
RAIN-DRIP AUTOMATIC WATER IRRIGATION SYSTEM

Shivani Bire*¹, Mayuri Choudhari*², Samiksha Petkar*³, Maithili Bhojar*⁴,

Nutan Dhande*⁵, Abhishek K Singh*⁶

*^{1,2,3,4}Student, Department Of Computer Engineering, Agnihotri College Of Engineering, Wardha, India.

*^{5,6}Assistant Professor, Dept. Of Computer Engineering, Agnihotri College Of Engg., Wardha, India.

ABSTRACT

Water scarcity is a critical global issue, and efficient water management in agriculture is essential to ensure food security and conserve water resources. This abstract provides an overview of an Internet of Things (IoT)-based water irrigation system designed to address these challenges. The IoT-based water irrigation system leverages cutting-edge technology to enhance the precision and efficiency of water usage in agricultural practices. The system comprises a network of interconnected sensors, actuators, and controllers that monitor and manage the irrigation process. Key components include soil moisture sensors, weather stations, and automated valves. The system's operation begins with soil moisture sensors that continually measure soil moisture levels. These sensors transmit data to a central controller, which processes the information and makes real-time decisions regarding when, where, and how much water to distribute. The controller takes into account the specific crop's water requirements, weather conditions, and historical data to optimize irrigation scheduling.

Keywords: Arduino Uno, Smart Irrigation, IOT Smart System, Planting Using IT, Smart.

I. INTRODUCTION

Irrigation is the process of giving water to plants for their growth and development. Traditional agricultural systems require huge amounts of money for on-site irrigation power. In this, we will study the smart technique of irrigation, Automatic Plant Watering System. It is used to detect the moisture from the pots, in what amount it is present, its percentage etc. We will get this whole data and by Arduino we can get all the information regarding the water supply. Using this data, we can determine the amount of water to be supplied to a variety of crops based on Plant's seasonal requirements.

Irrigation is a critical component of modern agriculture, enabling efficient water management for crop cultivation. Traditionally, irrigation systems have relied on manual or timer-based methods, which often result in inefficient water usage and resource wastage. To address these challenges, the integration of Internet of Things (IoT) technology into irrigation systems has become increasingly popular. IoT-based irrigation systems offer a smart and data-driven approach to optimize water usage, enhance crop yields, and conserve resources.

The raising population, the agricultural production is needed. The irrigated agriculture has been an extremely important source which increases the production and its value.

Now a days people wants to look their work from anywhere in manner of digital devices such as smartphone and tablet or laptop. These things are done easily by using Internet of thing (IoT).

This presentation on "Rain-drip automatic water irrigation system" is for to create and IOT based irrigation mechanism which makes the pumping motor ON and OFF on detecting the available moisture content and sufficient water level.

The data through IOT platform has to be passed and this results overcoming of labour intensive work and also controls the water management system.

Here we use hardware and software components for all this process.

OBJECTIVE

1. To use IoT sensors and data analysis to ensure that the irrigation system only provides water when and where it is needed. This prevents overwatering, which can lead to water wastage and soil erosion.

2. To monitor soil moisture levels, weather conditions, and other environmental parameters in real-time. This data is used to schedule irrigation cycles intelligently, minimizing the use of water and energy resources.
3. To automate the operation of the irrigation system, reducing the need for manual intervention and allowing for remote monitoring and control via a smartphone or computer.
4. To reduce water and energy bills by optimizing irrigation, which can lead to cost savings for farmers and homeowners.
5. To enhance crop health and yield by ensuring that plants receive the right amount of water at the right time. This can result in better agricultural productivity.
6. To provide an easy-to-use interface for users to monitor and adjust irrigation settings as needed, ensuring that the system is user-friendly and accessible.

