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# Design And Implementation of Smart Agriculture Irrigation System Based on Weather Forecasting

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**ABSTRACT:** Agriculture is the source of living of maturity Indians and it also has a innumerable influence on economy of the country. The ideal of our design is to reduce this homemade involvement by the planter by using an automated irrigation system which purpose is to enhance water use for agrarian crops. This paper presents the design and perpetration of wireless detector network that can cover the air temperature, moisture, light intensity in a crop field and from remote places also. The system consists of bumps, which are equipped with small size operation specific detectors and radio frequency modules. The alleviation for this design came from the countries where economy is grounded on husbandry and the climatic conditions high to deficit of rains & failure of water. The growers working in the ranch lands are only dependent on the rains and bore wells for irrigation of the land. Indeed if the ranch land has a water- pump, homemade involvement by growers is needed to turn the pump on/ off when demanded. The design is intended to cultivate an automatic irrigation system which controls the pump motor ON/ OFF on seeing the humidity content of the soil. In the field of husbandry, use of applicable fashion of irrigation is essential. The advantage of using this fashion is to reduce mortal intervention and still certify proper irrigation. A software operation was developed by preordaining the threshold values of soil humidity, temperature and water position that was programmed into an arm regulator. This paper presents the controlling and covering the position of water and detecting the soil humidity content.

**KEYWORDS:** Internet of things (IOT), Arduino, Soil moisture sensor, temperature sensor, motor, humidity sensor

## I. INTRODUCTION

As we know that Indian economy is one of the largest developing husbandry of the world. The agrarian sector has its largest donation in the Indian economy. To achieve maximum utilisation of man power and to gain maximum profit in a given quested there's a need in the upgradation of colorful engineering ways that are being used moment. therefore maintaining proper quantum of water position in the soil is one of the necessary conditions to gather a good crop that can be a source of colorful types of nutrient whether micro or macro for their proper growth. If we talk about Indian growers they're worst hit by the dearths that occurs due to failure of crops depending upon colorful failure factors. Rain plays the crucial part in deciding the future of these crops as well as the growers every time. The over utilisation of ground water has drastically reduced the ground water position in the last 15years. So it's the need of hour to use each and every drop of water wisely so that it can also be used by our coming generation also. Also we should develop some new styles that use the renewable sources of energy. The development of these new ways are going to reach our thing of sustainable development as well as to cut off the emigration of hothouse feasts to a minimum level. As the name of our design that's AUTOMATIC IRRIGATION SYSTEM with the help of the Solar power is a step to use some new engineering ways. This fashion will be a veritably good option for the small and medium growers who suffer every time just because of failure of crops that took place every time. The perpetration of this technology has a wide compass in the near future.

## II. LITERATURE SURVEY

**2.1 V.Swathi, A. Krishnamurthy-**This paper presents the design and perpetration of wireless detector network that can cover the air temperature, moisture, light intensity in a crop field and from remote places also. The system consists of bumps, which are equipped with small size operation specific detectors and radio frequency modules. The detector data is transmitted via radio frequency link to the centrally localized computer outstation for data logging and analysis. This data can be examiner from the remote places by uploading the data into the internet, also the detector bumps can

also be programmed from the computer outstation itself according to the changing requirements of growers therefore precluding the need for redeployment of the wireless detector network every time some changes are to be made. Since the energy is the main operating constraint sleep mode of the core element is employed

**2.2B. Prabhushankar, R.Jayavadiel** -Agriculture is a source of livelihood of majority Indians and has great impact on the economy of the country. In dry lands or in case of insufficient rainfall, irrigation becomes difficult. So, it needs to be automation required for proper yield and handled remotely for farmer usage and safety. In this paper we suggest a Wireless sensor network and Embedded based technique to control water flow level for sectored, sprinkler or drip method section irrigation system. This system will be very economical in terms of the hardware cost, man power, and power consumption. In places such as agriculture land areas must be a continuous need for monitoring the water level at particular field. In places such as drip irrigation for coconuts, bananas and some vegetable plants, the water is let out through pipes directly to each field. A person has to carefully watch the water level at regular intervals. His job becomes difficult at night times and for frequent power cut. Sometimes there is wastage of water and electricity due to negligence and other times there is a hard job for the formers. This is highly helpful in places such as drip irrigation systems where there are many flow pipes but does not require any change in the agricultural field. When the motor is switched on the sensors are activated and the fields are irrigated automatically without man power. Once the water reaches a particular level which may take several hours, this system takes appropriate steps to regulate or even stop the water flow.

