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[ijirset@gmail.com](mailto:ijirset@gmail.com)

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# Smart Agriculture System using IoT

Komal Chavhan<sup>1</sup>, Sujay Bobade<sup>2</sup>, Chaitali Raut<sup>3</sup>, Vishakha Atkare<sup>4</sup>, Sagar Jadhao<sup>5</sup>,  
Mrunal Sadawarte<sup>6</sup>, D.A.Shahakar<sup>7</sup>

UG Student, Student of Electrical & Power Engineering, P.R.Pote College of Engineering & Management, Amravati,  
Maharashtra, India<sup>1,2,3,4,5,6</sup>

Head of the Department, Department of Electrical Engineering, P.R.Pote College of Engineering & Management,  
Amravati, Maharashtra, India<sup>7</sup>

**ABSTRACT**-India is an agricultural country and India's economy is dependent on agriculture. The farmer works hard in the field and if he gets the weather, he gets the crop he wants. But in the last few years, farmers have been facing serious problems like wet drought and drought. To deal with these problems, farmers need to develop. There are few things available in the market that can alleviate the plight of farmers. For hours, farmers have to irrigate their fields and even in the rainy season, farmers have to stay overnight to inspect their fields. This smart farming system will help them face challenges like electricity, supplementary water, wet drought, dry drought, etc.

**KEYWORDS:** Agriculture, Agriculture Precision, Temperature Sensor, Smart Farming, Soil Moisture Sensor

## I. INTRODUCTION

India is an agricultural country. India is dependent on rainfall to improve food security and agricultural productivity. The implementation of this project brings various benefits to the government and farmers. For the government's solution to the energy crisis. Using an irrigation system reduces water and energy wastage. For farmer they will grow good quality of product by performing number of test. The proposed system for the irrigation sector is an easy to implement and environmentally trendy solution. Introduction of Smart Agriculture System will result in an increase of crop productivity, use of renewable sources of energy which will be cost effective & require less labour. Use of ineffective means of farming leads to decrease in crop output requiring large manpower. Many farmers are abstaining from farming as they could not produce enough profit.

We being engineers tend to propose innovative means of farming which will be cost efficient & will also boost the economy. Smart Agriculture System using IoT which can enable various technological methods to control the parameters like Soil moisture, Temperature, Humidity.

Our project also includes maintaining the overall data and stores in IoT and supports power consumption regulation i.e., the motor can turn ON and OFF automatically by using sensors. This project will focus mostly on small scale operation of the system. There are several main parts that will be considered in this work. These include: wireless data collection, practical operations based on communication in the system, sustainability, and functionality.

The data collection will focus on information sent from a device to a web address which one should be able to access from a home/work computer or better known as the use of Internet of Things (IoT). The operations include monitoring plant health, watering, and even perhaps consideration of other necessary variables for optimal plant growth. Sustainability can be determined on how the system holds up over time. It all over the system can control through our mobile phone that reduces the farmer effort. This system is one-time investment get benefits for farmer long time. Our project try to reduces farmer effort also try to improve quality of product

## II. NEED OF SMART AGRICULTURE

The goal of smart agriculture research is to create decision-making support plans for agricultural management. Smart farming requires attention to population growth, climate change and the problems of workers who have drawn a lot of



technical attention from planting and irrigating crops to health and harvesting. In IoT-based smart farming, a mechanism for monitoring has been created. Crop field with automatic help of sensors and irrigation system. There are many reasons to implement a smart agriculture solution into commercial and local farming. In a world where the internet of things is accelerating adoption of data gathering and automation, an important industry such as agriculture can surely benefit.

Monitoring and collecting data for soil moisture, air temperature, air humidity and sunlight intensity across multiple fields will improve efficiency of water usage and crop yield of large and local farms. As the world population increases, farming and food production will have to increase with it. Low cost sensors, data insights and IoT Platforms will enable this increase in efficiency and production. Smart farming requires attention to issues such as population growth, climate change, and labour, which have drawn a lot of technical attention from planting and irrigating crops to health and harvesting.