II. LITERATURE SURVEY

- M. Safdar Munir et. al [1] This paper proposed an Intelligent Smart Irrigation System. It follows the KNN Algorithm to understand and detection of moisture. It Collects data from various sources such as from machine sensor, weather forecast etc. and form the equation and combines them together to make up final result and form a decision to find equidistance. This decision helps in watering plants to detect their level of moisture.
- Dr. S. Velmurugan et.al [2] In this paper, the soil moisture sensor plays an important role. Moisture sensor not only detects moisture but also air temperature, air humidity, UV, soil temperature. All these data is used to maintain the level of moisture
- Bashria A.A. Yousef et.al [3] In this paper, Smart Irrigation System is developed. Its main purpose is to save water, keep plants and soil irrigated and without much of human support. A sensor will gather various readings from soil and based on moisture present, pump will turn on. It will be used to Irrigate land automatically. The data will be shown on user's device screen .
- M Gayathri et.al [4] This paper proposed an IoT Based Smart Irrigation Architecture. It follows a Hybrid Machine Learning Algorithm to understand and complete the needs of plants. It collects data from various sources such as from machine sensor, weather forecast etc. and combines them together to make up final result and form a decision. This decision helps in watering plants .
- Mohamed Fazil et.al [5] In this paper, a small Smart Irrigation System is developed. It is based on Internet of Things. It is system controlled using a computer. It is used to detect moisture content present in the soil. Once it understands that water moisture is below certain threshold a switching system will turn on the system and will provide with water and care to plants. It is used mainly for saving time and energy .
- Meghana Gupta et.al [6] In this paper, the sensor plays an important role. Moisture sensor detects moisture but also check the time by delaying and closing the time interval to supply sufficient amount of water. Solenoid value is used to maintain level of moisture.
- Priyanka P et.al [7] developed with respect to initial objective. Its main purpose is to detect what amount of water is used for irrigation purpose area wise. It will be used to Irrigate land automatically. The data will be shown in big zone .
- Priyanka P et.al [7] This paper proposed a Sprinkler Irrigation System. It follows a Socioeconomic aspect. It Collects data from various sources such as from machine sensor and combines them together to find what number of sprinklers are used seasonal wise and crop wise and make up final result. This decision helps in watering plants to detect the level of moisture at the seasonal level.

III. METHODOLOGY

The methodology of an IoT-based irrigation system involves a systematic approach to design, implement, and manage a smart irrigation system that relies on Internet of Things (IoT) technology. This method can be broken down into several key steps:

- **System Design and Planning:** Begin by defining the objectives of the IoT-based irrigation system. Determine the specific crops to be irrigated, the environmental conditions, and the desired level of automation. Consider the types of sensors and actuators needed.

- **Sensor Deployment:** Install various sensors, including soil moisture sensors, weather sensors, and humidity sensors, in the agricultural field. These sensors will collect real-time data about soil moisture levels and environmental conditions.
- **Connectivity Setup:** Choose the appropriate wireless connectivity technology, such as Wi-Fi, LoRa, or cellular networks, to connect the sensors to a central control system. Ensure a reliable and robust network infrastructure for data transmission.
- **Central Control System:** Develop or select a central control system, which can be a cloud-based platform or an on-premises controller. This system receives data from sensors and processes it. It should have the capability to store data and run algorithms for decision-making.

