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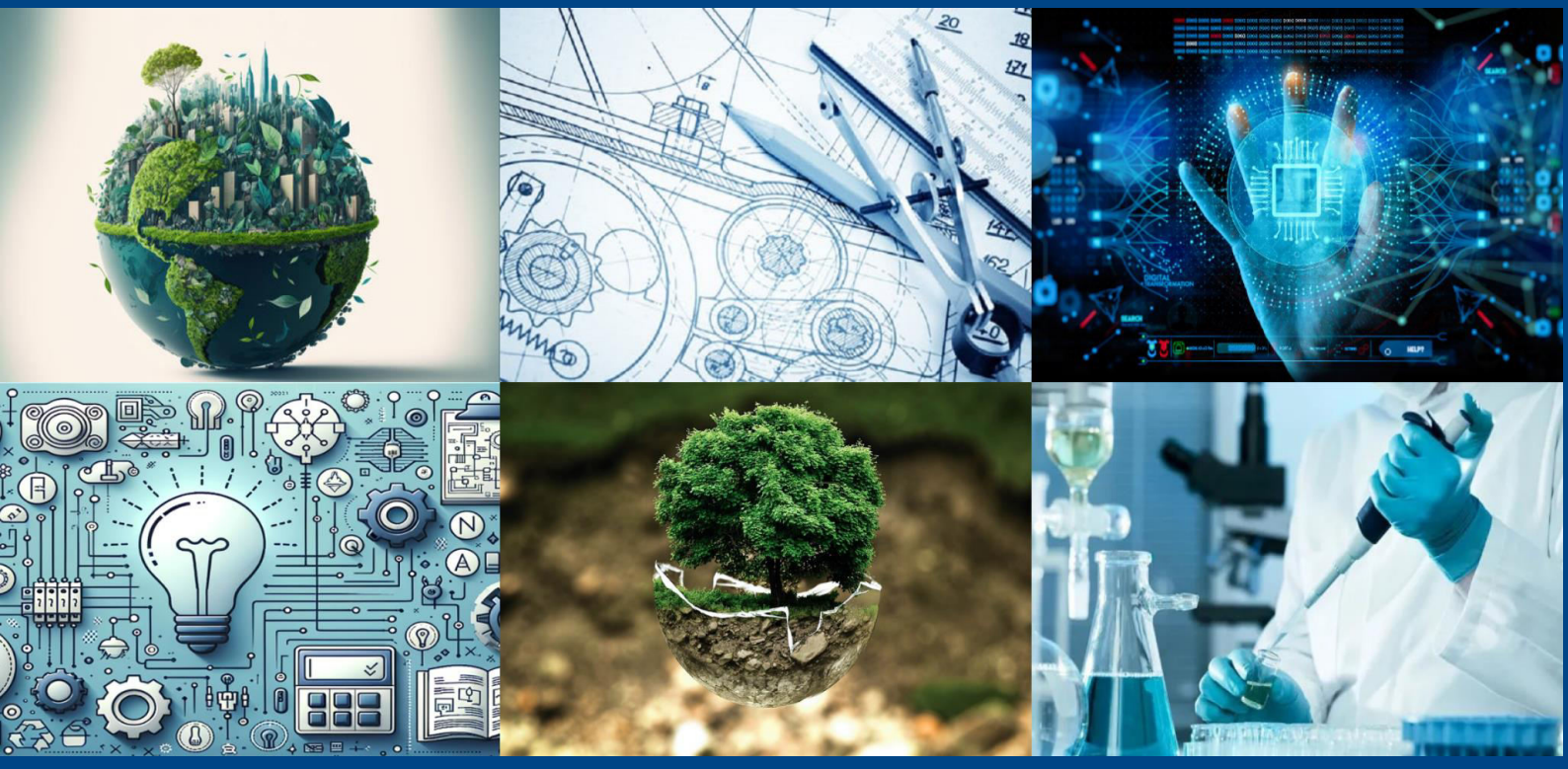

