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Internet Of Things Based Smart Agriculture Towards Making Fields Talk

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INTRODUCTION- Agriculture is the back bone of India, it ranks second in the world in farm output. Irrigation accounts for 55-70% of water usage in India. The use of innovative tools based on technologies in farming is expected to bring a number of benefits. Nearly 60% of water used in irrigation is wasted, in this project water is conserved by microcontroller-based system. Monitoring of agriculture process is entirely manual which may lead to some improper management in turn leads to reduction in yield. Late night monitoring of crops is not possible. Presently farmers apply pesticides based on manual sampling or previous years result. Manual sprinkling of pesticides which will be improper in terms of quantity. If the crop field are less moisture which leads to reduce in yield is resolved. By introducing technology to agriculture the system checks the moisture level, temp level and humidity level and based on these levels the further actions are taken. This project highlights the potential of wireless sensors and IoT in agriculture, as well as the challenges expected to be faced when integrating this technology with the traditional farming practices. The sensors which are available for specific agriculture application, like soil moisture, humidity, plant growth are listed. How this technology is helping the growers throughout the crop stages, from sowing until harvesting is explained and we can also monitor the trespassers through the IR sensor.

OBJECTIVES- Automatic irrigation system and updating to the farmer. Sensor monitoring based on the sensor value pump will get turn on and off. Exact Disease name identification using machine Learning and proper pesticide name suggestion. Protection of the agricultural field from intruders. No need of employees. It saves water and farmers time. Compact and low cost.

METHODOLOGY- To monitor the state of environment we have used six sensors in the suggested system: soil moisture, humidity and temperature, pH, IR and NPK sensors. Arduino Uno is a Microcontroller board which is of low-cost, flexible, and easy-to-use programmable open-source board that can be integrated into a variety of electronic projects.

Soil Moisture Sensor is the fork-shaped probe with two exposed conductors, acts as a variable resistor (just like a potentiometer) which is used to measure the volume of water in soil. A power relay module is an electrical switch that is operated by an electromagnet. Humidity And Temperature Sensors are used to measure humidity and temperature respectively. The temperature range of DHT11 is from 0 to 50 degree Celsius. Humidity range of this sensor is from 20 to 80%. DHT11 is small in size with operating voltage from 3 to 5 volts. Here we are using 5V mini water pump. This will control by threshold values of soil moisture sensor, humidity and temperature sensor and type of plant. IR sensors allow you to sense motion. They are used to detect whether a human or an intruder has moved in or out of the sensor's range. And they give a buzzer or send an alert message to the farmer about the

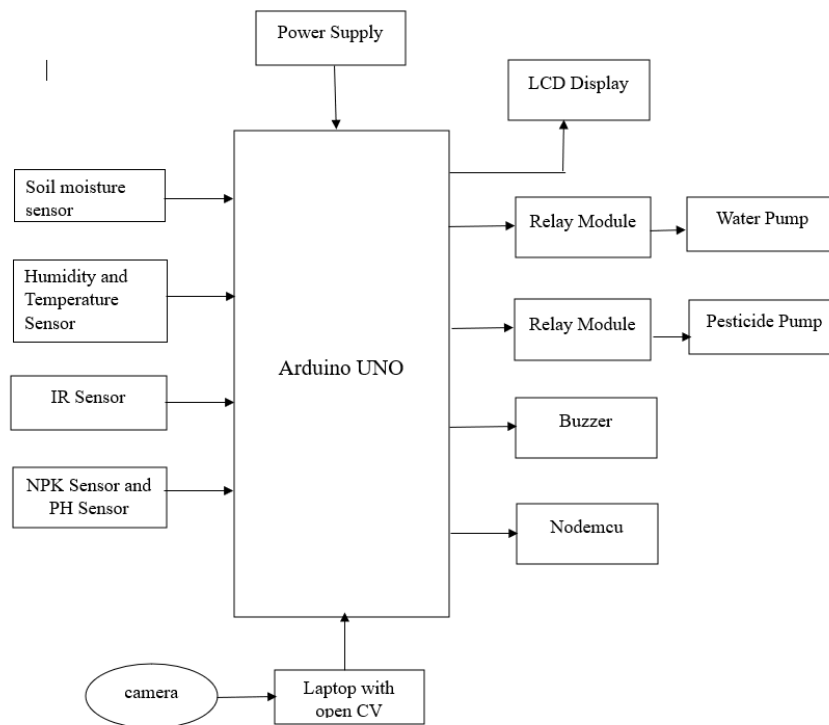
intruder. The soil NPK sensor is suitable for detecting the content of nitrogen, phosphorus, and potassium in the soil. It helps in determining the fertility of the soil and the pH sensor functions as a soil pH meter . Convolutional neural network is the special type of artificial neural network in which the connectivity between the layers is inspired by the visual cortex. It is applied for analyzing visual imagery. They have applications in image and video recognition, image classification. This algorithm is used in our system to detect whether the leaf is diseased or not.

The **proposed system** has the following:

This system includes,

- Smart irrigation
- Protection of agriculture field
- Pesticide Sprinkling Automation
- Continuous monitoring control of field
- The soil moisture sensor measures wet content in the soil. When soil moisture sensor goes low, the water pump will be on and it exceeds defined levels of the water motor will turn off automatically.
- IR sensor detects the motion or unusual movement in the agricultural land which automatically turn on the buzzer in the field making the land protected from intruders.
- The NPK sensor, pH sensor, Humidity and temperature sensor all together helps in monitoring the soil fertility, growth of the plant and also can predict the yield.
- Crop disease will also be detected in our system which can prevent the losses in yield and quantity of agricultural product. Depending on whether the crop is diseased or not pesticide is sprinkled automatically.
- In this system, the farmer need not to go their field, instead they can remotely monitor and control the environmental parameters along with the entire system through internet.

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CONCLUSION- Farmers can benefit greatly from an IoT-based smart agriculture system. As it allows for an automated irrigation system, crop disease detection, Pesticide sprinkling automation and Continuous monitoring of the Agricultural field as well as the Climatic factors such as humidity, temperature, and moisture. This technology also detects animal invasions, which are a major cause of crop loss. With the implementation of IoT in agriculture, processes are managed more effectively in the field with the aid of sensors. In this way, farmers are able to monitor crop conditions remotely, and better manage natural resources. Therefore, smart agriculture is much more effective than traditional agriculture.

FUTURE SCOPE- Farmers can benefit greatly from an IoT-based smart agriculture system. As it allows for an automated irrigation system, crop disease detection, Pesticide sprinkling automation and Continuous monitoring of the Agricultural field as well as the Climatic factors such as humidity, temperature, and moisture. This technology also detects animal invasions, which are a major cause of crop loss. With the implementation of IoT in agriculture, processes are managed more effectively in the field with the aid of sensors. In this way, farmers are able to monitor crop conditions remotely, and better manage natural resources. Therefore, smart agriculture is much more effective than traditional agriculture.

