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DESIGN AND IMPLEMENTATION OF MODERNIZATION OF AGRICULTURE AND CROP PROTECTION USING IOT

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Abstract - This paper presents "Dream of Farmers" - a collaborative system made up of a Wireless Sensor Network (WSN) using sensors like Temperature and air or dust sensor in this project depending on nature variation, sensors detect the values and takes the decisions to protect the crops by opening and closing the sheet or panel through dc motor. The crops are protected by measuring the pH level in the water depending on the pH values the Arduino acts whether to supply the water through pump or not. The project deals with agriculture and it consists of microcontroller, sensors, solar panels, water pumps, Wi-Fi module with e-agriculture that may come to the farmers interest and also used to control the natural resources. Therefore, this problem has made farmers to go for the implementation of agro-environmental remote monitoring method in their agricultural industries. The main aim is to directly interact with the farmers and to make their work easy. This is done by intimating the farmers about soil moisture, temperature, pH level, weather condition and also about the motor level condition using IoT Technology. This project will send an alert message to farmers in the website with date and time so that they can maintain their landproperly. By using this method, the farmer may feel more comfortable to work on his land without any stress. Using IOT, the farmer will be able to monitor their lands from anywhere also they can access their land at any time. They will be asked to monitor using IOT so that it will avoid placingthe substitute for his land. They can also monitor their crop by control over website through their mobile phones or computer system. Hence this system is used to remote monitoring the agricultural field. In future there will be a scarcity of power generation via fossil fuels, water etc., which may lead to depend widely on solar power generation so that farmer can make source of income even though the farmer get loss in the crop yield as this is the main impact of this project which make backbone to the farmers.

Index Terms— IoT, sensors, temperature, humidity, moisture, fire, object, soil, WI-FI module, DC motor.

1.INTRODUCTION

India is ranked to be the second largest in agriculture among other nations. Agriculture is the backbone of India. Today the Indians are second largest in the production of wheat, rice etc. cropping patters has been changed according to the lifestyle of people. Technology makes people lazy and farming these days are also developed with new technologies. Plant protection is a mandatorything in agriculture in order to intimate the farmers about their crops, the farmers are enabled with logins to the website using particular username and password so that he can see the details that includes date, time and data which is sent by the Arduino board using Wi-Fi from which they can monitor their lands easily. Barren lands are the biggest threat to the farmers. To take care of these major and mandatory things, few things are being implemented in our paper.

In this project the proposed system is to prevent the spoilage of crops due to heavy rainfall and sun rays. This is achieved with embedded system design using IOT technology. The actual concept of this project is to be protecting the crops from heavy rainfall and sun rays by covering the field automatically and also to save the collected rain water. In order to achieve this by using IOT technology, sensors and soil moisture sensor and also use of renewable energy resources like solar power that is generated fromsolar panel as the power source to this project. Large number of the population depends on leaf crop either for its cultivation or forthe purpose of processing. It is observed sluggish in the agriculturedevelopment leading to the attack of disease.

The benefits of modern farming technologies depend on whether.India expands its agricultural infrastructure such as irrigation systems, flood control systems, and stable electricity use as well as manufacturing power. As irrigation becomes the vital role to have growth in the economic status of our country. Proper watering Intime and applying of bio fertilizers, along with proper monitoring of fields results in the social modernization of Indian agriculture system. This became quite interesting concept which isgoing to be major tool to reduce the power cost required for automation of agriculture. This device incorporates both wired andwireless technologies, as well as an Arduino controller, to providedaily monitoring of the farm's environmental conditions, as well as the required precautions to be taken in order to increase yield through modern agriculture.

2.EXISTING SYSTEM

Designed a wireless sensor network (2014)

Balaji Banu and his teammates [2] designed and developed a wireless sensor networks to keep track of agricultural fields to expand the productive capacity of farming. Water level, humidity,temperature sensors and so on are used monitor the different conditions. They used ATMEGA8535 and IC8817 BS to convert analog to digital and used wireless sensor with wireless transceiveralong with zig bee protocol. To store and retrieve data we use database and web application. In this situation if sensor node failures and energy consumption are managed.

Advantages

It helps in obtaining real time information on environmental monitoring and WSN reduces the complexity of devices development to small and large area.