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Smart Agriculture System by using IOT for Mango Farm

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ABSTRACT: Advances in technology, equipment, and sensors have given rise to "smart farming," a new paradigm in agricultural monitoring that depends on high-tech, network-based cycles. We might anticipate that cloud computing, the Internet of Things, and new technologies will encourage growth and introduce robotics and artificial intelligence into agricultural environments. In addition to creating a number of issues, such radical deviations are upending long-standing farming practices. This study examines the techniques and equipment used in Internet of Things (IoT) agriculture applications using wireless sensors, as well as the anticipated challenges that arise when combining technology with conventional farming methods. Additionally, farmers benefit from this technology information at every stage of the crop life cycle, from seeding to harvesting. Additionally, it is being investigated.

KEYWORDS: **internet-of-things (IoT); advanced agriculture practices; smart farming; sustainable agriculture; crop management issues and problems;**

1.INTRODUCTION

IOT is revolutionizing the agricultural industry and giving farmers the tools they need to overcome the enormous challenges they confront. Agriculture must manage growing water shortages and limited land supply while fulfilling the growing global population's consumption needs.
A mobile smartphone can be used to monitor a gadget's operation thanks to a technology called the Internet of Things (IOT). The Internet of Things (IOT) focuses on connecting and communicating devices that are placed in various technologically advanced areas, some of which may be far from one another's senses. The Internet of Things, or IOT, is a kind of network technology that gathers data from various sensors and allows anything to connect to the Internet so that data can be shared.

II. LITERATURE SURVEY

Vishal R. Satpute, Neha K. Nawandar, and others (2019) The majority of Indians rely on agriculture for their livelihood, and it accounts for a significant portion of the country's economy. Because of this, water is a valuable resource that must be protected with the newest technologies. In addition to being essential to industry 4.0, IoT also makes smart farming possible. The goal of the work being presented here is to create an intelligent, low-cost smart irrigation system. With features including admin mode for user engagement, one-time setup for irrigation schedule estimation, neural-based decision making for intelligent support, and remote data monitoring, it leverages the Internet of Things to provide autonomous communication and connection between the system's equipment.[1].

Santosh Kumar Barti, Tirthkumar Patel, Jash Joshi, and others (2019) The Internet of Things (IoT) is a current and emerging technology that is influencing people's lives by giving things intelligence. It is a self-configuring network composed of various devices. The latest advancements in IoT-powered smart farming are revolutionizing traditional agricultural practices by decreasing crop waste and improving their efficiency while also saving farmers money. The goal is to suggest a solution that can alert farmers by creating messages on various channels. By gathering real-time data from the farms, such as temperature, humidity, soil moisture, UV index, and infrared radiation, the device will help farmers take the appropriate actions to enable smart farming.[2].

S. Balaji, A. Jain, S. Vijendra, et al. (2020) Every farmer has a lot riding on the crops' quality and output. Growing water problems and the requirement for appropriate agricultural maintenance techniques are pressing challenges that must be handled with the utmost care. This study suggests automating agricultural irrigation systems. The Internet of

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Things (IoT) is the foundation of the suggested solution, which would be a more accurate and affordable way to meet farm needs. A Since it is commonly understood that water is a limited resource, excessive waste of this vital resource should be avoided. [3].

Athanasios Lossifides, Dimitrios Glaroudis, and others (2020) The era of smart farming has already begun, and it is anticipated to have significant social and environmental ramifications. In this regard, the main route ahead for innovative farming methods is the Internet of Things (IoT) technology.The application level protocol used by IoT nodes, gateways, and application servers is one of the most crucial components of the underlying communication network architecture and technology, which underpins the Internet of Things' unparalleled capacity for data collection and management. This study provides a current overview of research efforts on IoT application layer protocols, emphasizing their performance, fundamental features, and new applications in agriculture. [4].

