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Crop Loss Prediction, Assessment and Evidence Collection

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ABSTRACT: Farming area being the foundation of the Indian economy merits security. Security not as far as assets just but rather additionally horticultural items needs security and assurance at exceptionally introductory stage, similar to insurance from assaults of rodents or creepy crawlies, in fields or grain stores. Such difficulties ought to likewise be mulled over. Security frameworks which are being utilized now daily are not sufficiently shrewd to give constant warning subsequent to detecting the issue. The incorporation of conventional philosophy with most recent innovation can prompt agrarian modernization. Keeping this situation in our mind we have structured, tried and dissected a gadget which is fit for breaking down the detected data and afterward transmitting it to the client. This gadget can be controlled and checked from remote area and it tends to be executed in agrarian fields, grain stores and cold stores for security reason.

KEYWORDS: auto irrigation system, soil moisture, compensation for crop loss due to flood or drought, rainfall intensity.

I. INTRODUCTION

Farming is considered as the premise of life for the human species as it is the primary wellspring of sustenance grains and other crude materials. It assumes essential job in the development of nation's economy. It likewise gives substantial sufficient work chances to the general population. Development in rural segment is vital for the advancement of monetary state of the nation. Tragically, numerous ranchers still utilize the conventional techniques for cultivating which results in low yielding of harvests and organic products. In any case, wherever mechanization had been executed and people had been supplanted via programmed apparatuses, the yield has been improved. Consequently there is have to actualize current science and innovation in the agribusiness segment for expanding the yield. In this venture we can plan a model which gathers the proof of the yield misfortunes in land, in light of reports as gathered in this model the insurance agency government or open divisions will choose how much measure of cash to clime the ranchers. This gadget we structured likewise causes the ranchers to control water siphon. Paper [1] creates a rural model in IOT condition which is human driven. It joins IOT and distributed computing all around to expel the deficiency and absence of the executives, which are the foundation of issues in agribusiness. Farmer’s are not getting required compensation for crop loss after flood or drought from insurance companies, so our project is used as evidence for crop loss which helps to claim compensation from insurance company. With the new initiative the state is expected to get a better picture of ground condition of agricultural crops so that accurate reports of crop loss can be compiled and sent to the centre for compensation. Internet of things is turned out to be a savvy and solid innovation to execute shrewd frameworks[2]. In [3] sensor data collection and irrigation control was put forward on vegetable crop using smartphone and wireless sensor networks for smart farming. Utilisation of new technologies and solutions in the agriculral domain, to supply an optimal choice for collecting and processing information to improve productivity, is also an effort. In addition, the scarcity of water [4], alarming climate change [5], and drought [6] necessitate enhanced and new methods for modern agricultural fields. To achieve this goal, the automation and smart decision making is becoming more

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important. Technologies such as wireless ad-hoc and sensor networks [7],[8], Internet Of Things (IOT) [9],[10], and cloud computing [11],[12] are supporting agricultural services for improved monitoring and decision making capabilities in a smart way.

II. LITERATURE SURVEY

Paper 1: "Rapid damage assessment of rice crop after large-scale flood in the Cambodian floodplain using temporal spatial data", by Youngjoo Kwak, Member, IEEE, Badri Bhakta Shresta, AtsuhiroYorozuya, and HisayaSawano, Volume: 8 , Issue: 7 , July 2015.
Paper 2: Automatic control of agricultural pumps based on soil moisture sensing" by BezaNegashGetu, Hussain A. Attia published in 14-17 Sept 2015 IEEE conference, DOI: 10.1109/AFRCON.2015.7332052 .

III. PROBLEM DEFINITION (Exiting System)

Numerous ranchers still utilize the conventional strategies for cultivating. They will not come to know that whether water pump is ON or OFF. They will not come to know about dry run remotely. The main answer for this issue is shrewd farming by modernizing the current conventional strategies for horticulture.

IV. PROPOSED SYSTEM

The proposed system aims at making agriculture smart using automation. The highlighting features of this project include controlling of water pump without internet through GSM and status notification of the water pump. It also detects rainfall level (viz, low, medium, high) and send SMS to the farmer which can be considered as evidence for crop loss.