### III. SYSTEM DESCRIPTION

In India, rural agriculture plays an important role in the development of the country. Basically agriculture depends on rainfall which is not an adequate source of water. Irrigation system is working in the field of agriculture to overcome this problem. This system will irrigate the agricultural area according to the type of soil. We have proposed IoT and smart farming systems using automation. This is IoT based on agricultural monitoring using wireless sensor networks collects and transmits data from different sensors deployed at different nodes. The wireless protocol includes temperature sensor, humidity sensor, water level sensors, pH sensors, ultrasonic sensors. When the IOT based agriculture monitoring system starts it checks the water level, humidity and moisture level. Temperature can be set on a particular level; it is based on the type crops cultivated. The temperature sensor measures the ambient temperature of the soil. The water level sensor measures the water level. Soil moisture sensor measures the level of moisture in the soil.

### IV. METHODOLOGY

We use photovoltaic module packed and connected assembly 6\*10 solar cell. Positive terminal of solar plate connected to positive terminal of battery and negative terminal of solar plate connected to negative terminal of battery. An amount of sunlight accepts by solar plate it gets stored energy into battery. 12-volt battery is use; it is lead acid battery it requires 7 to 8 hours charging time. An amount of energy coming from sun get stored into battery. then this energy provides all through our system. Battery provides 12V but our sensor work on 5V therefore we use 7805 IC, it converts 12V supply to 5V supply provided through all sensors. In IC 7805, 78 mean is voltage regulator and 05 mean it provided 5V o/p.

Hence, IC 7805 convert 12V to 5V supply also IC 7805 provided +5V regulated power supply and 5V supply provided to the microcontroller. Microcontroller read the data of all sensors, perform various operations. It helps in controlling also it read all over the data of sensor and display on LCD also on mobile phone. Microcontroller has inbuilt Wi-Fi module, it connects through internet with the help of iot it read all over the data of sensor and display on LCD.

Here we use moisture sensor, pH sensor, humidity sensor, water pump, 5V relay, LCD, ultrasonic sensor, 2 IC's of 7805

- Moisture sensor: - moisture sensor detects the amount of moisture present in soil. It works on 5V supply. It has 3 pin, 1st is ground 2nd is analog pin and 3rd is digital pin.
- PH sensor: - we use ST01 soil Ph meter. It detects the soil Ph level of plant from time to time. It is very necessary that may help to control the Ph value in soil and improve the growing environment quality of plants.



- It is ST01 green colour with Ph range is 3.5 – 8.5 (3.5 -6.5 acid, 7 -8 alkaline).
- Humidity sensor: - DHT11 Humidity sensor detects the temperature and humidity in atmosphere and display on LCD also in mobile phone.
- Water pump: - water pump (3v to 5v DC) it has flow rate 1.2 to 1.6 l/min and operating current is 0.1-0.2A.
- 5V Relay: - It is use as switch between motor pump and microcontroller. The purpose of relay use in system is to control (ON/OFF) heavy load at pre-determined condition.
- LCD: - It is liquid crystalline display 16\*2 where all the data of sensor it can be display on LCD.
- Ultrasonic sensor: - An ultrasonic sensor is an electronic device which detect the level of water as the level of water increases then percentage which shown on LCD get decreases or vice versa.

An amount of energy coming from sun it gets stored into battery which is 12V then battery provided all over supply through our system. 2 IC's 7805 use which convert 12V to 5V supply then provided to the microcontroller, it is in build Wi-Fi module which connected to the internet when the data of sensor display on mobile phones also on LCD. We can develop the application as smart irrigation system that's why we can control all over system also on phone. All sensor connected through microcontroller, moisture sensor detect moisture in soil, ultrasonic sensor detects the water level as water level is up then percentage get increases, through the app, we can off the motor. Then ph sensor detect ph level of soil same as DHT11 sensor detect the temperature and humidity and display on LCD also on app with the level of this we can control all over system. Due to temperature has less amount of sunlight or in rainy season we also have another solution we can provided the supply through transformer, we can also provide the arrangement in nodemcu325 transformer is provided AC as we require additional amplifier that help in critical condition.

