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# IoT Based Crop Monitoring Using Drones for Agriculture

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**ABSTRACT**:As new technologies has been introduced and utilized in contemporary world, there's a necessity to bring advancement within the field of agriculture also. Various Researches are undergone to boost crop cultivation and are widely used. so as to ay of farming. Online crop monitoring using IOT helps the farmers to remain connected to his field from anywhere and anytime. Various sensors are wont to monitor and collect information about the sphere conditions. Collectively the about the farm condition is shipped to the farmer through GSM technology improve the crop productivity efficiently, it's necessary to watch the environmental conditions in and round the field. The parameters that must be properly monitored to reinforce the yield are soil characteristics, climate, moisture, temperature, etc.,Internet of Things (IOT) is getting used in several real time applications.

**KEYWORDS**: Classification, Data Mining, Machine Learning, Predictive analysis, Social Networking Spam, Spam detection.

## I.INTRODUCTION

Drones are among the foremost emergent technologies that have numerous advantageous applications; however they can also pose a important threat. In recent times, a number of incidents happened with drone sacrilegious privacy of the security of sensitive amenities including some nuclear power plants in France. One of the most aspects of human survival is that the agriculture which is that the main source of food. Unfortunately most of the farmers in our country use traditional way of farming which may be a hectic process to analyse data manually associated with soil and crops. This may be overcome by modern farming methods. Because the agriculture industry is one in all the important aspects of a country's economic process, it's necessary to bring automation in agriculture which relatively enhances the crop yield and helps in developing economy.

Deployment of automation in agriculture ends up in effective crop monitoring without human intervention within the field. Internet of things is that the network of physical objects embedded with sensors, software and electronic components like microcontrollers, as sensors and microcontrollers cannot be connected to the net directly. The crop productivity relies on good irrigation system. so as to take care of the irrigation system effectively, sensor is deployed within the field which senses the water requirement of the soil and provides irrigation automatically.The farmer are able to view the knowledge of his field through GSM technology.

## II. SIGNIFICANCE OF THE SYSTEM

This paper mainly focuses on how IoT techniques by using drones can be applied to predict the risk factors of spam in the data that is being used. The study of literature survey is presented in section III, Methodology is explained in section IV, section V covers the test cases, section VI shows the experimental results of the study, and section VII discusses the Conclusion.

## III. LITERATURE SURVEY

Several Researchers [1] have designed a wireless sensor networks to watch the conditions of the farming and increasing the crop yield and quality. Sensors are wont to monitor different conditions of environment like water level, humidity, temperature etc., The processors ATMEGA8535 and IC-S8817 BS, analog to digital conversion and wireless

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sensor nodes. Wireless transceiver module supported Zigbee protocol are utilized in the designing the system. Database and web application is employed to retrieve and store data. During this experiment the sensor node failure and energy efficiency are managed. [2] wireless sensor based automated irrigation system to optimize water use for agricultural purpose. The system consists of distributed wireless sensor network of soil moisture, and temperature sensors mounted within the crop field. Zigbee procedure is employed to handle the sensor information and water quantity programming using algorithm with threshold values of the sensors sent to a micro controller for irrigation system. Data inspection is completed using by using electrical device and cellular internet interface. A wireless camera is fixed in crop field to watch the disease area using image processing technique.

Also [3] proposed the transition from agriculture to recent agriculture in China. The agriculture intelligent system was supported IOT which is introduced for organic melons and fruits production and quality. Many of the technologies were utilized in the system, like RFID, sensors and etc., The system contains three platforms to watch agriculture and fruits. The intelligence agricultural system supported internet has been applied to the melon and fruit production, it plays a task which isn't only that the farmers have lesser working hours, but also to boost the flexibility to avoid wasting costs, improve the standard of fruits. [4] provided an in-depth study of applying wireless sensor networks to real-world habitat monitoring. a collection of system design requirements are developed that cover the hardware design of the nodes, the look of the sensor network, and therefore the capabilities for remote data access and management. to judge this implementation, have deployed an initial prototype network at the James San Jacinto Mountains Reserve (JMR) in Idyllwild, California[4]. JMR may be a 29-acre ecological preserve, representing only one of the University of California System Natural Reserve System's 34 land holdings. JMR climate is different from GD and weather changes can exists for very long time. the info collection is made easy from previously inaccessible employing a micro-measurement scale[5].