YH Robinson, EG Julie, RS Krishnan, and others (2021) Field watering in traditional agricultural systems uses a significant amount of electricity. This study suggests a Global System for Mobile Communication (GSM)-based smart irrigation system to assist farmers in watering their farms. This system sends acknowledgement messages on the job's state, including the soil's humidity level, the ambient temperature, and the motor's condition with regard to the main power source or solar power. To calculate input parameters and generate motor status outputs, a fuzzy logic controller is utilized. Additionally, the method avoids the crop employing panels from being exposed to unconditioned rain and turns off the motor to conserve power when rain is available. [5].

A greenhouse's various zones were equipped with the suggested system, which was based on a Wireless Sensors Network (WSN). Through radio-frequency (RF) communication, this network transmits data from the plant environment, including temperature and soil humidity, to a Raspberry Pi server. A fuzzy logic controller (FLC) analyzes these data and determines the best course of action to regulate the irrigation. With the help of an IBM Human Man Interface (HMI) created under Node-RED, the built system can monitor and manage the greenhouse's watering from any location at any time. In an actual setting, the suggested technique was used to water tomato plants.[6].

Guangwen Wang, Liang Zhao, Wen Tao, and others (2021) A new line of research in agriculture was prompted by the emergence of the Internet of Things (IoT), and different IoT communication technologies are utilized to communicate with various devices in various layers. Information became dispersed due to the rapidly growing number of IoT-based smart agriculture studies and initiatives, and the communication technologies involved were not previously examined and discussed in prior reviews.

This study critically reviews the most recent research relevant to smart agriculture with IoT communication technology with the goal of locating and reviewing academically validated literature on the topic.[7].

III. METHODOLOGY

The system approach involves implementing a robotic prototype device that is controlled by a mobile application. The first stage for the prototype format will be creating the chronology and reviewing relevant literature. We can begin putting the architecture and automation approach for executable into practice after examining the advantages and disadvantages of earlier research on the topic of an automatic irrigation system. The project flowchart was used to establish the timeframe.

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The steps can be found in the process chart that follows:

