Intelligent Farming using Internet of Things

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Abstract: *In recent times due to COVID'19 all of us are staying indoors. Many people , especially in India most of the population depends on Agriculture. In India around 70 percentage population depends on Agriculture. During this pandemic situation, they couldn't able to work in fields. In this situation Technology should help farmers also to work from Home. In this paper we are going to discuss about Intelligent way of farming using Internet of Things. For using this technology in a better way, farmer should need smart phone with internet. If the farmer uses touchpad phone, just he will get notification. Some of the problems facing by farmers are electricity problem, wild life's problem, water problem, crop disease, climate problem etc. All these problems will be solved by using this technology. Also the proposed work will help farmer in irrigation system, monitor pH value of soil and also helps farmer to monitor all the above problems from home.*

Key Words: *Internet of Things, pH, sensors.*

1. INTRODUCTION:

As we all know, in India 70 percentage of the population depends on Agriculture. But these farmers are facing lots of challenges, even after investing lots of amount. In every year, many farmers in India commits suicide due to loss. Also in India man power is more than using technology. But in recent situation COVID'19 , to save their life, farmers also in a situation to stay indoors. In these situation they couldn't able to monitor their crops. Also they are facing major problems like electricity problem, wildlife's problem, climate problem, water problem, crop disease problem[5]. To solve all these problems, in our proposed system we are using Internet of Things. In this proposed work we are going to use different sensors[6,7,8,9] which help the farmers to monitor their crops through smart phone with internet connection or just by notification message. Nowadays mostly everyone knows how to use smart phone in India. So it will not be difficult for the farmers to monitor their crops through smart phone during pandemic situation. Result of the proposed work help farmers to get more profit with less man power. After using this technology, farmers does not need to afraid in any situation

2. Related work:

Big Data is changing the extension and association of cultivating through a draw push system. Worldwide issues, for example, food security and wellbeing, manageability and subsequently proficiency improvement are attempted to be tended to by Big Data applications. These issues make that the extent of Big Data applications stretches out a long ways past cultivating alone, yet covers the whole gracefully chain[1]

Tending to environmental change impacts on agribusiness is uncommon test. There are number of components that impact the degree to which ranchers in a specific area receive innovations. This examination applied a participatory evaluation strategy to survey ranchers' inclinations and ability to-pay for chosen practices and innovations in differing precipitation zones. The investigation found that ranchers' inclinations for innovations are set apart by certain shared traits just as contrasts as indicated by their financial qualities and precipitation zones. The most favored innovations by neighborhood ranchers were crop protection, climate based yield agro-warnings, water reaping, site-explicit incorporated supplement the board, unexpected harvest arranging and laser land leveling. The outcomes additionally demonstrate that ranchers' inclinations and readiness to-pay are affected by innovations and their expense of usage. This examination shows the potential for utilizing a participatory prioritization way to deal with give data on environmental change adjustment arranging at neighborhood level[2].

3. Proposed Work:

As we discussed early, farmers are facing electricity problem in India , to avoid this we are going to use opto - isolator, which converts light to electricity. Next problem faced by the rural farmer is wild animals . Most of the time wild animals destroy the fields and thief steals the crops. So in the proposed work we are going to use motion detection

sensor, which helps to detect the movement of animals or birds or thief and also it makes noise to threaten animals or birds or thieves and the same time it will give information to farmers smart phone through message and also in the android application .As we all knows crop needs water, by using Internet of Things we are going to use smart irrigation system in the field. So Dielectric moisture sensor is used in the proposed work. This help to identify the moisture of the soil and based on the moisture of the soil, water will be send automatically to the crop. As we all know pH plays important role in agriculture. In our proposed work, we used pH to detect the pH value. This sensor analyze the pH value of the soil. If it decrease or increase it will inform to the farmer . Farmer can get all information in his phone . Another major issue faced by farmer is crop disease. So in our proposed system we are using Hyperspectural sensors which helps to detect crop disease in early. Yield Monitoring system helps to monitor the yield. All these sensors are used for smart farming. These are connected with the GPS which is connected with the farmers smart phone . Android application is used for the smart farming. Farmer can monitor or control his field by using the android app. There are some farmers who cannot able use to smart phones , keeping this in mind, in our proposed system, alert message will also send as normal text message. So our proposed system helps the former who knows to use smart phone and also the former who doesn't have smart phone . If smart phone is used , farmer can contol his field remotely. By using this system, farmer can monitor his field during this COVID'19 pandemic situation as well.

