indicates the chance of dew, fog, or precipitation. This effect is measured in a heat Index table. As a result, it may often feel hotter during the summer in areas where better is relative humidity. Both temperature and relative humidity may be measured the use of a virtual thermometer. Amount of water with inside the air (in grams/m<sup>3</sup>) at a given temperature to the most feasible water content material lat that temperature, and its far expressed as a percentage. When there's extra water, the soil will behavior extra strength because of this that that there can be much low resistance. Then the moisture degree can is high.

Dry soil conducts electricity poorly, so whilst there can be whole lot less water, then the soil will behavior a lot less energy because of this that that there can be more resistance. Therefore, the moisture degree can be lower. This sensor might also be related in modes; Analog mode and digital mode. Much are able to join it in Analog mode after which we are alehouse it in Digital mode. The temperature and humidity size taken from one of a kind.

## 7. Conclusion

Smart agriculture is a place that has drawn heavy interest from the scientific community, especially via the contribution of WSNs. The measurements acquired from sensory devices are pinpoint right in addressing the challenges and requirements of crop cultivation on an character basis, this is consider ably tormented by way of temporal variant of environmental, cropland soil conditions The proposed gadget configuration modified in to experimentally evaluated in a particular olive grove, which modified into used as a checking out ground guide of one of a kind agricultural applications. Feedback from the carried out experiments indicates that, for this specific implementation, serial facts transmission is to be blamed for most of the synchronization's inaccuracy. This inaccuracy may additionally bead dressed via maximizing serial baud rate, at the identical time as minimizing the transmitted message's length. Therefore, the machine in its entirety is deemed appropriate in assignment its wishes of successfully monitoring agricultural environments.

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