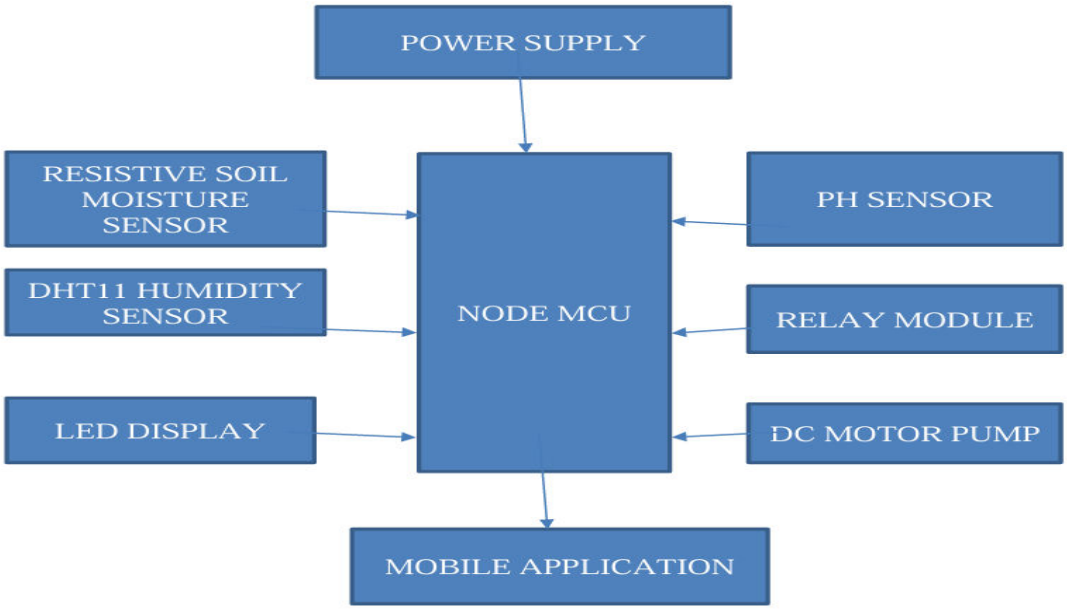

Figure 1 Methodology

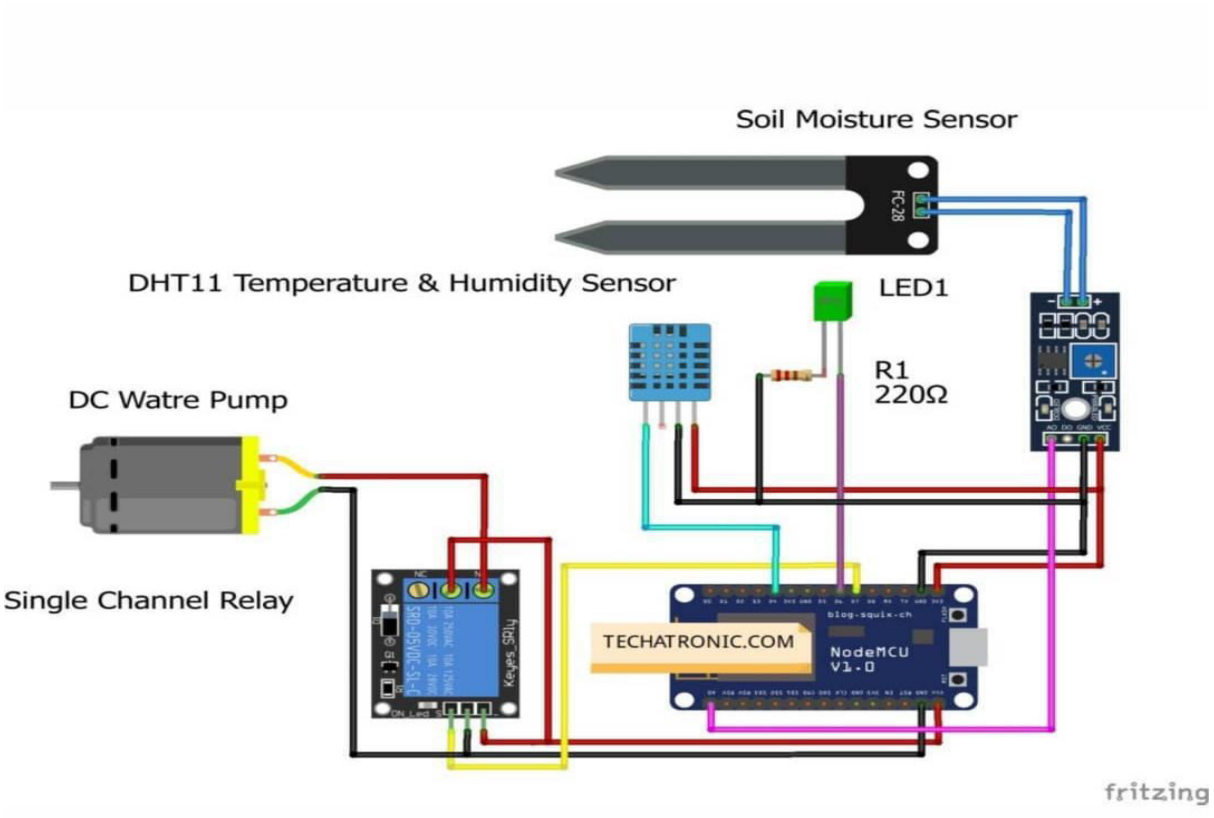

Figure 2 Connection and components of IOT based irrigation System

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IV. SOFTWARE PLATFORMS

Google offers an open-source tool called App Innovator. With the help of this application, novices can write Android-compatible programs. It makes use of graphical user interfaces like Scratch.

