A SMART IOT BASED FARM MANAGEMENT SYSTEM CONTROLLED AND MONITORED BY WEB APPLICATION.

Tejas Chavan[1], Dayanand Nimbalkar [2], Pratiksha Gadadare [3], Khushali Sathawane[4] , Prof. Amruta More.[5]

[1] *Tejas Chavan, Computer Engineering, Anantrao Pawar college of Engineering and Research, Maharashtra, India*
[2] *Dayanand Nimbalkar, Computer Engineering, Anantrao Pawar college of Engineering and Research, Maharashtra, India*
[3]*Pratiksha Gadadare, Computer Engineering, Anantrao Pawar college of Engineering and Research, Maharashtra, India*
[4] *Khushali Sathawane, Computer Engineering, Anantrao Pawar college of Engineering and Research, Maharashtra, India*

ABSTRACT

As we can see in today's world only some devices like PC's and mobiles are connected to internet. Now-a-days world is fully overtaken by the internet and internet of things. The Internet of Things (IOT) is simply means to monitor a physical device or machine, or it is inter-networking of physical devices which is embedded with electronics, sensors, software, and network connectivity to enable it to achieve greater value and services by exchanging data with the manufacturer. due to busy life nowadays, we are not able to maintain proper plant care like watering the plants, checking if the plant is getting enough sunlight etc. Hence, we design the Web Application which helping Farmer. This system is designed as a plant monitoring system based on IOT. In this project we used different Sensors such as Temperature sensor, Moisture sensor, etc the sensors are used to detect the values or parameters such as soil moisture, temperature, water level, and soil type. Development and deployment of sensing technologies is one of the main steps in achieving sustainability in crop production through precision agriculture.

Key Words: *Html, sensor Network, Django,Soil Detection, Light detection, Node MCU.*

1. INTRODUCTION:

We live in a world where everything can bemanaged and controlled automatically, but there are still several important industries in our countrywhere automation has not been adopted or fully utilized, perhaps due to several reasons. is theprice. One such field is agriculture. Agriculture has been one of man's primary occupations since early civilizations, and even today, manual intervention in agriculture is inevitable. Plant monitoring forms an important part of the agriculture and

horticulture sector in our country, as it can be used to grow plants in controlled climate conditions for optimal production. Automation of plant monitoring and management of climate parameters that directly or indirectly affect plant growth and thus their production. Automation is the process control of industrial machines and processes that replaces human operation. This paper presents plant monitoring system technology that provides feedback to the user via a smartphone. An automated system will reduce the need for manpower and thus reduce the errorrate. in a large area it is quite impossible for farmers to monitor the efficiency of the system byimplementing this technology, farmers can easily monitor the system using their smart phone. Also due to today's busy life we are not able to maintainproper plant care like watering the plants, checkingif the plant is getting enough sunlight etc. To facilitate this, we are making an IOT based automation system in which the user can monitor the plant parameters like temperature, humidity, moisture and can also water them.

2. LITERATURE SURVEY:

We have studied many previous works done in this area by different researchers. The useof technology in agriculture plays an important role in increasing production as well as reducing the workforce. A review paper IoT Based Plant Monitoring System [2] shows that in India about 35% of the land was reliably irrigated. And 2/3 ofthe country depends on the monsoon for water. Irrigation reduces dependence on the monsoon, improves food security and agricultural productivity, and offers more job opportunities inrural areas. Farmers are facing problems related to irrigation system, how much water they must supply and at what time? Sometimes waterlogging causes damage to crops as well as water wastage. To avoid such damage, we need to maintain an approximate water level in the soil.The Internet of Things and Node MCU reference paper [3] explains that a prototype is the first stepin building an Internet of Things (IoT) product. AnIoT prototype consists of a user interface, hardware devices including sensors, actuators and processors, backend software and connectivity. An IoT microcontroller unit (MCU) or development board is used for prototyping. The IoT microcontroller unit (MCU) ordevelopment board contains low-power processors that support various programming environments and can collect sensor data using firmware and transmit raw or processed data to alocal or cloud server. NodeMCU is an open-source firmware and LUA programming languagedeveloped for ESP8266 Wi-Fi chip.