**2.3R. suresh, S.Gopinath, K.Govindaraju**-The green house based modern agriculture industries are the recent requirement in every part of agriculture in India. In this technology, the humidity and temperature of plants are precisely controlled. Due to the variable atmospheric conditions sometimes may vary from place to place in large farmhouse, which makes very difficult to maintain uniformity at all the places in the farmhouse manually. The proposed system implemented GSM is used to report the details about irrigation. The report from the GSM is sent through the android mobile. The keil software is used for simulating the result

### III. EXISTING SYSTEM

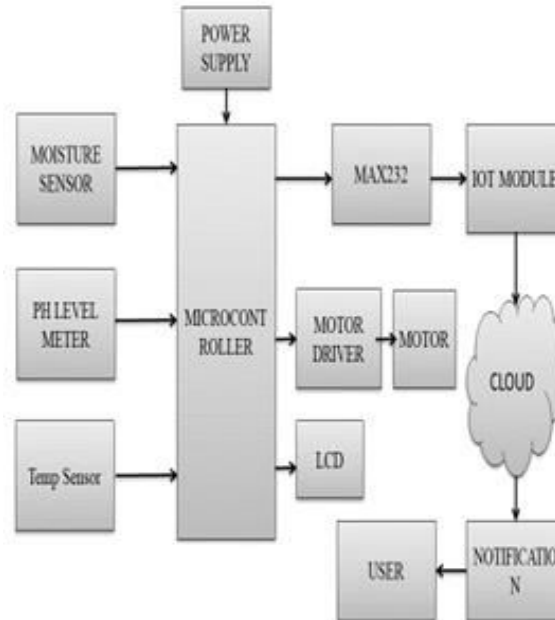
Utmost of the crop conservation systems in our country are done manually. Farmers stay in the agrarian lands for longer duration for crops irrigation and field conservation. The accurate value of the soil humidity position, crop stuffiness, PH position and growth position aren't known. Present there's arising global water extremity where managing failure of water has come a tedious job and there are conflicts between druggies of water. This is an period where mortal use and pollution of water resource have crossed the situations which lead to limit food product and low down the ecosystem. The major reason for these limitations is the growth of population which is adding at a faster rate than the product of food and after a many times this population will add up to 3- 4 billion. Thos growth can be seen in countries which have deficit of invariant crop conservation and are economically poor. Because of growth in population there's a huge demand to raise food product by 50 in the coming partial century to maintain the capita, grounded on an supposition that productivity of being ranch land doesn't decline. The crop water stress indicator called as CWSI was around 30 times agone.This crop water stress indicator was also integrated using measures of infrared cover temperatures, ambient air temperatures, and atmospheric vapor pressure values to determine when to wash using drip irrigation. The operation of these granges which are in glasshouseswill bear a data accession to be located in each hothouse and the control room where a control unit is located. These are separated from the product area. At present, the data is transferred using wired communication called field machine. This data is transferred between glasshouse and control room. All the problems related then's presented using CAN and ZigBee protocols.

### IV. PROPOSED SYSTEM

By automatic crop monitoring process, farmers would be able to know the right amount of water and Nutritionists at the right time thus maintaining the growth of crops. The farmer can measure the water level, PH level, and crop growth at any place. These values in agricultural land are measured by using sensors. It also assists the farmer to maintain the crop. The WSN for remote monitoring of crop fields consists of a set of wireless sensor nodes distributed in an area called end devices or sensor nodes. They have a stronger battery, a larger memory, and more computation power, the sensor nodes collect the data from the field by using sensors and this data is sent to the path between end devices. The collected data is sent to the internet and pc through WSN. Here in this paper an experimental scale within rural areas where there is an enormous disposition of irrigation systems which is executed using arduino controller and wireless communication module using iot.



#### 4.1 BLOCK DIAGRAM



#### 4.2 Working

The main of this implementation is to demonstrate that the automatic irrigation system can be used to reduce water usage. The system has a water level sensor which will indicate the presence of water level in the tank. A software application was advanced by programming the verge values of soil moisture water level that was automated into a microcontroller. The proposed hardware of this system includes arduino, Temperature, humidity, PH level and soil moisture sensors, LCD. The system is low cost & low power consumption so that anybody can afford it. The data monitoring is collected from the server. It can be used in precision farming. The system can be designed in such a way that even illiterate villages can operate it. They themselves can check different parameters are the soil like salinity, acidity, moisture, etc. from time to time. During the irrigation period, they have to monitor their distant pump house throughout the night as the electricity supply is not consistent.

### V. SYSTEM REQUIREMENTS

#### HARDWARE DESCRIPTION

##### 5.1 NODE MCU

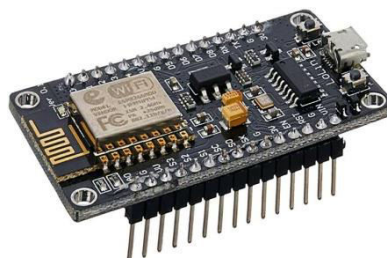


Fig 5.1 Node MCU

NodeMCU is an open-source Lua based firmware and improvement board uniquely focused on for IoT based Applications. It remembers firmware that runs for the ESP8266 Wi-Fi SoC from Espressif Systems, and equipment which depends on the ESP-12 module.

