# DRIP IRRIGATION IN AGRICULTURAL LAND THROUGH ANDROID MOBILE APPLICATION

**Roselin Deepa. V [1]**
*PG Scholar, Department of Computer Science, Thiruvalluvar College of Engineering and Technology*

**Anantharaj.B [2]**
*Head of the Department, Department of Computer Science [2], Thiruvalluvar College of Engineering and Technology [2]*

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**ABSTRACT**:- This Investigation and Research ultimately aims on Agriculture. To be exact and precise the study focuses on the aspect of monitoring Agricultural Crops in the Field through the medium of Internet. This modernized Project is named as "The Internet of Things" (IOT). The main feature of IOT technology is to help Farmers in gathering Information about the crops which has been cultivated in the Field. The technology assists in gathering Information such as, weather, moisture, temperature and fertility of soil. Through this assisted online monitoring it enables to detect the level of water, weed, crop growth, pest detection, animal intrusion in to the field etc. The exact motive of this project helps Farmers to get connected to their Farm from anywhere and anytime. This system functions using Wireless sensor networks which observes the farm conditions and micro controllers are installed to control and automate the farm processes. To get regular monitoring, images and videos are made regularly using wireless cameras in the Farm and the Data is sent to smart phone which is connected to Internet. IOT technology is surely a help and it enhances the productivity in Agriculture with less cost..

## 1. INTRODUCTION

It was in 1995 the term "thing to thing" was first coined by Bill Gates. 'Internet of Things' (IoT) was brought up by EPC global. IOT functions in a way that it interconnects human to thing, thing to thing and human to human. The aim of IOT is to provide wide range of network by combining various types of connected devices. IoT tries to achieve three major aims namely, Communication, automation and cost saving in a system. IOT empowers farmers in saving time and money. This wireless network monitoring of Agriculture observes the conditions of the farming improves the crop quality and yield. IOT technology replaces traditional wired technology to wireless and reduces manpower cost.

A well designed Mobile Application (app) and installed modern technology in Farms communicate and transfer Data though web.

There is a constant transfer of information with a possibility to store information in Database. There is also a possibility to view statistical growth of crops from time to time. It is a powerful solution for optimum water management and an effective Irrigation system. With the help of received information in smart phone we can determine the frequency and time of irrigation. Through this method we save water, manpower, quality crops and time. It helps farmers in real time monitoring and increasing rice production. The automated control of irrigation helps farmers in more food production.

## 2. LITERATURE REVIEW

This paper proposes an [1] agricultural environment monitoring server system for monitoring information concerning an outdoors agricultural production environment utilizing Wireless Sensor Network (WSN) technology. The proposed agricultural environment monitoring server system collects environmental and soil information on the outdoors through WSN-based environmental and soil sensors, collects image information through CCTVs, and collects location information using GPS modules. 1.designed a wireless sensor networks to observe the conditions of the farming and increasing the crop yield and quality. 2. Database and web application is used to retrieve and store data 3. Sensors are used to monitor different conditions of environment like water level, humidity, temperature etc.,. The reference paper [2] The aim of this experiments is to realize greenhouse environment system, where the of system efficiency to manage the environment area and reduce the money and farming cost and also save energy.

The process used here is to [3] determine the proper frequency and time of watering are important to ensure the efficient use of water, high quality of crop detection delay throughput and load. Wireless sensor networks (WSN) is an important and exciting technology with great potential for application in various fields including medicine, transportation, agriculture, industrial process control, global-scale environmental monitoring and precision agriculture. The main aim of this paper is. [4] to propose a state of art wireless sensor technology in agriculture, which can show the path to the rural farming community to replace

some of the traditional techniques. Based on the value of soil moisture sensor the mote triggers the water sprinkler during the period of water scarcity. Once the field is sprinkled with adequate water, the water sprinkler is switched off. Hereby water can be conserved. Also the value of soil pH sensor is sent to the base station and in turn base station intimates the farmer about the soil pH via SMS using GSM modem.