3.1 Opto-isolator:

In India rural area farmers are facing electricity problem. If we want to use smart farming, of course there is a need of electricity. But in India farmers are facing electricity shortage. Consequently in this proposed work we are utilizing opto-isolator which moves electrical signs between two secluded circuits by utilizing light[3]. This assists with changing over light vitality to electric vitality. Its least complex structure, an optoisolator comprises of a light-emitting diode (LED), IRED (infrared-emitting diode) for signal transmission and a photosensor (or phototransistor) for signal gathering. Utilizing an optocoupler, when an electrical flow is applied to the LED, infrared light is delivered and goes through the material inside the optoisolator. The bar traversed a straightforward hole and is gotten by the recipient, which changes over the balanced light or IR once more into an electrical sign. Without light, the info and yield circuits are electrically disconnected from one another.

3.2 Motion Detection Sensor

One of the major problem faced by farmer is by wild animals, thief[4]. So in the proposed work Motion detection sensor is used. This sensor monitors the motion of the animal or bird or thief or some unusual activities during the absence of the farmer. It will send message to the farmer and also it makes noise to threaten the animal or bird or unusual activity. When the farmer is not in the field , he can activate this and he can monitor through his smart phone. So whenever any unusual activity happens in the field farmer will get alert message and also at the same time this sensor make noise to threaten the animal or birds or thief. A motion identifier is an electrical gadget that uses a sensor to recognize close by motion. Such a gadget is regularly incorporated as a part of a framework that consequently plays out an undertaking or alarms a client of motion in a region. They structure a crucial part of security, mechanized lighting control, home control, vitality effectiveness, and other valuable framework

3.3 Dielectric Moisture Sensor

This sensor helps to monitor the moisture level of the soil. If the moisture of the soil is less, it will inform the server as well as the farmers smart phone. Once the server got the information, it will activate the spraying pump automatically and OFF the spraying pump once the required moisture is needed. Suppose if the moisture in the soil is high, it will activate the temperature senor till it met the required temperature. Soil dampness sensors commonly allude to sensors that gauge volumetric water content. Another class of sensors measure another property of dampness in soils called water potential; these sensors are typically alluded to as soil water expected sensors.

3.4 pH Sensor

This sensor helps to monitor the soil to calculate the pH value and also the nutrients present in the soil. Whenever this level is low or high . This sensor gives the information to the farmer. So that the farmer can take smart decision.

3.5 HyperSpectural Senor

One more major problem faced by the farmer is the crop disease. This HyperSpectural Sensor helps farmer by detecting the crop disease early by analyzing the crop. It helps in the early detection of the disease which is going to affect the crop. It will send notification to farmer as message or in the android app. Now the former will be alert . Hyperspectral imaging empowers ID of weeds, checking of plant wellbeing, and assessment of readiness. Early recognition of harvest pressure is a typical application.

3.6 Yield Monitoring System:

Yield monitoring is a sensor which helps to monitor the yield during harvest. This helps to inform farmer about the harvest. Yield observing frameworks are a fundamental segment of accuracy farming. They show the spatial inconstancy of yield in fields, and have become a significant factor in current reapers.

4. CONCLUSION:

This paper helps the farmer to monitor his field from home. Previously farmers faced huge loss due to climate, water, wild life's, crop disease. This paper helps the farmer to gain more profit and also during emergency situations he can watch or monitor his field through his smart phone. Hence this paper will be more useful for the farmers.

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