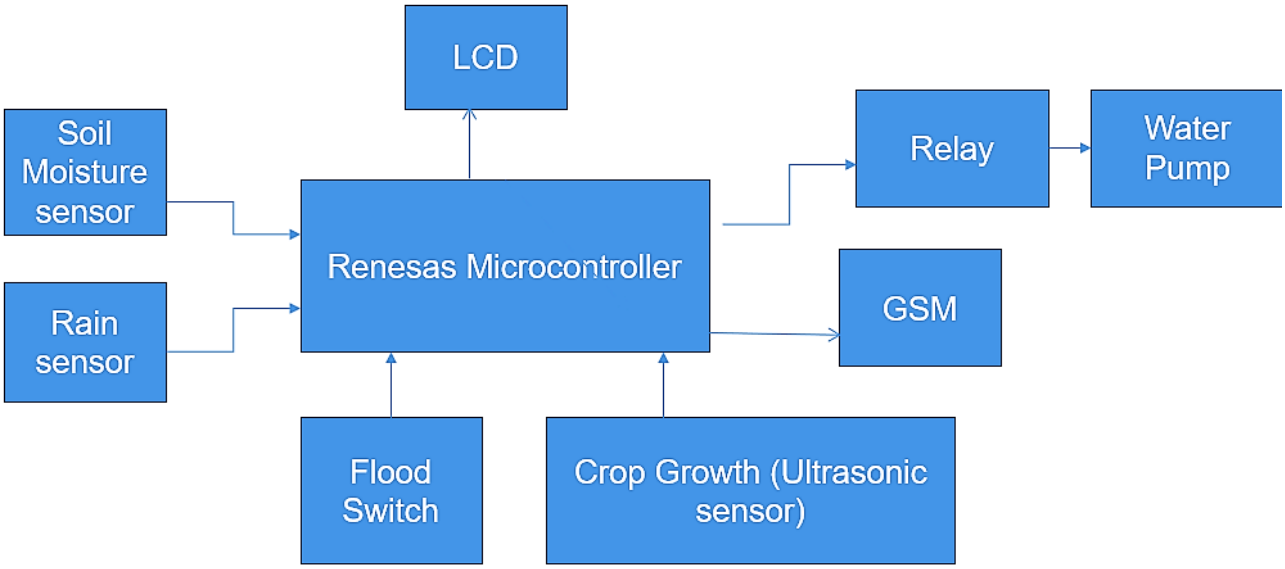

Fig.1. hardware block diagram

V. WORKING

The system is mainly composed of a single microcontroller R5F100LE, LCD, GSM, water pump, soil moisture sensor, ultrasonic sensor, rain sensor, relay, flood switch as shown in fig.1. The microcontroller located at the centre of the block diagram forms the control unit of the entire project. Implanted inside the microcontroller is a program that

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encourages the microcontroller to make a move dependent on the sources of info gave. Microcontroller will monitor the status of the water pump and it will update on the LCD and send SMS to farmer through GSM. In [13] a GSM based keen agribusiness framework was proposed for doing mechanization of a few rural assignments. We can control the water pump using GSM. Soil moisture sensor will be connected to zeroth pin of fifth port of renesas microcontroller which detect the land status if its dry it automatically turn ON pump in auto mode, but in case of manual mode farmer only decide to pump ON and OFF. Rain sensor will measures intensity of rainfall viz, low, medium and high. In crop growth analysis we are using the ultrasonic sensor to measure the height of crop growth, and the entire things (evidence for losses) will be sent to the farmer's mobile through GSM. Flood switch is a simple switch which is manually turned ON after flood occurs. By switching ON the flood switch the microcontroller will automatically sends the data like land condition, water pump condition, crop growth condition, rainfall intensity to the farmer's SIM through the GSM. Relay is the simple switch which controls the water pump ON and OFF when microcontroller sends the signal. Based on this reports the insurance company will decides how much amount of money to clime the farmers and what are the main aspects of crop loss.

