*Impact Factor (SJIF): 5.301*

**International Journal of Advance Research in Engineering, Science & Technology**

*e-ISSN: 2393-9877, p-ISSN: 2394-2444*

***Volume 5, Issue 3, March-2018***

# IoT Based Automated Agriculture System

[1]Panimalar.S , [2]Divya.T, [3]Ezhil Oviya.D, [4]Nandhini.D

[1]Assistant Professor, Department of CSE,

Panimalar Institute of Technology, Chennai, Tamil Nadu,India. e-mail:panimalarjerome@gmail.com

[2]Student, Department of CSE , Panimalar Institute of Technology, Chennai, Tamil Nadu, India. e-mail:divya96cse@gmail.com

[3]Student, Department of CSE , Panimalar Institute of Technology, Chennai, Tamil Nadu, India. e-mail:ezhiloviyadevarajan.12@gmail.com

[4]Student, Department of CSE , Panimalar Institute of Technology, Chennai, Tamil Nadu, India. e-mail:naandudilli@gmail.com

***Abstract:-*** Internet of Things (IoT) is an environment of connected physical objects that are accessible through the internet. The 'thing' in IoT could be any object with build-in-sensors that have been assigned an IP address and have the ability to collect and transfer data over a network without manual assistance . IoT has various applications namely smart home, smart city, smart retail, smart healthcare, smart agriculture, energy engagement, poultry and farming, smart water management, industrial purpose. Here we sense the temperature, moisture, and humidity values of the field and water level in the well using temperature, humidity and flow sensor respectively. The the sensors analog value is converted to digital format by the ADC. The ARDUINO controller gets the output from the ADC. The sensor values monitored by the controller can be sent wirelessly to the user's cell phone using GSM modem. By using IOT, we can able to upload to server and we can able to monitor the data base from anywhere. The data base was stored in the cloud.

***Keywords:****Wireless Sensor Network, Internet of Things, Automation, Sensor, Controller.*

*****

## I. INTRODUCTION TO AUTOMATED AGRICULTURE

Modern Innovative IoT applications are addressing the agriculture issues and rising the quality, quantity, sustainability and cost effectiveness of agricultural production. Many farmers still use the traditional methods of farming which outcome in low yielding of crops and fruits. But in modern agriculture wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Through the use of various sensors and wireless devices, farmers can obtain information about soil moisture, soil temperature, and nutrient condition in the soil or the occurrence of plant diseases and pests in plants. On the basis of the information received, farmers can react in a timely manner and apply appropriate measures. Data on the operation of agricultural machinery is obtained using sensors, which enable operators to adjust machine operation to working conditions in order to achieve higher effectiveness and quality of the production process results are given when implemented in real time environment. In Real-Time Automation of Agricultural Environment for Social Modernization of Indian Agricultural System attracts great attention these days. By Distributed in the fields sensors based irrigation systems offers a potential solution to support site-specific irrigation management that allows producers to maximize their productivity while saving water. instrumentation and design of variable rate irrigation, a wireless sensor network, and software for real-time in-field sensing and controling a site-specific precision linear-move irrigation system is discussed here. Sensors are the essential device for precision agricultural application. In this paper we have detailed about how to utilize the sensors in paddy crop field area and explained about Wireless Sensor Network (WSN), and IOT sensor applications and the results are given when implemented in real time environment.

## II. LITERATURE SURVEY

The existing method and the oldest ways in agriculture is the manual method of checking the parameters. In this method the farmers they verify themselves all the parameters and calculate the readings.[1] The system is able to notify the administrator if water shortagearises in the main water supply and an administrator can also communicate with the system by sending SMS (Short message service) of a particular keyword. This system can be applied in both farmland as well as small pot plants. Using this system, a very promising outcome is found in sustaining and cherishing the plants in a more scientific way.[2] The suggested action are devoted to reduce the waste of water and to maximize the crop yield according to the weather conditions and the real