1) We would like to log into the application first.
2) Following login.The temperature, humidity, PH, and moisture level are all visible to us.
3) The temperature, humidity, PH, and moisture level in the application can all be monitored, as seen in figure
4) In accordance with variations in temperature, humidity, and moisture level.The motor can be turned on and off.

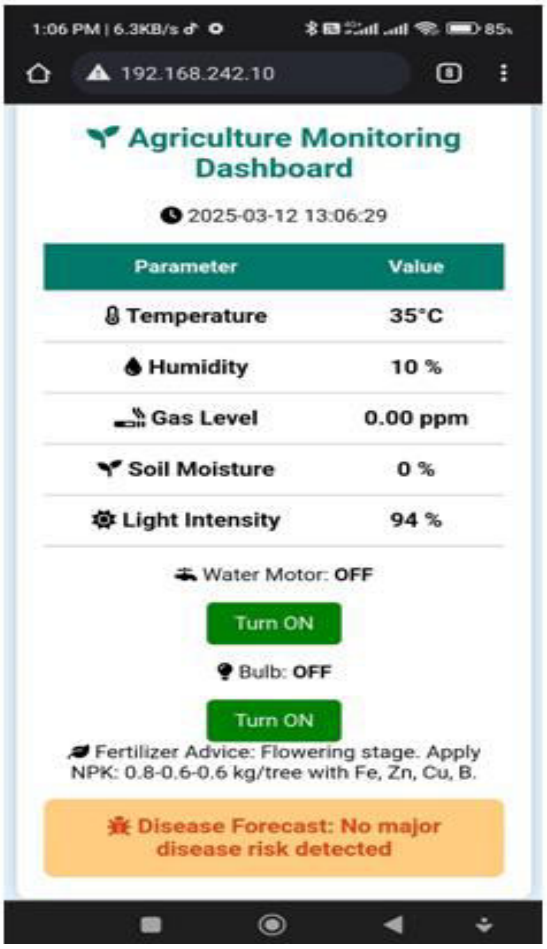

Figure 3 output

V. RESULT AND DISCUSSION

The objective has been achieved following the completion of the design and the gathering of the smart irrigation system's components. Additionally, every criterion was met in order to complete this smart irrigation system, bringing it to full production and completion. The system was then tested, and the outcome met the necessary standards. Until two or three moisture sensors from any one of the three fields notify the Arduino that the soil is dry and the crop needs water, the system will not function.

Once the sign reaches the Arduino, it will send a command to the relay of the pump to exchange it straight to irrigate that field and a command to the relay of that particular line field valve to be powered to open the valve. Additionally, if two or three of the three plants' moisture sensors are turned on, all three fields can be irrigated simultaneously. Thus, the pump will run to irrigate all three plants once all solenoid valve relays have been activated to open all of the valves.

Initially, selecting an appropriate pump to irrigate all of the blooms simultaneously was a challenge.The system's program has been set up, and unless the three moisture sensors are triggered, the system will stop working. However, the system will stop working if one sensor is triggered by any lines because that sensor may also be faulty. Even though all plant sensors are turned on to safeguard the water pump, the system will not function at all if the water tank level is low.

VI. CONCLUSION

More creative and efficient methods of crop production are needed to both preserve the shrinking amount of arable land and meet the expanding worldwide demand for food. The necessity of food security in connection with ecologically conscious farming must be understood by all. Technological advancements in agriculture are increasing crop yields and drawing innovative young people to the industry as a respectable career option. This study emphasized the significance of various farming technologies, such as the Internet of Things, in making agriculture smarter and more successful in meeting future needs. We have emphasized the current challenges and possible future advancements in the industry for the benefit of engineers and scholars. In order to boost crop productivity, every square inch of farmland should be equipped with sustainable Internet of Things (IoT) sensors and communication technology.

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