VI. COMPONENTS DESCRIPTION

Soil moisture:
The dirt dampness sensor comprises of two probes which are utilized to quantify the volumetric substance of water. The two probes enable the current to go through the dirt and after that it gets the opposition incentive to gauge the dampness esteem. Apart from measuring soil moisture, monitoring soil moisture distribution is also important in agriculture[14]. At the point when there is more water, the dirt will lead greater power which implies that there will be less opposition. Along these lines, the dampness level will be higher. Dry soil conducts electricity poorly, so when there will be less water, then the soil will conduct less electricity which means that there will be more resistance. Therefore, the moisture level will be lower. The threshold value is 300,if the sensor senses less than threshold value then it will display as "land wet" if the value shows more than 300 then it displays as "land dry".

Rain sensor:
Rain sensors are available in both wireless and hard-wired versions, most employing fibrous disk that swell in the presence of rain and shrink back down again as they dry out. an electrical switch is in turn depressed or released by the fibrous disk. The threshold value will be given for every level (low, medium, high). If the value is less than 120 then it is considered to be low rain, if the value lies between 120-150 then it is considered to be medium rain, if value exceeds 150 then it is heavy rain. These messages will be displayed on LCD as "LOW", "MEDIUM", "HIGH". Due to heavy rain the crop might be lost. This loss is measured by giving a value of 5 to calculate the loss

Ultrasonic sensor:
Ultrasonic sensors measure separate by utilizing ultrasonic waves. The sensor head radiates a ultrasonic wave and gets the wave reflected again from the objective. Ultrasonic Sensors measure the separation to the objective by estimating the time between the outflow and gathering.The digital value 0 and 1 is assumed for the evaluation of growth of the crop. If value is displayed as "G0" then there is no proper growth of crop, if it display as "G1" then it is said to be normal growth of crop. If growth is normal "G1" and flood is detected, then loss is counted as 5.

GSM:
The GSM modem duly interfaced to the microcontroller through the level shifter IC Max232. The SIM card mounted GSM modem upon receiving digit command by SMS from any cell phone send that data to the microcontroller through serial communication.

Flood switch:
Flood switch is a simple switch which is manually turned ON after flood occurs. If flood switch is turned on then loss is the sum of all losses.

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VII. ASSUMPTIONS

- Plants around the particular plant subjected to ultrasonic sensor are assumed to be of same height and yields same.
- Care taken to raise all plants is assumed to be same.
- Microcontroller will assume the flood has occur when flood switch is ON and sends data to farmer.
- Yield is assumed to be proportional to the height of the crop.

VIII. RESULT

Information gathered from sensors stored in SIM (as message),which can be used as evidence for claiming refund amount from insurance company or any private sectors. The collected information of total loss for different situations are shown in the table.1.

Soil moisture	Rain Analysis	Crop growth	Water pump	Flood switch	Total loss
Dry	Low	Good	ON	Detected	05
Wet	High	Good	OFF	Detected	10
Dry	Low	Good	ON	Detected	05
Wet	Low	Good	OFF	Detected	00

Table.1

IX. ADVANTAGES

- Manual activity has been decreased to significant degree.
- Less man power required.
- Easy to use.
- Efficient and reliable.
- Getting a wide range of government advantages will be simple.
- Government can easily support for the suffered farmers.

X. LIMITATIONS

- Framework disappointment may happen because of altering improperly.
- Framework disappointment may likewise occur without power.

XI. FUTURE SCOPE

For project demo concern, we have developed a prototype module. Future work can be extended by adding amazon cloud server, dry run sensor, water pump theft, temperature sensor with and without internet using IOT. To make this project as user friendly and durable, we need to make it compact and cost effective. Going further, most of the units can be embedded along with the controller on a single board with change in technology, thereby reducing the size of the system.

XII. CONCLUSION

The task is planned utilizing organized demonstrating and can give the ideal outcomes. It tends to be effectively executed as a Real Time framework with certain modifications. Science is discovering or making real leap forward in different fields, and thus innovation continues changing now and again. Going further, the vast majority of the units can be created on a solitary alongside chip in this manner making the framework minimal consequently making the current framework increasingly powerful. To make the framework appropriate for constant purposes parts with more noteworthy range should be executed.

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