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Automatic Crop Protection From Rain Using IOT & Blynk App

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Abstract:

As the fourth revolution continues, technology is also developing rapidly. One of its most important a nd effective uses is in agriculture. From irrigation systems to cropspecific fertilizer needs, technologie s such as artificial
intelligence and the internet of things have brought about major changes. One of the problems that nee ds to be addressed is the protection of crops from heavy rains, which cause serious damage to crops an d soil fertility and create great stress for the farmer. We solve this problem by providing automatic con trol and manual control in the proposed model.

The motivation behind our article is to protect crops from these heavy rains and save the same rains fo r the
future when water is scarce. Smart Crop Guardian presents an innovative crop protection system integrating Internet of Things (IoT) technology and the Blynk App, a dedicated mobile application. This system is designed to automatically shield agricultural fields from heavy rain, optimizing water usage and improving overall yield management. Through rain-sensing technology, an automated crop protection mechanism, and a user-friendly interface, the objectives are to safeguard crops, enhance resource efficiency, and contribute to sustainable farming practices. As part of the broader Smart Farming movement, this solution addresses contemporary challenges in agriculture, aligning with the goals of Precision Agriculture and Agriculture 4.0. The scalable, accessible, and sustainable approach of Smart Crop Guardian aligns with the growing global trend of adopting advanced technologies in agriculture, providing a comprehensive solution for crop protection and yield optimization.

Keywords: Automatic Crop Protection, IoT, Rain, Agriculture, Sensor Deployment, Automation, Environmental Monitoring, Crop Yield Enhancement, Sustainable Farming.

I. INTRODUCTION

In the ever-evolving landscape of technological progress, the Internet of Things (IoT) stands out as a transformative force reshaping industries across diverse sectors. Among its promising applications, agriculture emerges as a key arena where IoT has the potential to redefine traditional practices and drive efficiency, productivity, and resource management to new heights. Particularly, the perennial challenge faced by farmers in protecting crops from unpredictable weather patterns, notably heavy rainfall, necessitates innovative solutions that go beyond conventional methods.

In the agricultural realm, where manual barricades and constant on-field surveillance prove impractical, we present the IoT-Based Automatic Rain Shutter – a ground breaking system designed to autonomously shield crops from rain by deploying a protective roof over the designated area. The significance of this solution is underscored by the colossal losses incurred by farmers due to rain-induced damage, making it imperative to bridge the gap between agricultural practices and cutting-edge technology.

Farming, a venerable science and art shaping the trajectory of human civilization, has a rich historical tapestry that spans millennia. From the cultivation of grains to the domestication of animals, agriculture has undergone remarkable transformations. However, the persistence of weather-related challenges demands innovative interventions to safeguard crops and sustain agricultural livelihoods.

Against this backdrop, the proposed IoT-Based Automatic Rain Shutter aligns seamlessly with the objectives of Precision Agriculture and Agriculture 4.0. It not only addresses the complexities of modern farming but also reflects a commitment to scalability, accessibility, and sustainability. By incorporating IoT technology, the system aspires to optimize resource usage, enhance overall yield management, and contribute to the global trend of adopting advanced technologies in agriculture. This introduction sets the stage for a comprehensive exploration of how the fusion of IoT and agricultural practices can pave the way for a resilient and efficient future in crop protection and yield optimization.

II. LITERATURE SURVEY

We have worked on similar projects in the past and we know what to do. Agriculture is the backbone of the Indian economy in many ways. Agriculture is our main source of income and we cannot live without agriculture. However, as of now, it is difficult to find farmers. Today's development is achieved by the use of computerization in all areas of life. The farming process here is automated to some extent.

P. Goutham Goud et al. [1] uses rain sensors, advanced microprocessors, and DC motors in a system that will detect flooding and wrap a protective barrier around the roof. This dryer protects your products from rain and moisture. To accomplish this task, Rainfall detects heavy rainfall and sends the data to the microcontroller. The protective material covers the roof and turns on the DC motor control circuit, generating a microcontroller message.

Dheekshith et al [2]. This sensor is connected directly to the actuator motor and rainproof housing. When the sensor detects rain, it starts working and rotates the paving rollers that cover the containers and prevent farmers from falling.

Current efforts require the protection of special resources available to people. By measuring soil quality we can limit runoff and eliminate debris. Flow can be controlled from a wide distribution point using pressure gauges and thermometers to understand the nature of soil moisture and temperature. There is currently no good framework available. Farmers need to go to a dry place and cover their crops; This is especially difficult if the farmer is far from the harvest area and heavy rain will occur before all crops arrive

III. PROBLEM STATEMENT

The problem we aim to address with our project, "Automatic Crop Protection from Rain using IoT and Blynk app" lies at the intersection of agriculture, technology, and climate change. It revolves around the vulnerability of crops to heavy rainfall events and the limitations of traditional farming practices in mitigating the adverse effects of such weather phenomena.