3. SYSTEM ARCHITECTURE:

The system architecture is the model that conceptually defines the views, structure, and behavior of the system. System architecture in other words is the representation and description of how the system works and communicates with other system components in general. The whole system is composed of the components and the subsystems that overall work together to make thesystem it should be in the first place.

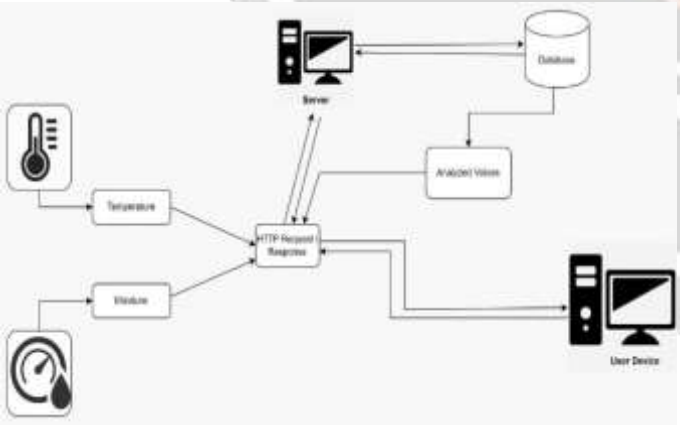

Figure 1: System Architecture Diagram

components with improved functions.

- Ease of use: The proposed system is easyunderstand and grasp. Use of the system requires no prior knowledge.

4. PRAMETER AND SENSOR SPECIFICATION:

4.1 Temperature and Humidity Sensor:

DHT11 is cheap digital temperature and humidity sensor. This sensor receives information from the surroundings and outputs a digital signal.Consists of via thermistor and humidity sensor. Like the sensor is small, consumes little energy andtransmit the signal up to a range of 20 meters.the original spatial data and ignore the redundantdata. This allows the extracted data to be processed in

Figure 2: Temperature and Humidity sensor

4.1.1 Temperature Sensor:

Sensor Model:	**DHT11**
Voltage	+5V
Input	Temperature and humidity in surroundings
Output	Digital Signal
Units	Temperature in Celsius and Humidity in Percentage

4.2 Soil Moisture Sensor:

A water level sensor is used capacity for measuring soil water content measuring its dielectric permittivity. When we insert this sensorinto the soil to be tested, then the water contentpresent in the soil expressed as a percentage.

4.2.1 Soil Moisture Sensor:

Sensor Model	**SHT10**
Voltage	**+3.3V**
Input	**Water**
Output	**Analog Signal**
Units	**Percentage**

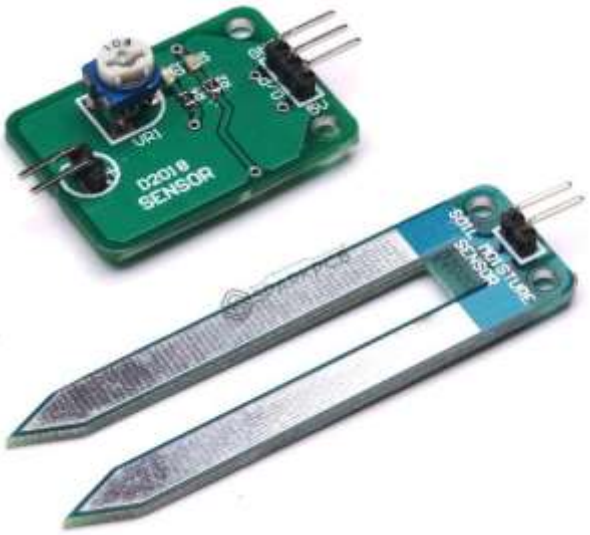

Figure 3: Soil Moisture sensor

4.3 Node MCU:

Node MCU is an open-source firmware for which open-source prototype board designs are available. The name "Node MCU" combines "node" and "MCU" (microcontroller unit). Strictly speaking, the term "Node MCU" refers to the firmware rather than the associated development kits. Both the firmware and the prototype board design are open source. Due to limited resources, users must select modules relevant to their project and create firmware tailored to their needs. Support for 32- bit ESP32 has also been implemented.

