Review of Various IOT Based Irrigation Systems

Ms. Snehal Wabale[1] Mr.Om Shelke[2] Ms. Sonali Balasaheb Anantkar[3]
[1,2]Student [3]Lecturer
[1,2,3]Department of Electronic and Telecommunication Engineering
[1,2,3]JSPM, Bhivarabai Sawant Polytechnic, Wagholi, India

Abstract— From time immemorial, agriculture has been the key to sustaining civilization. Farming has come a long way from not-so-efficient manual methods of growing crops to automated large scale cultivation that combines the use of machinery with various soil treatment techniques and high yield seeds. IoT is ushering in a new era of smart farming to allow farmers to grow crops in a more controlled and productive manner, and facilitate better utilization of land thru proper crop selection and enhanced monitoring of soil, irrigation, temperature, plant health and other critical aspects that impact the yield.

Keywords: IOT, Irrigation Systems

I. INTRODUCTION

The growth rates of population and income are the important drivers of world food demand. World population will be 8.6 billion in 2030 and 9.8 billion in 2050. But unfortunately, only a limited portion of the earth's surface is suitable for agriculture uses due to various limitations, like temperature, climate, topography, and soil quality.

In response to these demands with a range of issues, farmers need new technology-based methods to produce more from less land and with less man power.

In most commonly performed farming procedures, farmers need to visit the agriculture sites frequently throughout the crop production process to have a better outlook of the crop scenario.

Here the idea of smart agriculture emerges. With the use of wireless sensors, the monitoring of crops can be done constantly with more accuracy. IoT provides a range of services, such as local or remote data acquisition, cloud-based intelligent information analysis and decision making,user interfacing, and agriculture operation automation. IoT has a vital role in coping up with the limitations and other issues like resources shortage and their precise use, food spoilage, climate changes, environmental pollution, and urbanization.

A range of sensors, unmanned aerial vehicles (UAVs), robots, communication devices, and other heavy machinery are used to deliver the sensed data.

II. RELATED WORK:

In this paper we have studied the various researches done earlier:

1) MUHAMMAD AYAZ et al.[1] The paper highlighted the role of various technologies, especially IoT, in order to make the agriculture smarter and more efficient to meet future expectations. For this purpose, wireless sensors, UAVs, Cloud computing, communication technologies are discussed in it.
2) G. Nandha Kumar et al.[2] The paper creates an awareness about the automation in agricultural field. Here the manual intervention can be reduced by irrigating the plants automatically and the whole information about the agricultural field can be viewed in android application.
3) Mokh. Sholihul Hadi et al.[3] This research aims to create an irrigation system based on IoT .This system is designed to monitor the condition of soil moisture and control the flow of water that will be watered on plants.
4) This increases crop yields and optimizes the water usage. This system uses a soil moisture sensor that will be processed by NodeMCU ESP8266 that is connected to the internet so that it can send data obtained from the sensor to Firebase.
5) Thilina N. Balasooriya et al.[4] This paper tells about the IoT- Based Smart System (IBSWS) with IoT as its backbone, it uses soil moisture sensors to accurately measure and compare the moisture of the soil to a pre-decided threshold value. The system can be managed by the user via the IBSWS App created using Blynk, which allows the user to select the type of plant. The app can also be used to monitor the pH and moisture levels by the user.
6) G. Sushanth et al.[5] The paper talks about q system which generates irrigation
7) Schedule based on the sensed real time data from field and from the weather data storage. It also senses the invasion of animals. The humidity, temperature, moisture can be fixed at a threshold level as per the environmental conditions of that particular region.
8) M. Rohith et al.[6] The paper states about a automated plant watering system reducing the manual work. Various parameters of the plants and soil such as temperature, moisture and humidity are sensed with the help of different sensors. When there is a decrease in any of the sensed values from the threshold value, it sends a signal to relay which in turn switches the motor on to water the plants automatically. Farmers can also view the real time field condition with the help of their smart phones through an app.

Various sensors and their uses in IoT based agriculture:

Sensor System	Target/Placed				Considered Purpose/parameters							
	Plant	Equipments	Soil	Weather	Yield	Temp	Moisture	Location/ tracxking	Wind	Pollution/ CO2	Water	Fruit/ Stem Size
Loup 8000i	NO	YES	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO
XH-M214	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO
Ag Premium Weather	NO	YES	NO	YES	NO	YES	NO	YES	YES	NO	NO	NO
FI-MM	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
PYCNO	NO	NO	YES	YES	NO	YES	YES	NO	NO	NO	YES	NO
MP406	NO	NO	YES	NO	NO	YES	YES	NO	NO	NO	NO	NO
DEERE	NO	YES	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO
Sol Chip Com	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	YES	NO
SenseH2TM	YES	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO	NO
DEX70	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
Piccolo ATX	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO
CI-340	YES	NO	NO	NO	NO	NO	YES	NO	NO	YES	NO	NO
Wimd Sentry	NO	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO
AQM-65	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
POGO Portable	NO	NO	YES	NO	NO	YES	YES	NO	NO	NO	YES	NO
SF-4/5	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
Met Station One	NO	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO
SD-6P	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
B-102	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO
YieldTrakk	NO	YES	NO	NO	YES	NO	YES	YES	NO	NO	NO	NO

III. CONCLUSION

There are different ways available using IoT to develop an automatic irrigation system. Some of the sensors which can be used in the system are mentioned above along with the parameters they are capable of measuring. This study would be helpful for development of a much accurate, efficient and economical IoT based Irrigation System. This study states that there are various technologies such as wireless sensors, UAVs, Cloud computing, communication technologies which can be incorporated in this system for better performance of it.

IV. REFERENCES

[1] MUHAMMAD AYAZ, MOHAMMAD AMMAD-UDDIN, ZUBAIR SHARIF, ALI MANSOUR, EL-HADI M. AGGOUNE, "Internet-of-Things (IoT) - Based Smart Agriculture: Toward Making the Fields Talk", IEEE 2019.

[2] G. Nandha Kumar, G. Nishanth, E. S. Praveen Kumar,B . Archana, "Aurdino based Automatic Plant Watering System with Internet of Things", IJAREEIA 2017.

[3] Mokh. Sholihul Hadi, Pradipta Adi Nugraha, I Made Wirawan, Ilham Ari Elbaith Zaeni, Muhammad Alfian Mizar, Mhd Irvan, "IoT Based Smart Garden Irrigation System", IEEE 2020.

[4] Thilina N. Balasooriya, Pranav Mantri, Piyumika Suriyampola, "IoT-Based Smart Watering System Towards Improving the Efficiency of Agricultural Irrigation", IEEE (GCAIoT) 2020.

[5] G. Sushanth, S. Sujatha, "IOT Based Smart Agriculture System", IEEE 2020.

[6] M. Rohith, R Sainivedhana, "IoT Enabled Smart Farming and Irrigation System", IEEE (ICICCS) 2021.