Obtaining the soil pH value in his mobile the farmer selects the necessary fertilizer and crop for his next season. Hereby the amount of fertilizer can be reduced. In order to overcome the lack of information and technical support and to increase the rice production, a development of rice cropping monitoring using WSN is proposed to provide a helping hand to farmers in real-time monitoring, achieving precision agriculture, and thus increasing the rice production. Thus automated control of water sprinkling and ultimate supply of information to farmers is done as a result of this project using wireless sensor network..

The aim of this paper [5]The work of rural farming community that replaces some of the traditional techniques. [5]Wireless sensor Network based automated irrigation system for optimize water use for agricultural purpose. The system consists of distributed wireless sensor network of soli-moisture, and temperature sensors placed in the crop field. To handle the sensor information Zigbee protocol used and control the water quantity programming using an algorithm with threshold values of the sensors to a microcontroller for irrigation system. The system has powered by solar panel and Cellular-internet interface for data inspection.

This paper introduced [6] the design, methods used and implementation of a global crop growth monitoring system, which satisfies the need of the global crop monitoring in the world. This paper provided an [7] in-depth study of applying wireless sensor networks to real-world habitat monitoring. Two small scale sensor networks deployed at Great Duck Island and James Reserve (one patch each). Results not evaluated' No calibration was done, development of auto-calibration procedure suggested Future, Develop a habitat monitoring kit. This research [8] , deals with hardware and the software of the network coordinator node and the sensor nodes. The system is composed of sensor nodes for collecting data, base nodes for processing collected data, relay nodes for driving devices for adjusting the environment inside greenhouse and an environment server for data storage and processing. Using the Barenbrug formula for calculating the dew point on the leaves, this system is realized to prevent dew condensation phenomena on the crop's surface acting as an important element for prevention of diseases infections. We also constructed a physical model resembling the typical greenhouse in order to verify the performance of our system with regard to dew condensation control.

The reference paper consists of [9] distributed wireless sensor network of soil moisture, and temperature sensors mounted in the crop field. Wireless communication entails significant economic savings, as there is no need to install new wiring and visual impacts and damage to the facades of historical buildings in city centers are avoided.[10] The agriculture intelligent system was based on IOT which is introduced for organic melons and fruits production and quality. According to the need for transition from traditional agriculture to modern agriculture in China and the Spirits of 2012 Central No. 1 Document of the People's Republic of China, the agriculture intelligent system based on IOT is introduced for organic melon and fruit production.

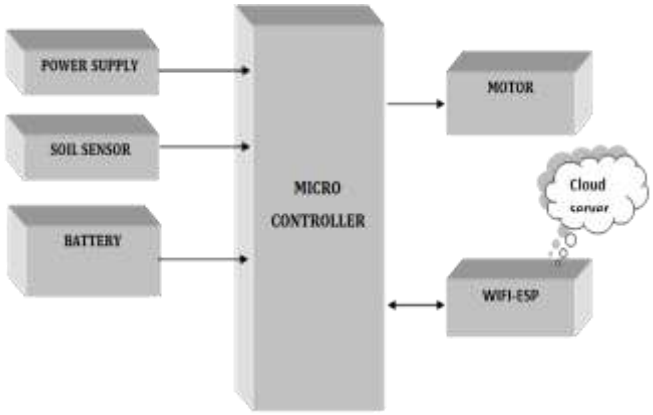
In this paper [11] , a novel wireless sensing network node with 2.4 GHz communication and flood detection with 0.02 volt/mm sensitivity is presented for flood monitoring of distribution substation of electrical utilities in low-lying area. Optimizing the maintenance, repair, and replacement of transformers, circuit breakers, IEDs, substation batteries and battery chargers, capacitor banks, and etc… A substation intelligence monitoring system contains a substation computer which is connected to a number of field devices through an input/output subsystem.

The aim of the [12] work described in this project is to design and implement the granary environmental monitoring system based on ARM7 and ZIGBEE which can be used in large granaries. The automatic monitoring of the grain will help us to improve the operation levels grain storage, reduce the grain losses and reduce the labor intensity.