## V. CONCLUSION

In this paper, we presented a cost-efficient smart agricultural system to enhance agricultural production by using sensor. IoT has been used in agricultural science to reduce costs and improve quality. There are still a lot of opportunities to build a good smart farming system as a basis for further smart research. With the intensity of increasing the range of sensors, protection for solar panels, increasing the range of solar panels, battery storage and protection from wildlife is extremely important for smart farming systems.

## REFERENCES

- [1] Capello, F., Toja, M., Trapani, N., 2016. A real-time monitoring service based on industrial internet of things to manage agrifood logistics. In: 6th International Conference on Information Systems, Logistics and Supply Chain.
- [2] Diedrichs, A.L., Tabacchi, G., Grünwaldt, G., Pecchia, M., Mercado, G., Antivilo, F.G., 2014. Low-power wireless sensor network for frost monitoring in agriculture research. In: Proceedings of IEEE Biennial Congress of Argentina, pp. 525–530.
- [3] Agriculture Monitoring System Using Smart And Innovative Farming: A Real-Time Study Andzio Elion PrivatDany, Prof. XiongShuming, INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH volume 8, issue 12, december 2019
- [4] Smart Farming System Monitoring and Control of Some Agriculture Features Using an Arduino Based System By: SalwaMitouilli Supervisor: Dr. Fouad Berrada Report – spring 2020.



- [5] MULTI PURPOSE SMART AGRICULTURE SYSTEM DrP.Pavithra Roy<sup>1</sup>, PhaniVeeranki <sup>2</sup>, Sri Lakshmi Pittu<sup>3</sup>, Hanisha Uppalapati<sup>4</sup>, Sri Krishna Teja Sanikommu<sup>5</sup> <sup>1</sup>Professor, Dept. of Electronics and Communication Engineering, Dhanekula Institute of Engineering and Technology, Andhra Pradesh, India <sup>2,3,4,5</sup>Bachelor of Technology, Dept. of Electronics and Communication Engineering, Dhanekula Institute of Engineering and Technology, Andhra Pradesh, India.
- [6] . TejasBangera, Akshar Chauhan, Harsh Dedhia, RiteshGodambe, Manoj Mishra, "IOT based smart village," InternationalJournal of Engineering Trends and Technology (IJETT), vol. 32, no. 6, Feb. 2016, ISSN: 22315381
- [7] Dr. V .VidyaDevi,G. MeenaKumari, "Real- Time Automation and Monitoring System for Modernized Agriculture", International Journal of Review and Research in Applied Sciences and Engineering (IJRRASE)Vol3No.1. PP 7-12, 2013.
- [8] S. R. Nandurkar, V. R. Thool, R. C. Thool, "Design and Development of PrecisionAgriculture System UsingWireless Sensor Network", IEEE International Conference on Automation, Control, Energy and Systems (ACES), 2014.
- [9] Rajalakshmi P and S. Devi Mahalakshmi, IOT Based CropField Monitoring and Irrigation Automation
- [10] Gondchawar, N. and Kawitkar, R.S., 2016. IoT based smart Agriculture. International Journal of advanced research in Computer and Communication Engineering, 5(6).
- [11] Smart Agriculture System Using IOT "VinayakWaghmare, ShubhamShrivastav, ChetanWaman, SachinSude" From Computer Engineering(CSE), Pune University
- [12] IOT BASED SMART AGRICULTURE RESEARCH OPPORTUNITIES AND CHALLENGES Aditi Mehta<sup>1</sup> , Sanjay Patel<sup>2</sup> Department of Information Technology, LDRP-ITR, Gandhinagar, India.
- [13] Garg, Saurabh Kumar, and RajkumarBuyya. "Green cloud computing and environmental sustainability." Harnessing Green IT: Principles and Practices (2020): 315-340.
- [14] Tanaka, K.; Suda, T.; Hirai, K.; Sako, K.; Fuakgawa, R.; Shimamura, M.; Togari, A, "Monitoring of soil moisture and groundwater levels using ultrasonic waves to predict slope failures," Sensors, 2009 IEEE ,vol., no., pp.617,620, 25-28 Oct. 2009



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