The problem at hand is to develop a new system using IoT and cloud technology to solve the sensitivity of crops to heavy rains. The system must provide timely, automated responses to protect crops. Automating agricultural lands and protecting lands and crops using IoT This system turns crops into agricultural land by providing them with water according to their temperature and needs.

IV. PROPOSE SYSTEM

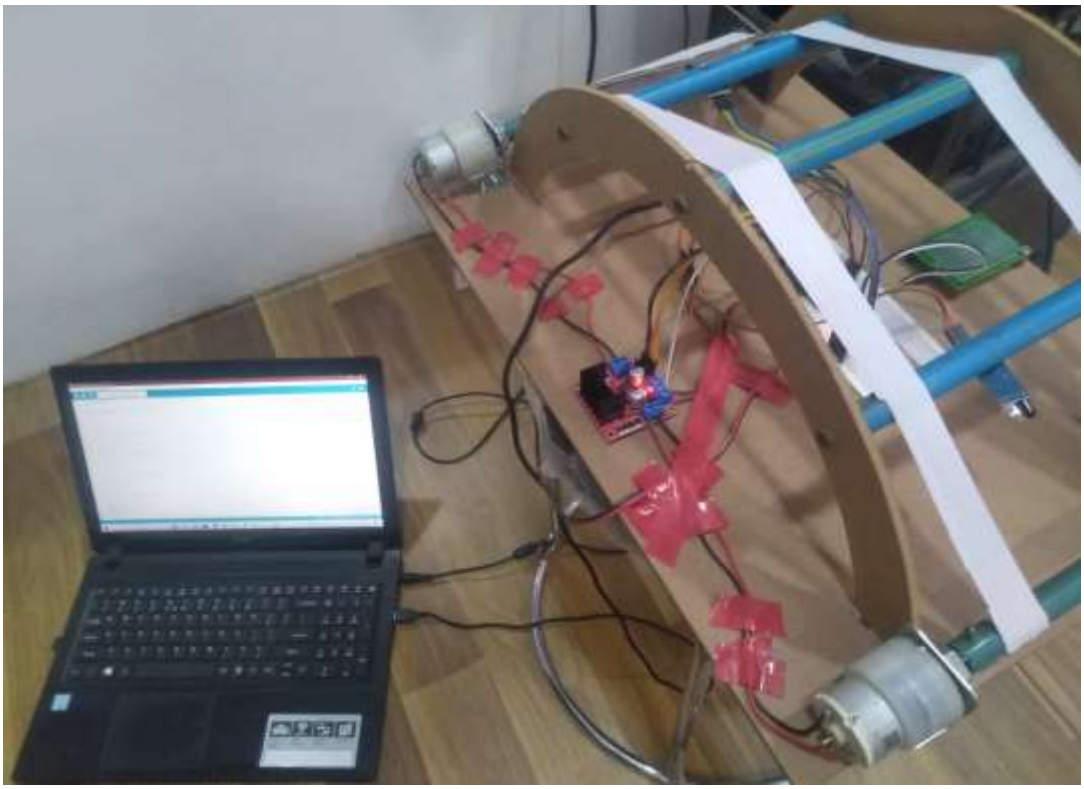

Fig. 1

TABLE I COMPONENT USED

Sr No.	Component	Description
1	ESP 32	- Microcontrollers for data processing and IoT connectivity - ESP32 is a family of low-cost, low-power microcontrollers with integrated Wi-Fi and dual-mode Bluetooth processors: - CPU: 32-bit microprocessor Operates at 240 MHz
2	Rain Sensor	•Detects rainfall for timely protection. Most rain-sensing wipers use a sensor that's mounted behind the windshield. It sends out a beam of infrared light that, when water droplets are on the windshield, is reflected back at different angles.
3	Motor driver	•A motor driver goes about as an interface between the motors and the control units. Usually, motors work under high current but the control unit requires a low current signal.
4	Dc gear Motor	•An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of torque applied on the motor's shaft
5	IR Sensor	•Monitoring Sunlight Exposure: IR sensors provide crucial data on sunlight exposure for optimizing crop growth conditions. •Detects obstacles or unwanted entities
6	Jumper Wire	•Connects components in the system

		•Including a dedicated slide for Jumper Wires not only highlights their importance but also provides a clear understanding of their role in establishing connections within the Automatic Crop Protection System