The design for [13] wireless sensor network (WSN) for a water irrigation control and monitoring that is composed of a number of sensor nodes with a networking capability that is deployed for an ad-hoc for the purpose Efficient water management is a major concern in many cropping systems in semiarid and arid areas. Distributed in-field sensor-based irrigation systems offer a potential solution to support site-specific irrigation management that allows producers to maximize their productivity while saving water of ongoing monitoring. 1. This project aimed to [14] ensure overall good quality of the production. 2. The data is collected at a main unit in order to process inferences that suggest timely interventions that preserve the grapes quality. This work reports the experience on the design and deployment of a WSN-based system for monitoring the productive cycle of high-quality wine in a Sicilian winery. This paper describes [14] the security issues of Internet of Things which are directly related to the wide application of the system. The paper presents a survey and analysis on the current status and concerns of Internet of things (IoT) security. The IoT framework aspires to connect anyone with anything at anywhere. IoT typically has a three layers architecture consisting of Perception, Network, and Application layers. A

number of security principles should be enforced at each layer to achieve a secure IoT realization.

**3. MONITORING SECTION:**




**MONITORING SECTION:**

A remote control for drip irrigation is the most beneficial approach for the farmers. This system reduces the extra manpower of the farmer for his farm like supplying water to plants. This system uses sensors like soil sensor parameters farmer can control drip due to internet connectivity between client and servers, farmer can control drip component from anywhere. This system remove drawback of previous systems like distance problem, range problem. The proposed system uses an externally hosted cloud computing platform to manage the database, android and the isolated server by the users across the country. This approach is very beneficial for the farmer for increasing crop production. This system can be used in area where water resources are less. This system can be used for large area farms. In this system sensor senses the data and sends the reading to the micro-controller.

Then micro-controller sends those reading to the farm pc through serial communication. Then these readings get stored in the database that is connected to farm pc in which we use data mining concept. These readings will be displayed on the android phone and pc. The mobile and pc is connected to the database through cloud.

**4: MODULES:**

**WIFIDEVICE:**

Internet of Things (IoT) is an ecosystem of connected physical objects that are accessible through the internet. Internet of Things can connect devices embedded in various systems to the internet. When devices/objects can represent themselves digitally, they can be controlled from anywhere. The connectivity then helps us capture more data from more places, ensuring more ways of increasing efficiency and improving safety The ESP-12 is popular because of its size and the number of pins brought to the side of the board. Recently, more development boards have become available with additional sensors, relays, LEDs and voltage regulators on the board. The ESP8266 runs on anything from 2.8 to 3.5 volts, so a couple of AA batteries will work. Most of us use a 3.3 volt regulated power source. Maximum current draw is 300 mA, so use a supply that can supply 500 mA to be safe **.**

**Power.+**3.3 volts to Vcc Ground

**Communications**.

–TxD on the board to RxD on the adapter –RxD on the board to TxD on the adapter – Ground

**Jumpers**.

–Connect Vcc to CH_PD to enable the chip – Connect GPI0 to GND to enable flash reprogramming.

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

**SOIL SENSOR**

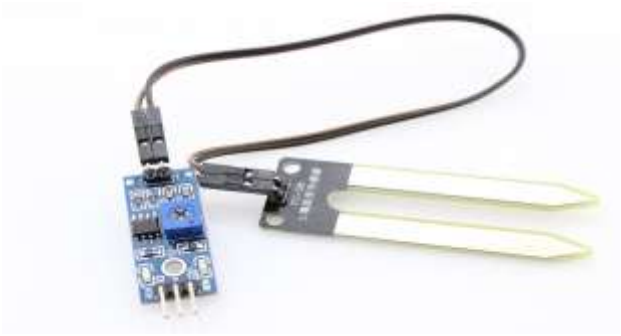
The Soil Moisture Sensor is used to measure the volumetric water content of soil. This makes it ideal for performing experiments in courses such as soil science, agricultural science, environmental science, horticulture, botany, and biology. Use the Soil Moisture Sensor to:

• Measure the loss of moisture over time due to evaporation and plant uptake. • Evaluate optimum soil moisture contents for various species of plants. • Monitor soil moisture content to control irrigation in greenhouses. • Enhance your Bottle Biology experiments.

