IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE)
e-ISSN: 2278-1676, p-ISSN: 2320-3331, Volume 17, Issue 4 Ser. I (Jul. – Aug. 2022), PP 01-04
www.iosrjournals.org

IOT Based Smart Agriculture toward Making the Fields Talk

Miss. Munde Anuradha M. 1, Dr.Vaijanath V.Yerigeri 2
(M. Tech Student, Department of Post-Graduation (Digital Communication) Professor, Department of Post-Graduation (Digital Communication) MBESs College of Engineering, Ambajogai, MS, India)

Abstract:
Indian agriculture is diverse ranging from impoverished farm villages to developed farms utilizing modern agricultural technologies. Facility agriculture area in China is expanding and is leading the world. However, its ecosystem control technology is still immature, with low level of intelligence. Promoting application of modern information technology in agriculture will solve a series of problems facing by farmers. Lack of exact information and communication leads to the loss in production. Our paper is designed to overcome these problems. This system provides an intelligent monitoring platform framework and system structure for facility agriculture ecosystem based on IOT. This will be a catalyst for the transition from traditional farming to modern farming. This also provides opportunity for creating new technology and service development in IOT (internet of things) farming application. The Internet of Things makes everything connected. Over 50 years since independence, India has made immense progress towards food productivity. The Indian population has tripled, but food grain production more than quadrupled there has thus been a substantial increase in available food grain per ca-pita. Modern agriculture practices have a great promise for the economic development of a nation. So we have brought-in an innovative project for the welfare of farmers and also for the farms. There are no day or night restrictions. This is helpful at any time.
***Key Word**: IoT, Smart Agriculture, Humidity, Temperature, Soil Moisture, Arduino.*

Date of Submission: 22-06-2022 Date of Acceptance: 04-07-2022

I. Introduction

Smart Agriculture developing model is a real time monitoring system It monitor the soil properties like temperature, humidity soil moisture PH etc. It is possible to control many operations of the field remotely from anywhere, anytime by IOT. It offers a futuristic way of life in which an individual gets to control his electronic devices using a smart phone, it also offers an efficient use of energy. It applied in all areas of industry, including smart agriculture, smart parking, smart building environmental monitoring, healthcare transportation and many more.

II. Related work

In the existing system of agriculture, the crops are being monitored with the help of Arduino boards and GSM technology where in Arduino boards acts as a microcontroller but not as a server. Hence in order to overcome all these features Arduino Nano boards or renesas microcontrollers are being included with the NodeMCU which a latest version is and also acts both as a microcontroller as well as server. Main feature of this methodology is its cheap cost for installation and multiple advantages. Here one can access as well as control the agriculture system in laptop, cell phone or a computer.

III. Proposed Methodology

The smart agriculture model main aim to avoid water wastage in the irrigation process. It is low cost and efficient system Is shown below.
Itincludes Node MCU, Arduino Nano, sensors like soil moisture and Dht11,Water Pump, relays.
3.1 NodeMCU: NodeMCU is an open source IoT platform. itincludes firmware which runs on the ESP8266 Wi-Fi SoCfrom Expressive Systems, and hardware which is based ontheESP-12module.

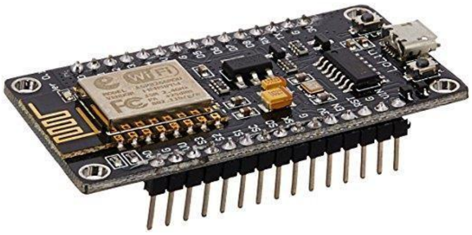

Figure 3.1 NodeMCU

The term "NodeMCU" by default refers to the firmware rather than the dev kits. The firmware uses the Lua scripting language. The programming code is being written for ESP8266 Wi-Fi chip using Arduino IDE, for which installation of ESP8266 library is required. We designed to make

Working with this chip super easy and a lot of fun. We took a certified module with an onboard antenna, and plenty of pins, and soldered it onto our designed breakout PCBs. While this chip has been very popular, it's also been very difficult to use. Most of the low-cost modules.

3.2 Block Diagram

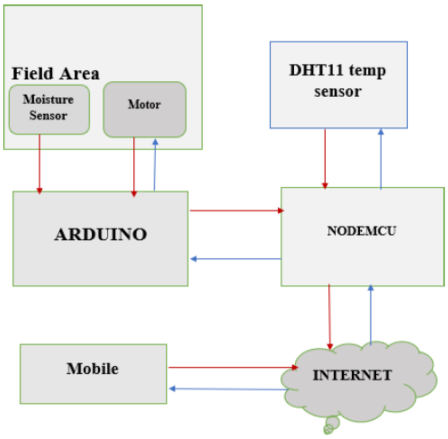

Figure 3.1 Block Diagram of Smart Agriculture Model

IV. HARDWARE COMPONENTS

4. 1ARDUINO UNO:

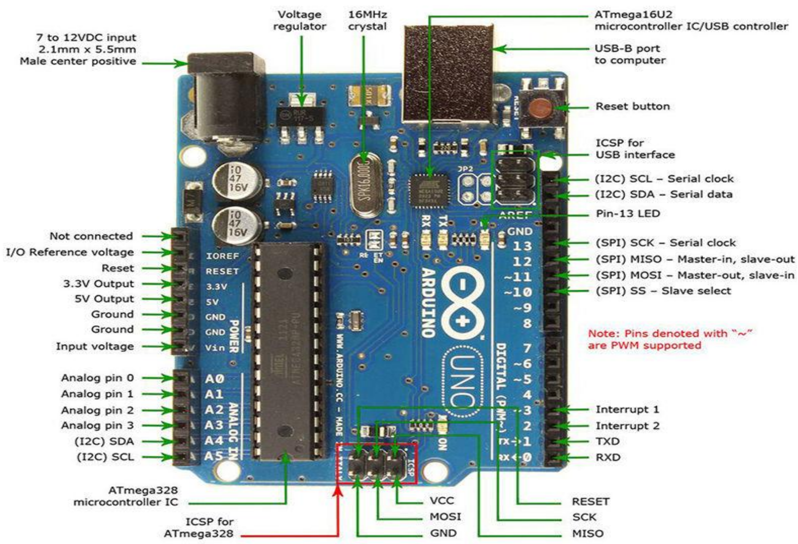

Figure 4.1Arduino

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.TheArduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware in order to load new code onto the board – you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

There are many varieties of Arduino board that can be used for different purposes. Some boards look a bit different from the one below, but most Arduino have the majority of these components in common

4.2 Relay Module: 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. Relays are used where it is Necessary to control a circuit by a Separate low-power signal, or where several circuits must be controlled by one Signal. The first relays were used in long Distance telegraph circuits as amplifiers: they repeated the signal Coming In from one circuit and re-transmitted it on another Circuit

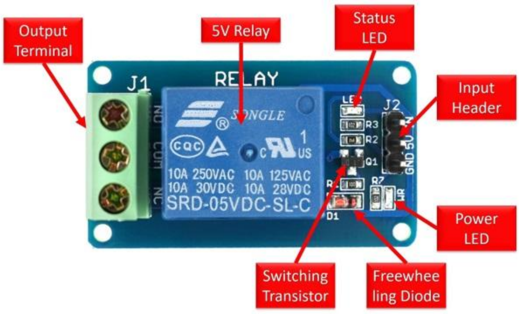

Figure4.2 Relay Module

4.3 Temperature and humidity sensor: Humidity Sensor is one of the most important devices that has been widely in consumer, industrial, biomedical, and environmental etc. applications for measuring and monitoring Humidity values. For monitoring the temperature and humidity we use the DHT11 sensor. The DHT11 detects the water vapor by measuring the electrical resistance between two electrodes. The humidity sensing component is a moisture holding substrate with electrodes applied to the surface. When water vapor is absorbed by the substrate, ions are released by the substrate which increases the conductivity between the electrodes. The change in resistance between the two electrodes is proportional to the relative humidity. Higher relative humidity decreases the resistance between the electrodes, while lower relative humidity increases the resistance between the electrodes. The principle in the humidity sensor is They consist of a humidity sensing component, a NTC temperature sensor (or thermistor) and an IC on the back side of the sensor. For measuring humidity, they use the humidity sensing component which has two electrodes with Humidity moisture holding substrate between them. Humidity indicates the likelihood of predications, dew, or fog. Higher humidity reduces the effectiveness of sweating in cooling the body by reducing the rate of evaporation of moisture from the skin. This effect is calculated in a heat index table or humidex the amount of water vapor that is needed to achieve saturation increases as the temperature increases. As the temperature of a parcel of water becomes lower it will eventually reach the point of saturation without adding or losing water mass.

Figure4.3 Temperature and humidity sensor

4.4 Moisture Sensor: A simple soil moisture sensor for gardeners. Soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity. Reflected microwave radiation is affected by the soil moisture and is used for remote sensing in hydrology and agriculture. Portable probe instruments can be used by farmers or gardeners.

Figure 4.1MoistureSensor

V. Conclusion

In this Proposed System, The smart agriculture using IOT has been work satisfactorily by monitoring the values of humidity and temperature successfully. Through the internet control the motor in the field. It also stores the sensor parameters in the timely manner. This will help the user to analyze the conditions of various parameters in the field anytime anywhere. Then control or maintain the parameters of field properly. Finally, we conclude that automatic irrigation system is more efficient than scheduled irrigation process.

References

[1]. 1. Sirsath N. S, Dhole P. S, Mohire N. P, Naik S. C &Ratnaparkhi N.S, "SMART AGRICULTURE USING Cloud Network and Mobile Devices".

[2]. Amardeo C, Sarma. I G. Identities in the Future Internet of Things[J]. Wireless Pers Commun, Vol. (49): 353- 363 2009.

[3]. Kim Y,Evans R G,Iversen W M. Remote sensing and control of an irrigation system using a distributed wireless sensor network. IEEE Transactions on Instrumentation and Measurement 2008.

[4]. Wang N, Zhang N P, Wang M H. Wireless sensors in agriculture and food industry-Recent development and future perspective[J]. Computers and Electronics in Agriculture, 2006.

[5]. Chan, M., Campo, E., Esteve, D., Fourniols, J.Y., "Smart homes-current features and future perspectives," Maturitas, vol. 64, issue 2, pp. 90-97, 2009.

[6]. Das, S.R., Chita, S., Peterson, N., Shirazi, B.A., Bhadkamkar, M., "Home automation and security for mobile devices," IEEE PERCOM Workshops, pp. 141- 146, 2011.

[7]. S.D.T. Kelly, N.K. Suryadevara, S.C. Mukhopadhyay, "Towards the Implementation of IoT for Environmental Condition Monitoring in Homes", IEEE, Vol. 13, pp. 3846- 3853, 2013.