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# Smart Farm System Using Raspberry Pi

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**ABSTRACT:** As water is the most important factor in increasing agricultural output, building more water infrastructure has been crucial to the development of farming in the country. The automatic sprinkler system that we will create for this thesis will assist a farmer or individuals in knowing about his field and the condition of his plants at home, or anywhere they may be in the globe. Through the use of DHT 11 and pH sensors, this effort will assist farmers in irrigating their land in an automatic manner based on soil, humidity, and weather conditions. These sensors detect changes in the surrounding air's temperature and humidity as well as the presence or absence of precipitation. These sensors detect changes in the surrounding temperature, humidity, and current level of precipitation. They then send an interrupt signal to the Raspberry Pi whenever there is a change in these parameters. In addition to lowering plant yield, excessive irrigation depletes soil fertility and creates ecological risks like salinity and water waste. The use of sprinkler systems has increased in recent years due to increased awareness of the water and energy conservation. At the moment, automation plays a significant role in human existence. It saves time, energy, and effort in addition to offering comfort.

**KEYWORDS:** surrounding temperature detection, level of precipitation, Raspberry Pi, DHT 11 and pH sensors.

## I. INTRODUCTION

The globe is currently dealing with a significant issue with the groundwater table, and agriculture requires a lot of water. Thus, a sustainable system is required. Right now, irrigation is done by hand everywhere. Many things that previously seemed unattainable have been eliminated by advancements in the science field. The development of smartphones, computers, cars, and "smart" science and technology has currently broadened the market and established new benchmarks. This technological The Internet of Things gives users the ability to specifically interact with various objects, materials, and features through the internet. This technology will make people's tasks easier and more intelligent. Smart agriculture is a cutting-edge field that has drawn the attention of many inventors and has been growing steadily for a while.

## II. RELATED WORK

We are developing an Internet of Things (IoT) Smart Farm System that uses a Raspberry Pi to sense the humidity and moisture content of the soil to function automatically. In order to save water, it will also use a rain sensor to monitor the pattern of rainfall in the area and a relay to turn the pump on and off without the need for human interaction. A pH sensor will help maintain the condition of the soil, allowing crops to be properly enriched. Through this project, we gain knowledge on Raspberry Pi-based IoT-based smart farm systems. The development of nations whose primary source of income is agriculture is greatly influenced by the agriculture industry. The nation's progress is hindered by challenge regarding to agriculture. Sensible agriculture that modernizes the out dated agricultural practices now in use is the best way to solve this issue. Therefore, the strategy is to use various automation techniques and Internet of Things-based technologies to develop agriculture. We can have appropriate crop growth monitoring and selection, automatic irrigation, etc. with the aid of the Internet of Things (IoT). A smart farm system based on Raspberry Pi is suggested to modernize and boost crop productivity in the field. We are utilizing advanced sensors that are readily available in the market to create an Internet of Things (IoT) based Smart farm System for our project. To monitor the amount of moisture in the soil, a capacitive soil moisture sensor is needed. To monitor air temperature and humidity, use a DHT-11 humidity temperature sensor. In the event of rain, a rain sensor will be employed to cut off the motor pump. We'll use a pH sensor to measure the soil's toxicity. It will assist farmers in determining whether or not their crops are receiving the right nutrients. The 5V power relay will regulate the pump. Therefore, the irrigation is finished automatically when the motor begins operating automatically and a low level of moisture is sensed in the soil.

### III. METHODOLOGY

Our suggested system is essentially composed of a few related components. Initially, we have focused solely on the setup of the circuit architecture. Wires have been used to link a variety of sensors to a Raspberry Pi in the direction of the schematic diagram. Secondly, to ensure real-time monitoring, all sensor data should be sent to the cloud. Lastly, we have used an affordable laser shield and an IP camera to guarantee the security of the company.

### IV. EXPERIMENTAL RESULTS

We are developing an Internet of Things (IoT) Smart farm System that uses a Raspberry Pi to sense the humidity and moisture content of the soil to function automatically. In order to save water, it will also use a rain sensor to monitor the pattern of rainfall in the area and a relay to turn the pump on and off without the need for human interaction. With the aid of a pH sensor, soil quality will be preserved, allowing for the appropriate enriching of crops. Through this project, we gain knowledge on Raspberry Pi-based IoT-based smart farm systems. The development of nations whose primary source of income is agriculture is greatly influenced by the agriculture industry. The nation's progress is hindered by challenges pertaining to agriculture. Sensible agriculture that modernizes the outdated agricultural practices now in use is the best way to solve this issue. Therefore, the strategy is to use various automation techniques and Internet of Things-based technologies to develop agriculture. We can have appropriate crop growth monitoring and selection, automatic irrigation, etc. with the aid of the Internet of Things (IoT). A smart farm system based on Raspberry Pi is suggested to modernize and boost crop productivity in the field.

### V. CONCLUSION

Agricultural progress depends heavily on the development of agriculture field networking technology, which is also a critical indicator of how far agriculture has come. It will be the agricultural development strategy with a longer time horizon. Applying the internet of things to agricultural production has a significant impact on making the most efficient use of the available water resources and also ensuring the efficiency, accuracy, and stability of agricultural production. This is after building the hardware for the smart farm system and analyzing and researching the network hierarchy features, functionality, and the corresponding software architecture of precision irrigation systems and detecting soil nature.

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