## 5.2 LCD Display



Fig 5.2 LCD

LCD can show numbers, characters and designs. The showcase is interfaced to I/O port of microcontroller (P0.0-P0.7). The presentation is in multiplexed mode . Inside 1/10th of a second the following showcase turns on. there show will bring about constant showcase of tally because of industriousness of Vision.

## 5.3 MOTOR



Fig 5.3 DC Motor

A DC motor is any of a class of rotary electrical motors that convert direct current electrical energy into mechanical energy. The most common type relies on the forces produced by magnetic fields. Nearly all type of DC motors has some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor.

## 5.4 Humidity Sensor

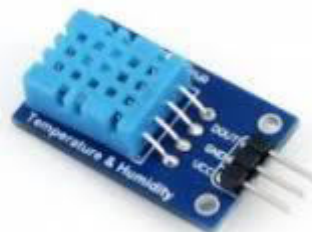


Fig 5.4 Humidity Sensor

A Humidity Sensor is an instrument used for measuring the moisture content in the environmental air or powders. Most measurement devices usually rely on measurements of some other quantity such as temperature, pressure, mass or a mechanical or electrical change in a substance as moisture is absorbed. From calculations based on physical principles, or especially by calibration with a reference standard, these measured quantities can lead to a measurement of

humidity. Modern electronic devices use temperature of condensation, or changes in electrical capacitance or resistance to measure humidity changes.

### 5.5 Power Supply

The AC supply is applied to 12V advance step down transformer. The transformer is the 12V AC which is corrected utilizing a diode connect. The yield of Diode Bridge of 12V DC is separated by capacitor.

### 5.6 ARDUINO UNO R3 MICROCONTROLLER

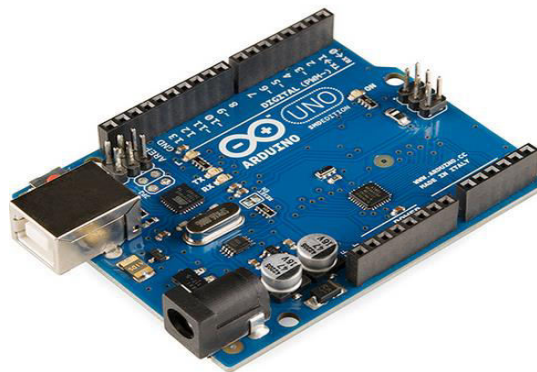


Fig 5.6 Arduino Board

The Arduino Uno R3 is a microcontroller board based on the ATmega328 IC. It has been 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contain everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

### 5.7 Soil MoistureSensor

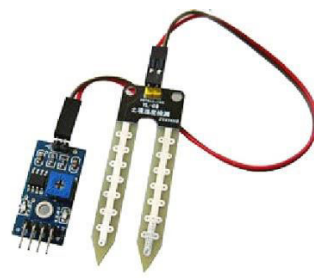


Fig .5.7 Soil Moisture sensor

Soil moisture sensors typically refer to sensors that estimate volumetric water content. Another class of sensors measure another property of moisture in soils called water potential; these sensors are usually referred to as soil water potential sensors and include tensiometers and gypsum blocks Measuring soil moisture is important for agricultural applications to help farmers manage their irrigation systems more efficiently.

### 5.8 TemperatureSensor



Fig 5.8 Temp sensor

A temperature sensor is a device, typically, a thermocouple or resistance temperature detector, that provides temperature measurement in a readable form through an electrical signal. A thermometer is the most basic form of a temperature meter that is used to measure the degree of hotness and coolness. Temperature meters are used in the geotechnical field to monitor concrete, structures, soil, water, bridges etc. for structural changes in them due to seasonal variations.

## VI. CONCLUSION

IOT grounded crop field covering system serves as a dependable and effective system for covering agrarian parameters. The corrective action can be taken. Wireless monitoring of field not only allows stoner to reduce the mortal power, but it also allows stoner to see accurate changes in it. It's cheaper in cost and consumes lower power. The GDP per capita in the agro sector can be increased. Agriculture is a backbone of mortal civilization since man has started husbandry. As the generation evolved, man developed numerous styles of crop monitoring to give growth to the crop. In the present script on conservation of water is of high significance. Present work is attempts to save the natural coffers available for mortal kind. By continuously covering the status of the soil, we can control the inflow of water and thereby reduce the destruction. This review is proposed to supports aggressive water operation for the agrarian land. Microcontroller in the system promises about increase in systems life by reducing the power consumption performing in lower power consumption.

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