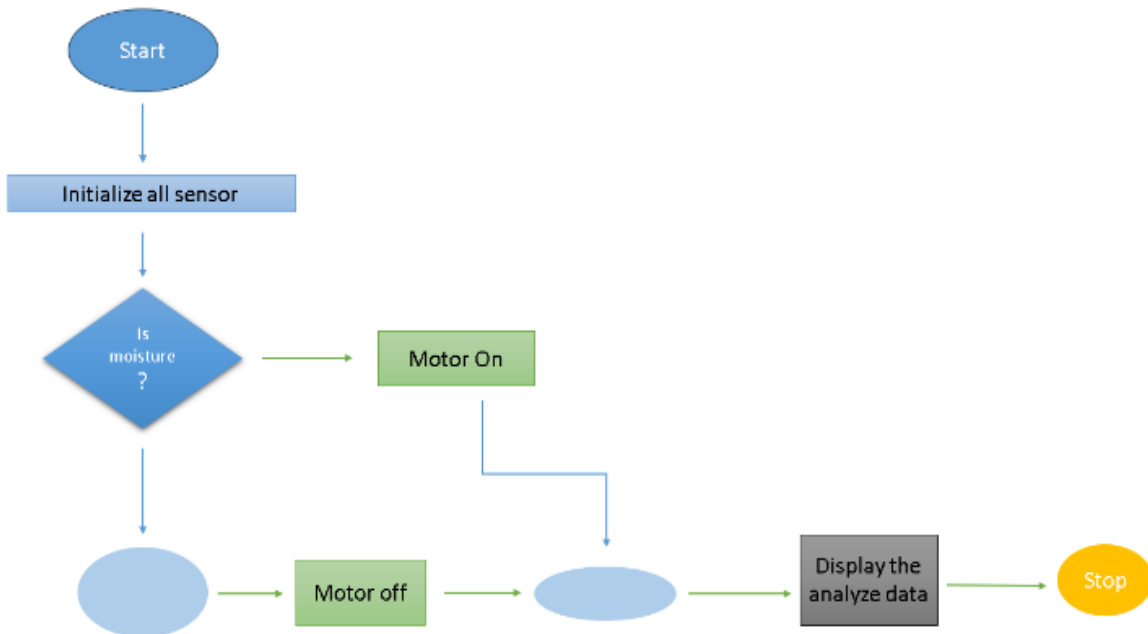


Fig 1. Flow-chart

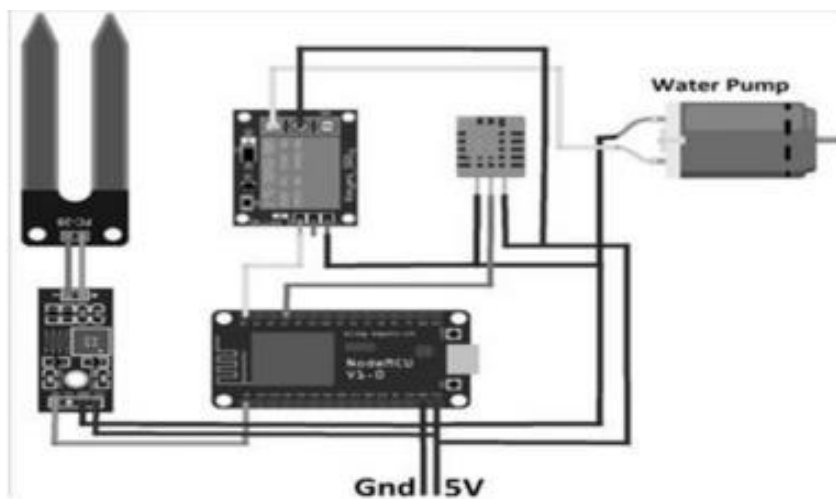


Fig 2. circuit diagram

IV. CONCLUSION

Water is life and it is important to save water. Without water not only humans, but also other living organisms won't exist. In today's world where pollution, water wastage are at all-time high it becomes extremely necessary to have clean water and to save it. Thus, Smart Irrigation System helps in doing. So, it gives live readings of moisture content in soil and can then be irrigated automatically or manually.

V. REFERENCES

- [1] Intelligent and Smart Irrigation System using edge computing and IOT, M. Safdar Munir, Imran Sarwar Bajwa, Amna Ashraf, Waheed Anwar, and Rubina Rashid, Research article, open access, Article ID 6691571, algorithm for KNN, 2021.
- [2] An IOT based Smart Irrigation System using soil moisture and weather predictions, Dr. S. Velmurugan, V. Balaji, T. Manoj Bharathi, K. Saravanan, T.J.S. Engineering College, T.J.S. Nagar, kavaraipeetai, chennai-601206, Tamil Nadu, India, novel algorithm, machine learning techniques, 2020.
- [3] An overview of smart irrigation systems using IoT, Khaled Obaideen, Bashria A.A. Yousef, Maryam Nooman AlMallahi, Yong Chai Tan, Montaser Mahmoud, Hadi Jaber, Mohamad Ramadan, Energy Nexus Volume 7, 100124, SDGs greenhouse gas emissions, 2022.
- [4] Smart Irrigation System using IoT, M Gayathri, D Arun Shunmugam, A Ishwariya, IJIRMPS | Volume 9, Issue 3, ISSN: 2349-7300, temperature sensor, humidity sensor, and soil moisture sensor, 2021.
- [5] Smart Irrigation for Crop Management Using IoT, Mohamed Fazil, Rohan S, Ashritha C, Nagesh Shetty, Ramalingam H M, International Journal of Multidisciplinary Research and Analysis ISSN(print): 2643-9840, ISSN(online): 2643-9875 Volume 05, NPK algorithm used, 2022.
- [6] Smart Irrigation System using IOT, Meghana Gupta Arakere, Avik Seal and Tejomurthula Bhuvana Teja, Asian Journal of Science and Technology, Vol. 10, Issue, 06, pp.9756-9768, connecting MQTT box to NodeMCU, 2019.
- [7] Application of IoT and Cloud Computing in Automation of Agriculture Irrigation, Khongdet Phasinam, Thanwamas Kassanuk, Priyanka P. Shinde, Chetan M. Thakar, Dilip Kumar Sharma, Md. Khaja Mohiddin and Abdul Wahab Rahmani, Hindawi Journal of Food Quality Volume 2022, Article ID 8285969, machine learning algorithm, 2022.