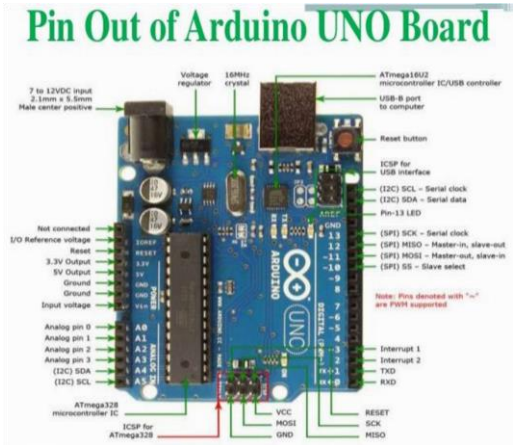
water needs. The proposed methodology is embedded in the network gateway making the system a truly autonomous wireless decision support system. [3]The numerical validation and the experiments performed in avineyard in the north of Italy point out a considerable water save respect to other state of the art methods based on parameters thresholding, and an improved exploitation of the irrigated water thanks to the reduction of the percolation phenomenon without affecting the quality of the crops.[4] Performance evaluations and simulation analysis conducted based on the effects of temperature demonstrate the effectiveness of our proposed scheme in controlling the greenhouse environmental changes for in the agriculture industry.[5] These features make the proposed algorithm highly compatible with realistic WSN deployments, e.g., ZigBee which are based upon the ad hoc on demand distance vector (AODV) where route request (RREQ) and route reply (RREP) packets are flooded in the network during route discovery phase. Index Terms— Wireless sensor networks, distributed localization, rangebased localization algorithms, Bayesian updates, precision agriculture.[6] In India about 70% of population depends upon farming and one third of the nation's capital comes from farming. Controlling all these operations will be through any remote smart device or computer connected to Internet and the operations will be performed by interfacing sensors, WiFi or ZigBee modules, camera and actuators with microcontroller . [7]Hence the project aims at making agriculture smart using both automation and IoT technologies. The highlighting features of this project includes smart GPS based remote controlled robot to perform tasks like spraying,weeding, moisture sensing, bird and animal scaring, keeping vigilance, etc. Secondly it includes smart irrigation with smart control and intelligent decision making based on accurate real time field datas. Thirdly, smart warehouse management which includes humidity maintenance, temperature maintenance and theft detection in the warehouse. [8] This work present the control of drip is applied to hydroponic farming in which is developed an interface between human and machine in a free software allowing continuous monitoring of moisture, pH, temperature and electrical conductivity of soil through the sensors housed in the crop root zone also, the controller performs the conditioning sensors, actuator control resource to irrigate water, and nutrient solution, and monitoring via web.[9] Resources only but also agricultural products needs security and protection at very initial stage, like protection from attacks of rodent or insects, in fields or grain stores. Such challenges should also be taken into consideration. Based on attempted test cases, we were able to achieve success in 84.8% test cases.[10] In this paper, greenhouse is a building in which plants are grown in closed to environment. It is used to maintain the optimal conditions of the environment, data acquisition greenhouse management.

## III. PROPOSED WORK

This project "Real-Time Atomization of Agricultural Environment for Social Modernization of Indian Agricultural System" Efficient water management is a major concern in many cropping system in semiarid and arid areas.
Temperature sensor, level sensor, moisture sensor, PH sensor connected with ARDUINO. Microcontroller transmits the data's using Global system for mobile communications Modem, this project offered stable remote access to field conditions and real-time control and monitoring of the variable-rate irrigation controller.Each unit is based on the micro-controller that controls the radio modem ZigBee and processes information from the soil-moisture sensor, temperature sensor and water level sensor. In this wireless sensor unit or transmission unit the sensor data from different sensors (Soil moisture, temperature, humidity and water level) are collected in the main controller. This data is displayed on transmission section LCD. ARM controller is programmed to some threshold values of temperature and soil moisture. Sensed values are compared with the threshold values and according to comparison automation is takes place.

## IV. HARDWARE USED

**Arduino Uno**



Arduino is a prototype platform(open source)based on an easy-to-use software and hardware. It consist of a circuit board, which can be programed (referred to as a micro controller) and a ready-made software called Arduino IDE (Integrated Development Environment),which is used to write and upload the computer code to the physical board.It has a 32 KB of flash memory for storing your code.An onboard LED is attached to digital pin 13 to make fast the debugging of code and to make the debug process easy.Finally, it has a button to reset the program on the chip.

