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Automatic Crop Protection from Rain Fall Using IOT and IBM Cloud

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Abstract: *With the ongoing fourth revolution, technology has been growing rapidly day by day. One of the most significant and efficient uses of this has been evident in the farming sector. From a basic water sprinkler system to the requirement of Fertilizer for specific crops, the likes of Artificial intelligence and the Internet of things have brought in great changes. One of the issues which need to be addressed is the protection of crops from heavy rainfall which causes significant damage to the crop production and soil yield, also causing huge mental distress to a farmer. We in our proposed model have given a solution to this problem by giving automated as well as manual control. The motivation behind our paper is to keep the crops protected from these heavy precipitations and preserve the same rainwater for future purposes when water is scarce. We use a sensor with a NodeMCU module to ensure the covering of the estimated field and LCD display to show status of Field. This project addresses the critical issue of protecting crops from heavy rainfall through the integration of Internet of Things (IoT) technology and the IBM Cloud platform. By deploying a network of sensors capable of measuring rainfall intensity, soil moisture, temperature, and humidity, real-time data is collected and transmitted to the IBM Cloud for analysis. These measures may include adjusting protective structures, or activating drainage systems. The project aims to improve crop yield and reduce losses caused by adverse weather conditions, making agriculture more sustainable and efficient. The combination of IoT and IBM Cloud empowers farmers with real-time monitoring and control, enhancing their ability to protect valuable crops. This project not only demonstrates the practical application of advanced technologies in agriculture but also provides a foundation for future research and development in this field.*

Keywords: Automatic Crop Protection, IoT, IBM Cloud, Heavy Rain, Agriculture, Sensor Deployment, Data Analysis, Automation, Environmental Monitoring, Crop Yield Enhancement, Sustainable Farming.

I. INTRODUCTION

In an era marked by rapid technological advancements, the Internet of Things (IoT) has emerged as a transformative force, revolutionizing industries across the board. One area where IoT has shown immense promise is in agriculture, where it has the potential to significantly enhance efficiency, productivity, and resource management. Crops in farms are many times ravaged by rains. This leads to huge losses for the farmers. It is not possible for farmers to barricade entire 2 fields or stay on the field for 24 hours and guard it. So here we propose an automatic crop protection system from rain. This system involves the protection of crops by an auto roof that covers the required area. This introduction sets the stage for an exploration of the IoT -Based Automatic Rain Shutter, a groundbreaking solution designed to address the challenges posed by unpredictable weather patterns and rain in agricultural practices. Farming is the science and art of creating plants and creatures. Agriculture was the key headway in the climb of stationary human advancement whereby the developing of prepared species made sustenance surpluses that engaged people to live in urban regions. The chronicled background of agriculture began an enormous number of years earlier. Consequent to get-together wild grains beginning at any rate 1,05,000 years earlier, early farmers began to plant them around 11,500

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years back. Pigs, sheep, and cows were prepared over 10,000 years earlier. Plants were autonomously developed in any event 11 districts of the world. Modern horticulture dependent on the enormous scope of monoculture in the twentieth century came to overwhelm agrarian yield, however around two billion individuals although everything relied on subsistence agribusiness into the twenty first. The natural impact of agribusiness is the effect that diverse cultivating practices have on the general conditions, and how those effects can be followed back to those practices. The characteristic impact of agribusiness fluctuates reliant on the wide combination of agricultural practices used over the world. Finally, the normal impact depends upon the creative practices of the system used by farmers. The relationship between spreads into the earth and the developing system is convoluted, in this manner it depends upon other air factors such as precipitation and temperature. There are two kinds of markers of natural impact: "signifies based", which relies upon the farmer's creation procedures, and "impact-based", which is the impact that developing strategies have on the cultivating structure or spreads to the earth. An instance of a strategies-based marker would be the idea of groundwater that is impacted by the proportion of nitrogen applied to the earth. A marker reflecting the loss of nitrate to groundwater would be impact based.

II. LITERATURE SURVEY

We've examined work on similar projects in the past and know how to do research. Agriculture is the backbone of the Indian economy, according to many ways. Agriculture is the primary source of nourishment for us, making life impossible without it. However, in the current situation, finding farm employees is difficult. Modern development is prompted by the computerization of all industries. Up to a certain extent, the agricultural process is automated here.

P. Goutham Goud et al [1] Rain sensor, a sophisticated microprocessor, and a DC motor are used in a system where the deluge is recognised and a protective shield is wrapped around the rooftop. The rain sensor of such a drying shed protects the harvest from rain and wetness. To automate this task, a rainfall detects the downpour and sends the information to the microcontroller. A defensive wrapper is wrapped over the rooftop top, and the microcontroller forms the information and activates the DC motor control circuit.