## IV. METHODOLOGY

The main principle is that the combination of both IoT and image processing together with sensor networks to supply realistic and accurate results about the agricultural field and its yielding in a very smart and straightforward method that's economical with water and labour saving as key preference. The hardware components being employed are Arduino Uno with micro controller ATMEGA 325, sensors -The moisture sensor (to detect the moisture required for health plant growth), LDR (Light dependent resistor- To detect the temperature and light-weight conditions required), Rain sensor (to detect the rain drops and thus save water by turning the pump motor off), Touch sensor (to detect the presence of stranger or animal in and round the field). Water Level Indicator is employed to spot the water level and pump motor is employed to manage the water system accordingly within the field. JPEG camera is employed to capture the pictures of the crop. The server side is given with 5V DC power supply using step down transformers

The sensors output is given to the Arduino that was programmed and interfaced with microcontroller. The output from the controller is given to the relay which drives the pump motor to manage the water system in required circumstances as indicated by the sensors, thus saving the water. Overhead tank is additionally being employed to store water during adequate rainfall. This stored water is supplied through pump motor to the sector when required or whenever the plant is dry this water can be served.

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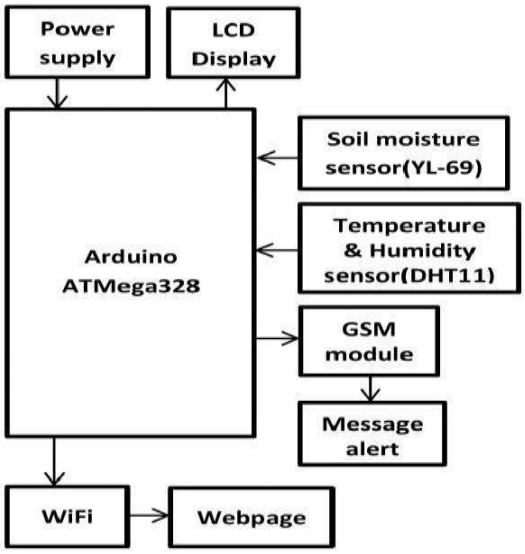


**Fig1. Block Diagram**

In this work, Drone is fitted with camera eye through Wi-Fi component which is used to capture live images and Videos.By using the proposed system, the photo captured by Drone and the image is stored in the Raspberry pi then diagnose the result of the selected image and finally we will find the affected crop.

## V. TEST CASES

| Parameters | Expected value | Actual value | e=E-A |
|---|---|---|---|
| Wheat | 1060 | 1060 | 0 |
| rice | 757 | 760 | 3 |
| maize | 1.00 | 0.980 | 0.02 |
| millets | 0.500 | 0.459 | 0.041 |
| pulses | 0.622 | 0.615 | 0.007 |

## VI. EXPERIMENTAL RESULTS

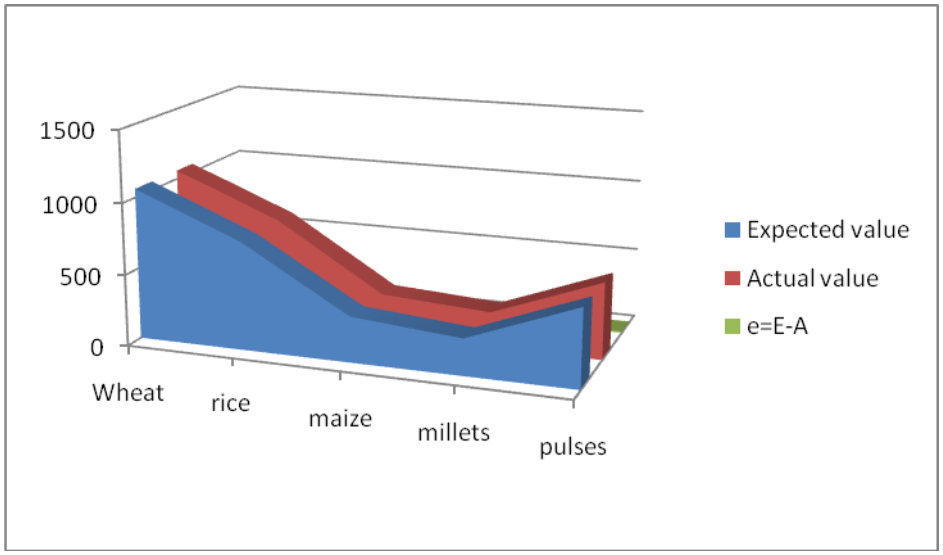


**Fig2. Performance of crop monitoring**

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## VII. CONCLUSION

All the agricultural topics are faced with the difficult of data processing and data gathering. These actions need to be well-organized, sometimes real-time, though also inexpensive. Thus, the paper proposes a concept of mixing the most recent technology into the agricultural field to show the standard methods of irrigation to modern methods thus making easy productive, and economical cropping. Severalamount of automation is introduced enabling the idea of monitoring the sphere and also the crop conditions within some long-distance ranges using cloud facilities. the benefits like water saving and labour-saving are initiated using sensors that employment automatically as they're programmed. The drone system with the GPS coordinates and navigates the crops also spray the pesticides on the infected areas. This might also be condensed the wasting of chemicals and water.

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