V. SYSTEM ARCHITECTURE

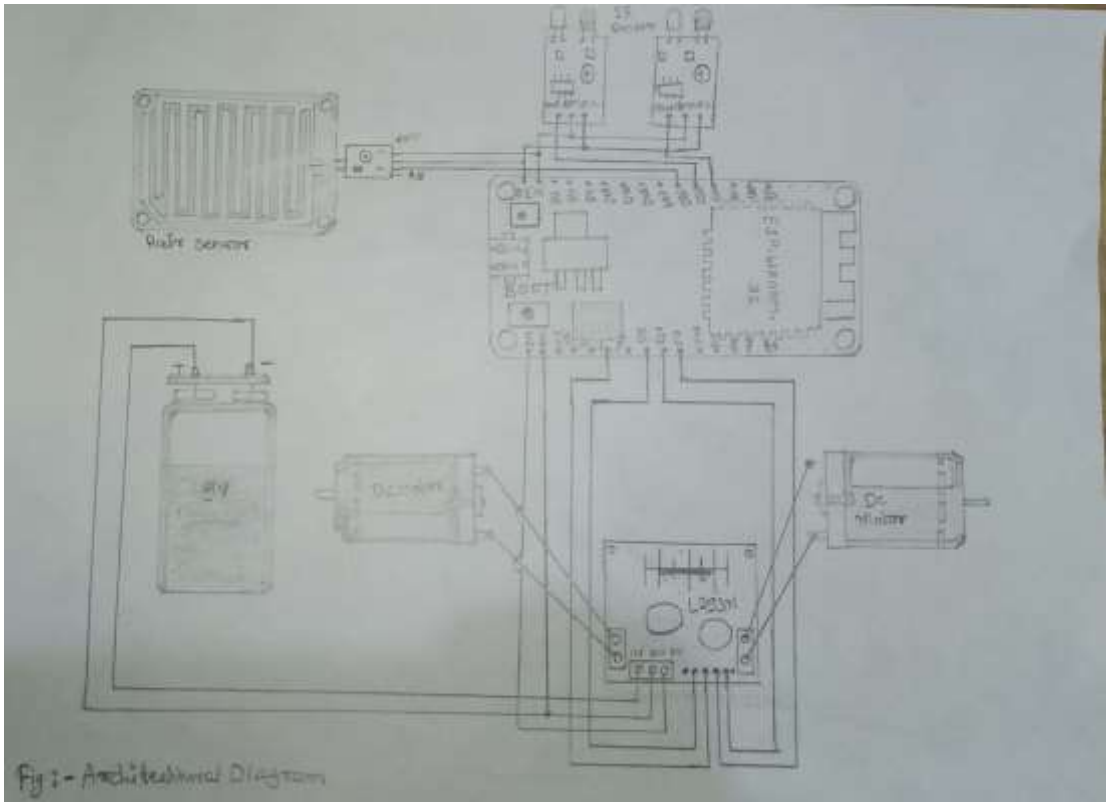

Fig.2

VI. WORKING OF SYSTEM

The proposed system for automatic crop protection from heavy rain using IoT and the Blynk application operates through the following steps:

Deployment of IoT Rain Sensors:

IoT-enabled rain sensors are strategically placed across agricultural fields to detect the onset of heavy rainfall accurately.

These sensors continuously monitor meteorological conditions and assess the risk of excessive rainfall, providing real-time data on precipitation levels.

Real-Time Data Collection:

The rain sensors send data to a central processing unit or cloud-based platform where the information is processed and analyzed.

The system evaluates the rainfall intensity and determines whether it exceeds pre-defined thresholds for triggering protective measures.

Automated Crop Protection Mechanism Activation:

Upon detecting heavy rain, the system triggers an automated crop protection mechanism.

This mechanism could involve deploying retractable canopies, mobile shelter systems, or other structures designed to shield crops from the adverse effects of excessive rainfall.

Blynk App Integration:

The Blynk App serves as the user interface and control center for the entire system.

Farmers and agricultural managers can monitor real-time weather data, receive alerts about potential heavy rainfall, and control the deployment of the crop protection mechanism remotely through the app.

VII. CONCLUSION

The proposed plant protection system is an important part of agricultural technology, considering the urgent need to protect crops from heavy rains during development, improving the use of resources and promoting permaculture practices. Leveraging IoT technology and integration with the Blynk mobile app, the system enables real-time monitoring, remote control and seamless changes in plant protection management.

Using IoT-enabled rainfall sensors and automatic protection mechanisms, the system ensures timely intervention without the need for manual intervention, thus reducing crop losses and increasing crop yield. The Blynk app is a user-friendly interface that allows farmers and farm managers to monitor weather, receive alerts and manage preventive measures.

Advantages of the proposed system include plant protection, resource utilization, real-time monitoring, remote access and user-friendly interface. These features help increase productivity, reduce environmental impact and make farmers more profitable.

Overall, the proposed system embodies the principles of smart agriculture and Agriculture 4.0 and is compatible with the world difference between precision agriculture and technological innovation. Agriculture sector. While it provides solutions to the problems caused by heavy rains, it also supports permaculture practices that will increase the durability and efficiency of the agricultural sector.

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