Depending on the soil physical properties and goal of the soil moisture measurement, some devices are more effective than others. Firstly, it must be considered that although volumetric moisture is a more intuitive quantity, in fine

texture soils water is strongly retained by solid particles and therefore may not be available for plant absorption and other processes like flow. In the case of plant-soil studies, soil suction may be a more useful quantity since it relates to the energy that plants have to invest to extract the water from the soil, and hence it is a more meaningful measure of plant water stress. Secondly, the desired sampling frequency is an important factor since response times of different sensors vary over a wide range (i.e., some devices require soil moisture to equilibrate with the sensor matrix).

Thirdly, soil physical properties (texture, shrinking/swelling) may influence the suitability of the selected method, because some of them require good soil-instrument contact. On the other hand, depending on soil type and hydrologic conditions (precipitation and evapo transpiration), some instruments might have higher maintenance requirements than others. Irrigation management is a practical application of monitoring soil moisture that is becoming widespread among agricultural growers. Soil moisture-based optimized irrigation consists of keeping the soil within a target moisture range by replenishing the plant water uptake with irrigation.



This practice reduces the potential for soil water excess and leaching of agrochemicals present in the soil, however it requires selection. of a suitable method for soil moisture estimation (Muñoz -Carpena et al., 2002; 2003). To calculate irrigation requirements (the amount of water that needs to be applied with each irrigation), suction values from tensiometric methods need to be converted to soil moisture through the soil characteristic curve.

**MOTOR**

When you feed in DC, the electromagnet works like a conventional permanent magnet and produces a magnetic field that's always pointing in the same direction. The commutator reverses the coil current every time the coil flips over, just like in a simple DC motor, so the coil always spins in the same direction. When you feed in AC, however, the current flowing through the electromagnet and the current flowing through the coil both reverse, exactly in step, so the force on the coil is always in the same direction and the motor always spins either clockwise or counter-clockwise.

**Liquid-crystal display (LCD)**

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.[1] LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

LCDs are used in a wide range of applications including computer monitors, televisions, instrument panels, aircraft cockpit displays, and indoor and outdoor signage. Small LCD screens are common in portable consumer devices such as

digital cameras, watches, calculators, and mobile telephones, including smart phones.

**Resistor**

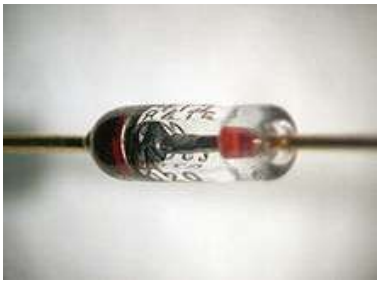
A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.

**Capacitor**

A capacitor is a passive two-terminal electrical component that stores electrical energy in an electric field. The effect of a capacitor is known as capacitance. While capacitance exists between any two electrical conductors of a circuit in sufficiently close proximity, a capacitor is specifically designed to provide and enhance this effect for a variety of practical applications by consideration of size, shape, and positioning of closely spaced conductors, and the intervening dielectric material. A capacitor was therefore historically first known as an electric condenser.

**Diode**

In electronics, a diode is a two-terminal electronic component that conducts primarily in one direction (asymmetric conductance); it has low (ideally zero) resistance to the flow of current in one direction, and high (ideally infinite) resistance in the other. A semiconductor diode, the most common type today, is a crystalline piece of semiconductor material with a p–n junction connected to two electrical terminals. A vacuum tube diode has two electrodes, a plate (anode) and a heated cathode. Semiconductor diodes were the first semiconductor electronic devices.

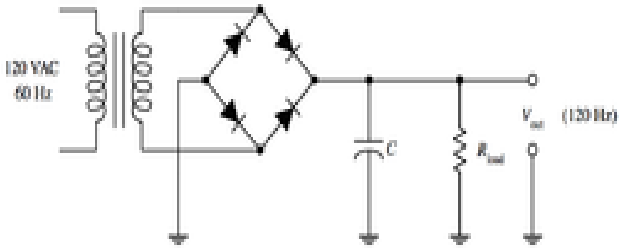


**Light-emitting diode**

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode, which emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.