## Zigbee Parameters:

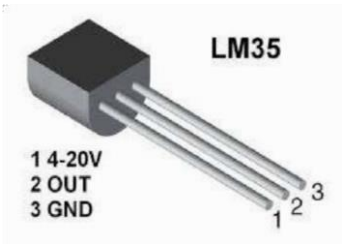
Supply voltage: 5v DC
• Detection range: (10-30) m
• RS232 Output
• TTL uart also provided
• Frequency: 2.4GHz
• Tx and Rx Status LEDs
• Low power

## ATMEGA328 Controller:

ATmega328/P is a low-control CMOS 8-bit smaller scale controller in light of the AVR improved RISC building design .The AVR center consolidates a rich guideline set with 32 broadly useful working registers. All the 32 registers are specifically joined with the Arithmetic Logic Unit (ALU), permitting two autonomous registers to be gotten to in one single guideline executed in one clock cycle.

## TEMPERATURE SENSOR

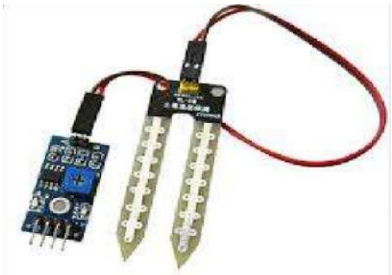
Thermistors are thermally sensitive resistors whose prime function is to exhibit a large, predictable and precise change in electrical resistance when subjected to a corresponding change in body temperatures. Coefficient (NTC) thermistors exhibit a decrease in electrical resistance when subjected to an increase in body temperatures and Positive Temperature Coefficient (PTC) thermistors exhibit an increase in electrical resistance when subjected to an increase in body temperatures.




Temperature Sensor

## SOIL MOISTURE SENSOR

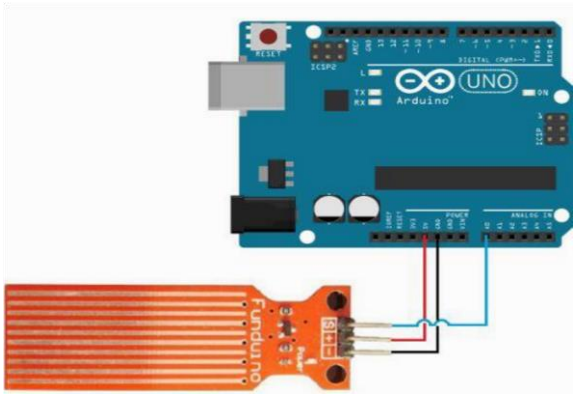
The circuit designed uses a 5V supply, fixed resistance of 100Ω, variable resistance of 10KΩ, two copper leads as the sensor probes, 2N222N transistor.
It gives a voltage output corresponding to the conductivity of the soil. The conductivity of the soil depends upon the amount of moisture present in it.



Soil Moisture Sensor

## WATER LEVEL SENSOR:

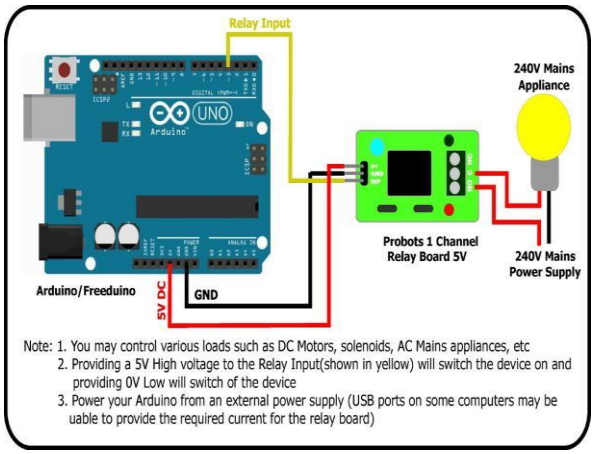
The purpose for this Sensor is to allow the user to evaluate a pressure sensor for not only water level sensing and to replace a mechanical switch, but also for water flow measurement, leak detection, and other solutions for smart appliances.



Water level sensor

## RELAY

A relay is an electrically controllable switch widely used in industrial controls, automobiles and appliances. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.