Figure 4: Node MCU

5. METHODOLOGY:

5.1 Automatic Irrigation Sprinkler:

In automatic irrigation sprinkler this Irrigation sprinkler will connect to the sensors in the system. The system will work according to thesituation of soil moisture level in the field. If the moisture level in soil is in measured level then withthe help of sensor this sprinkler will of automatically. Otherwise, it will continue the sprinkler on until it reached to that level.

6. CONCLUSION:

A system to monitor temperature, humidity, moisture levels in the soil was designed and the project provides an opportunity to study the existing systems, along with their features and drawbacks. The proposed system can be used to switch the motor (on/off) depending on favorablecondition of plants i.e., sensor values, thereby automating the process of irrigation. which is one of the most time efficient activities in farming,which helps to prevent over irrigation or under irrigation of soil thereby avoiding crop damage. The farm owner can monitor the process online through Front End Structure. By this work, thewastage of water and the consumption of power by motor can be reduced so that they are conserved for the future use. Through this projectit can be concluded that there can be considerabledevelopment in farming with the use of IOT and automation.

Figure 5: Irrigation Sprinkler

7. REFERENCES:

[1] Doukas, Charalampos. Building Internet of Things with the ARDUINO. CreateSpace Independent Publishing Platform, 2012.

[2] Swan, Andrew RH, and Michael Sandilands. "Introduction to geological data analysis." International Journal of Rock Mechanics and Mining Sciences and Geomechanics Abstracts. Vol. 8.No. 32. 1995.

[3] Mathur, Archana S., Surajit Das, and Subhalakshmi Sircar. "Status of agriculture in India: trends and prospects." Economic and politicalweekly (2006):

[4] García, Ileana, Rodolfo Mendoza, and María C. Pomar. "Deficit andexcess of soil water impact on plant growth of Lotus tenuis by affecting nutrient uptake and arbuscular mycorrhizal symbiosis." Plant and Soil 304.1-2 (2008): 117-131.

[5] Rao, R. Nageswara, and B. Sridhar. "IoT based smart crop-field monitoring and automation irrigation system." 2018 2nd International Conference on Inventive Systems and Control (ICISC).

[6] Paudel, Mina Nath. "Multiple Cropping for Raising Productivity and Farm Income of Small Farmers." Journal of Nepal AgriculturalResearch Council 2 (2016): 37-45.

[7] Ahmad, Latief, Sabah Parvaze, and R. H. Kanth. "Crop water requirement of major crops of Srinagar, Kashmir (J&K)." J. Exp. Agr 15.2 (2017): 1-9.

[8] ed wireless sensor network." IEEE transactions on instrumentation and measurement57.7 (2008): 1379-1387.

[9] Saraf, Shweta B., and Dhanashri H.Gawali. "IoT based smart irrigation monitoring and controlling system." Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2017 2nd IEEE International Conference on. IEEE, 2017.

[10] Vaishali, S., et al. "Mobileintegrated smart irrigation management and monitoring system using IOT." Communication and Signal Processing (ICCSP), 2017 International Conference on. IEEE, 2017.

[11] Jagannathan, S., and R. Priyatharshini. "Smart farming system using sensors for agricultural task automation." Technological Innovation in ICT for Agriculture and Rural Development(TIAR), 2015 IEEE. IEEE, 2015.

[12] Rajkumar, M. Newlin, S. Abinaya, and V. Venkatesa Kumar. "Intelligent irrigation system—An IOT based approach." Innovations in Green Energy and Healthcare Technologies (IGEHT), 2017 InternationalConference on. IEEE, 2017.

[13] LaxmiShabadi, NandiniPatil."Nikita. M, Shruti. J, Smitha. P&Swati. C,"Irrigation Control System Using Android and GSM for Efficient Use of Water and Power"." International Journal of Advanced Research in Computer Science and Software Engineering 4.7 (2014).

[14] Gutiérrez, Joaquín, et al. "Automated irrigation system using a wireless sensor network and GPRS module." IEEE transactions oninstrumentation and measurement63.1 (2014): 166-176

[15] Wang, Yang, et al. "Wireless sensor networks for intensive irrigated agriculture. "Consumer Communications and NetworkingConference, 2007. CCNC 2007. 4th IEEE. IEEE, 2007.