Disadvantages

Implementation of web-based application for raw data analysisis not used.

Automated irrigation management system using WSN (2014)

Joseph Haule, Kisangiri Michael [4] proposed a Automated irrigation management system using WSN. The best solution for water management is to control irrigation and rescheduling basedon WSN and the soil moisture is examined automatically. This phase is used to decide the correct threshold frequency and watering time, which is critical to make sure of effective water usage, high crop quality, and throughput and load. OPNET performs simulations for agriculture. Another WSN configuration is used for irrigation systems that use the Zig bee protocol,which has an effect on battery life.

Advantages

Use of WSN consumes low power and data rate hence more energy efficient technology and also help the farmers in analyzingthe system whether it performs normally or if any action needed.

Disadvantages

Since WSN is still in its early stages of growth, with uncertain communication times and low data rates and hence power consumption and communication may suffer.

Atomization of agricultural environment (2014)

Prabha and her group [6] members published a paper on Arm 7 controller to monitor the field and they use soil moisture sensor to measure the water content in the field, weather conditions are monitored and the thefting of the pump is avoided by the buzzer alert and sends information to the farmers using GSM.

Advantages

Low power consumption high performance. It helps in accessingthe data from any remote place.

Disadvantages

No usage of IoT, Wi-Fi module as there are using LAN network communication. The software is not compatible with other OS versions.

Remote controlled agriculture monitoring system (2015)

Sirisha [3] and her team presented a paper on how to use the water efficiently so that they considered temperature and humidity sensors to predict the weather conditions depending on that the farmer can do the production without any crop loss. Zigbee based on sensor node and WSN is used to monitor the agriculture in realtime. In this paper they mainly focused on the weather condition.

Advantages

Helped in real-time field monitoring and accurate prediction onweather condition by farmers.

Disadvantages

Wireless sensor is not stable and both hardware and software.

Automating irrigation using WSN (2018)

Akshata. S. Jagatap, Asso. Prof: S. R. Dhotre [5] have proposed a smart irrigation system as in previous paper [4] mentioned in this and also improvised with a wireless LAN rather using Zigbee technique for efficient use. Many of the areas as been attracted towards this type of implementation and hence this makes a more advantages in greenhouse system and in agricultural areas. So, this proposed system helps in getting more yields with less wastage of water.

Advantages

Reduces more man power and work done efficiently. Helps in farmers to analyze the field and accordingly necessary action is taken.

Disadvantages

Power consumption and communication can be lost as WSN is still in under development stage with unreliable communication times and low data rate.

IoT based intelligent crop monitoring system (2019)

Ramaprasad S S [1] proposed an IoT based crop monitoringsystem. Arduino Microcontroller is used to control the entiresystem and used earlier proposed system [4], [5], [6] concepts and made upgradation with the system by sending alert messagesthrough GSM and they implemented power supply with analternative source called solar panel.

Advantages

Protecting the agriculture fields from animals or any intruder. Uses optimal water usage results in good yield.

Disadvantages

No usage of fire sensor, air quality sensor, rain sensor.

3. CONCLUSIONS

This IoT based architecture system is a reliable and economical system for observational agricultural parameters. The right action should be taken and cut back the human power, however it conjointly permits user to visualize correct changes in it. It is cheaper in value and consumes less power. The GDP per capital in agriculture sector may be multiplied. Water is essential in agriculture hence developed system uses best method to water supply which gives good yield by measuring the wet content within the soil and conjointly it alerts the buzzer and message is sent to the farmers once if any unwelcomed person within the field and hearth. The session information are going to be sent to the farmer victimization WIFI it continue causation associate information to the farmer regarding the field condition. Farmers are connected to their agriculture field from any place and anytime. So, this project helps the farmer in protecting the field and saving from monetary losses and conjointly helps in achieving the best quality crop yield and the farmer can get power produced from solar panels placed on the roof resulting with uninterrupted power supply. So that the farmer can make this resource (power supply) by storing into a battery's and making this as a source of income to the farmers by selling it. In future there will be a scarcity of power generation via fossil fuels, water etc., which may lead to depend widely on solar power generation so that farmer can make source of income even though the farmer get loss in the crop yield as this is the main impact of this project which make backbone to the farmers. Hence this will be useful for the marginal farmers.

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