Dheekshith et al [2] developed a system for identifying precipitation by using a downpour distinguishing sensor. The sensor is connected to a direct actuator motor and a spread job that protects against rain. When the sensor detects rain, it goes to work and pivots the spreading roll, which covers the gathered merchandise and protects the farmer from losses.

The current work entails preserving the unique resources that are available to mankind. We can limit the flow of water and so eliminate waste by assessing the status of the soil productively. Water stream can be obligated by substantially sending by knowing the state of moistness, and temperature over with the use of unexpectedness and temperature sensors. There are currently no effective frameworks available in the current situation. The farmer must go to the drying region and cover the gathered fields, which is particularly difficult if the farmer's location is distant from the harvest and the entire crop would be pummeled by the downpour before the farmer arrive.

III. PROBLEM STATEMENT

The problem we aim to address with our project, "Automatic Crop Protection from Heavy Rain using IoT and IBM Cloud," 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 an innovative system that leverages IoT and cloud technology to address the vulnerability of crops to heavy rainfall. This system must provide timely and automated responses to protect crops. To automate the agriculture land and protects the land and crops using IOT This system automates the agriculture land by supplying the water to the crops on the basis of temperature and their requirement. It also monitors the removal of excess water accumulated in the field The protection is provided to the land using IOT, Sensors are used to detect any animals and birds entering the land and they are avoided

IV. PROPOSED SYSTEM

To overcome the limitations of existing systems, we have proposed a framework that covers the harvested crops from heavy precipitation and navigates this water to the nearest storage chamber to avoid soil erosion and have the least

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impact on crop yield. The method consists of ATMEGA328P Micro-controller, NodeMCU wifi module to control the system from a nearby place, Soil Moisture Sensor, LCD which will give live readings to the farmer.

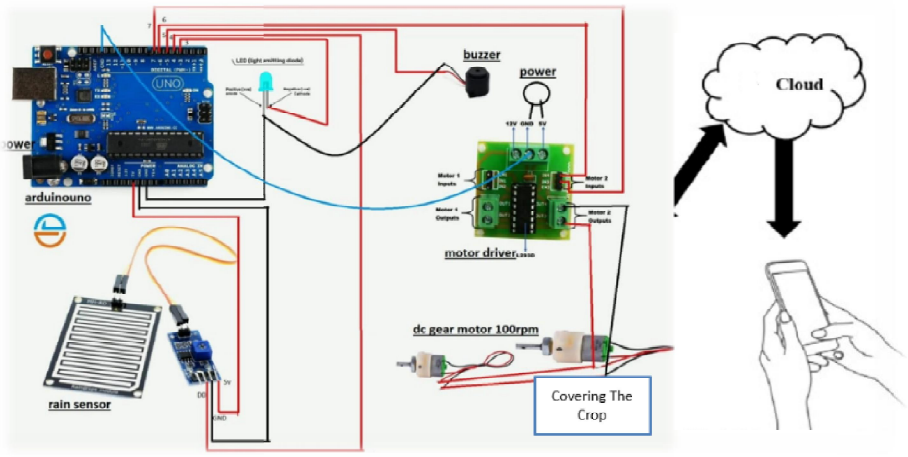

Fig. Block Diagram of Proposed System

V. WORKING OF SYSTEM

- External IoT Sensors: These sensors collect environmental data (rainfall intensity, soil moisture, temperature, and humidity) and send it to the central system.
- IBM Cloud: The data collected by the sensors is transmitted to the IBM Cloud platform for storage, processing, and analysis.
- User Interface: The user interface accesses data from the IBM Cloud to display real-time environmental conditions and control the system.

Start
↓
IoT Sensors
↓
Sensor Data Collection
↓
Data Transmission
↓
IBM Cloud
↓
Data Processing
↓
Automated Decision-Making
↓
Crop Protection Measures
↓
User Interface
↓
User Interaction
↓
Alerts & Notifications
↓
End

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VI. ADVANTAGE

- **Crop Protection and Yield Optimization**: The project helps protect crops from heavy rain and adverse weather conditions, minimizing damage and optimizing yields.
- **Resource Efficiency:** By automating protection measures, the project optimizes resource usage, conserving water and energy.
- **Real-Time Monitoring**: Farmers can monitor their fields in real time through the user interface, allowing for timely interventions and decisions.
- **Remote Monitoring:** Farmers can monitor and control their fields remotely, increasing flexibility and reducing the need for physical presence

VII. CONCLUSION

The "Automatic Crop Protection from Heavy Rain using IoT and IBM Cloud" project stands as a testament to the power of innovation in agriculture. In an era where climate change and extreme weather patterns threaten crop sustainability, this project emerges as a beacon of hope for farmers worldwide. Through a combination of cutting-edge technology, data-driven decision-making, and a commitment to resource efficiency, this project has not only achieved its primary goal of protecting crops from heavy rainfall but has also paved the way for a more sustainable and resilient future in agriculture.

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