## V. SOFTWARE USED PROTEUS 8 SIMULATOR

Proteus 8 is one of the best simulation software for various circuit designs of the microcontroller. It has almost all electronic components and microcontrollers readily available in it and hence it is widely used simulator. It can be used to test programs and embedded designs for electronics before actual hardware testing. The simulation of programming of the microcontroller can also be done in Proteus. Simulation avoids the risk of damaging hardware due to wrong design.

## VI. EXPERIMENTATION & RESULTS

The hardware is interfaced with all the sensors in the board. The hardware components include the microcontroller, buzzer, relay, ADC converter, GSM module and all the sensors interfaced. The board is inserted with a SIM card which is used to communicate with the owner and the recorded values. The output shown below denotes the temperature, soil moisture condition and the intruder detection. The second result is the output from the Android Application that is developed in the mobile phone. It determines the temperature, humidity, moisture and the intruder detection.


Android application monitoring

## VII. CONCLUSION

In this paper, we can find water level, temperature, moisture and we can also find humidity in this paper. A wireless decision support system for the optimized management of the irrigation in agriculture has been presented. The properties of the WSAN technology have been exploited to acquire heterogeneous environmental parameters and to control the functioning of the irrigation system. The controller performs irrigation scheduling effectively, delivering the required dose of water resources to meet the requirements of the plant, avoiding excessive doses, furthermore the proper nutrition of the plant is controlled by allowing the development time of the plant lower, obtaining the first green fruits a month making possible to obtain much production in the year.

## ACKNOWLEDGEMENT

We express our sincere thankfulness to our Project Guide **Mrs.S.Panimalar** for her successful guidance to our project. Without the help it would be a tough job for us to accomplish this task. We thank our guide for her consistent guidance, encouragement and motivation throughout our period of work. We also thank our Head of the Department (CSE) **Dr.V.Subedha** for providing us all the necessary facilities.

## REFERENCES

1) S. R. Nandurkar, V. R. Thool, R. C. Thool, "Design and Development of Precision Agriculture System Using Wireless Sensor Network", IEEE International Conference on Automation, Control, Energy and Systems (ACES), 2014.
2) Dr. V .Vidya Devi,G. Meena Kumari, "Real- Time Automation and Monitoring System for Modernized Agriculture" ,International Journal of Review and Research in Applied Sciences and Engineering (IJRRASE) Vol3 No.1. PP 7-12, 2013.
3) Alexandros Kaloxylos, J Wolfert, Tim Verwaart, Carlos Maestre Terol, Christopher Brewster, Robbert Robbemond and Harald Sundmaker. ''The Use of Future Internet Technologies in the Agriculture and Food Sectors:
Integrating the Supply Chain'' in 6th International Conference on Information and Communication
Technologies in Agriculture, Food and Environment. pp. 5160.
4) Y. Kim, R. Evans and W. Iversen, "Remote Sensing and Control of an Irrigation System Using a Distributed Wireless Sensor Network", IEEE Transactions on Instrumentation and Measurement, pp. 1379–1387, 2008.
5) H. Navarro-Hellin, R. Torres-Sanchez, F. Soto-Valles, C. Albaladejo-Perez, J. A. Lopez-Riquelme, and
R.Domingo-Miguel,"A wireless sensor architecture for efficient irrigation water management," Agr. Water Manage., vol. 151, pp. 64-74, 2015.
6) N. Harris, A. Cranny, M. Rivers, K. Smettem, and E. G.
Barret-Lennard, "Application of distributed wireless chloride sensors to environmental monitoring: initial results," IEEE Trans. Instrum. Meas., vol. 65, no. 4,pp. 736-744, Apr. 2016.

7) C. T. Kone, A. Hafid, and M. Boushaba, "Performance management of IEEE 802.15.4 wireless sensor network for precision agriculture," IEEE Sensors J., vol. 15, no. 10, pp. 5734-5747, Oct. 2015.
8) F. Viani, M. Bertolli, and A. Polo, "Low-cost wireless system for agrochemical dosage reduction in precision farming," IEEE Sensors J., vol. 17, no. 1, pp. 5-6, Jan. 2017. 9) F. Viani, "Experimental validation of a wireless system for the irrigation management in smart farming applications," Microw. Opt. Techn. Let., vol. 58, no. 9, pp. 2186-2189, Sep. 2016.