**Power supply**

A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters. Some power supplies are discrete, stand-alone devices, whereas others are built into larger devices along with their loads.

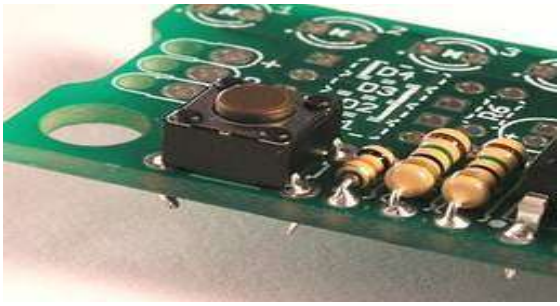


**Reset**

In electronics and technology, a reset button is a button that can reset a device. On video game consoles, the reset button restarts the game, losing the player's unsaved progress. On personal computers, the reset button clears the memory and reboots the machine forcibly.

Reset buttons are found on circuit breakers to reset the circuit. This button can cause data corruption so this button often doesn't exist on many machines.

Usually, in computers and other electronic devices, it is present as a small button, possibly recessed into the case or only accessible by a pin or similar thin object, to prevent it being pressed accidentally.



**Transistors:**

A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. It is composed of semiconductor material usually with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals changes the current through another pair of terminals. Because the controlled (output) power can be higher than the controlling (input) power, a transistor can amplify a signal. Today, some transistors are packaged individually, but many more are found embedded in integrated circuits.

Transistors are commonly used in digital circuits as electronic switches which can be either in an "on" or "off" state, both for high-power applications such as switched-mode power supplies and for low-power applications such as logic gates. Important parameters for this application include the current switched, the voltage handled, and the switching speed, characterised by the times.Various configurations of single transistor amplifier are possible, with some providing current gain, some voltage gain, and some both. From mobile phones to televisions, vast numbers of products include amplifiers for sound reproduction, radio transmission, and signal processing.

**Relay:**

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays.

**Switch**

A switch is an electrical component that can break an electrical circuit, interrupting the current or diverting it from one conductor to another.

The mechanism of a switch may be operated directly by a human operator to control a circuit (for example, a light switch or a keyboard button), may be operated by a moving object such as a door-operated switch, or may be operated by some sensing element for pressure, temperature or flow. A relay is a switch that is operated by electricity.

**BATTERY**

An electric battery is Convert chemical energy directly into electrical energy, which device are consisting of one or more electrochemical cells with external connections provided to power electrical devices.


A discharging battery has a positive terminal, or cathode, and a negative terminal, or anode. The terminal marked negative is the source of electrons that when connected to an external circuit will flow and deliver energy to an external device.

When a battery is connected to an external circuit, electrolytes are able to move as ions within, allowing the chemical reactions to be completed at the separate terminals and so deliver energy to the external circuit. It is the movement of those ions within the battery which allows current to flow out of the battery to perform work. Historically the term "battery" specifically referred to a device composed of multiple cells, however the usage has evolved to additionally include devices composed of a single cell.

**5. CONCLUSION**

India is one of the largest countries in the World which produces more food products. We all have studied in our schools that Agriculture is backbone of India. Through my research and findings, I feel that there should be more modernized innovative to help Farmers produce more quality products in an efficient way. It is possible when we make use of modern technology and latest information technology not only in the field of communication but also in Agriculture. I feel that my research is one such help for an efficient Agriculture.

Every technology has its own advantages and disadvantages. It is true that even my Research has its own pros and cons. For example, if a farmer is made aware of any Animal intrusion though this modern technology, it cannot save the crops from destruction unless it is stopped by a person. Another example would be; if a farmer irrigates his farm using IoT technology, it cannot change the water supply to other farms if the field is irrigated through canal irrigation. It needs a man to channelize the water supply to the field. There are few more drawbacks in this technology for example, unreliable communication times, fragile, power consumption, loss of communication, cost spent of Gadgets etc.

On one side there are number of drawback in IOT technology on the other side there is lot of positive results and effective production which is fruit of through this modern technology. Finally, this system is compact in frame work, light weight, good in performance and operation. It improves the agricultural production efficiency with use of modern technology.

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