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SMART IRRIGATION AND SOIL CHECK USING IOT SYSTEM AND IMAGE PROCESSING

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Abstract

Agriculture is basic source of livelihood People in India. It plays major role in economy of country. But now days because of migration of individuals from rural to urban there's hindrance in agriculture. Monitoring the environmental factor isn't the entire solution to extend the yield of crops. There aren't any of things that decrease the productivity to a good extent. Hence Automation must be implemented in agriculture to beat these problems. An automatic irrigation system thereby saving time, money and power of farmer. The Traditional Farm land irrigation techniques require manual intervention. With the automated technology of irrigation the human intervention will be minimized. Continuous sensing an monitoring of crops by convergence of sensors with Internet of things (IOT) and making farmers to privy to crops growth, harvest periodically and successively making high productivity of crops and also ensuring correct delivery of products to finish , consumers at right place and right time. So to beat this problem we opt for smart agriculture technique using IOT. This Project includes sensors like temperature, humidity, soil moisture and rain detector for collection the sector data and processed. These sensors are combined with well established web technology within the sort of wireless sensor network to remotely control and monitor data from the sensors.

Keywords— Arduino Uno, ESP8266 (Wi-Fi module), Automation of Irrigation System, Sensors

Introduction

Agriculture is major source of income for the most important population in India and is major contributor to Indian economy. In past decade it's observed that there aren't much crop development in agriculture sector. Food prices are continuously increasing because crop rate declined. There are number of factor which is accountable for this it's going to result to water waste, low soil fertility, Fertilizer abuse, global climate change or diseases etc. it's very essential to create effective intervention in agriculture and therefore the solution is IOT in integration with wireless sensor network. Internet of things (IOT) may be a method of connecting everything to the internet- it's connecting object or things (such as car, home, electronic devices, etc.) which are previously not connected with one another main purpose of IOT is ensuring delivery of right information to right people at right time. In agriculture irrigation is that the important factor because the monsoon rain falls are unpredictable and unsure .

Need of automatic irrigation:

- Simple in install and configure.
- Saving energy and resources, in order that it will be utilized in proper way and amount.
- Farmers would be ready to smear to correct quantity of water at the proper time by automatic irrigation.
- Avoiding irrigation at the incorrect time of day, reduce runoff from overwatering saturated soils which can improve crop performance. Automated irrigation system uses vales to

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show motor ON and OFF. Motors are
often automated easily by using controllers and no need of labour to show motor ON an OFF. It is precise method for irrigation and a valuable tool for accurate soil moisture control in highly specialized greenhouse vegetable production.It is time saving, the human error elimination in adjusting available soil moisture levels.

This project uses IOT technology in agriculture, gathering crops growth environmental parameters during a fixed place to assist farmers find problems in time. Agriculture experts give guidelines with specific information to extend the farmer‟s income and help them within the prevention and control of crop diseases and pests. Through the custom development of mobile apps, it's been implemented with agriculture technology promotion and expert online FAQ. The system development composes three parts: The server, Android client and PC client to attain scalability, high reliability, security, compatibility of technical requirement.

Smart agriculture IoT system

This section presents the smart agriculture IoT system. In particular, the framework of the smart agriculture IoT system is illustrated In the smart agriculture IoT system, the bottom layer is aimed at agriculture data collection. In this layer, various sensors are deployed to collected the environmental parameters that are important for crop growth. Representative environmental parametersinclude the air temperature and humidity, carbon dioxide concentration, soil moisture and temperature, and light intensity, etc. Specially, these parameters are collected every five minutes. Before the collected parameters are transmitted to the data center in the cloud for analytics, they are preprocessed in the edge computing layer. In particular, two preprocessing tasks are carried out in the edge layer. The objective of the first task is to monitor the state of each sensors and this objective is accomplished by detecting the incomplete data or the outliers from the collected parameters. The objective of the other task is to greatly reduce the amount of data and this objective is accomplished by compressing the collected parameters. For example, if the air temperature is kept at 25 degrees in ten sampling periods, each with five minutes, only one value namely 25 will be transmitted to the data center. This way the bandwidth can be saved by reducing the amount of data transferred.The collected data is analyzed by various data mining algorithms and artificial intelligence models in the cloud layer. In a smart agriculture IoT system, an important task is to take a series of measures to adjust the environment to adapt to crop growth. This task is done by using deep reinforcement learning to make smart decisions in our system.

PROCESS

1) Sensor data acquisition :-
The sensor is interface with Arduino Uno such as DHT11 Temperature, Humidity, Soil moisture and Rain detection sensor is used.

2) Wireless data transmission :-
The data acquired from sensors are transmitted to the web server using wireless transmission (WIFI module ESP8266).

3) Data processing and Decision making :-
The data processing is the task of checking various sensors data received from the field with the already fixed threshold values.

The motor will be switched ON automatically if the soil moisture value falls below the threshold and vice- versa.

The farmer can even switch ON the Motor from mobile using mobile application.

4) Automation and irrigation system :-
The irrigation system automated once the control received from the web application or mobile application. The relays are used to pass control form web application to the electrical switches using Arduino microcontroller. The circuits with low power signal can be controlled using relay.

5) Web application :-
The web application will be designed to monitor the field and crops from anywhere using internet connection.

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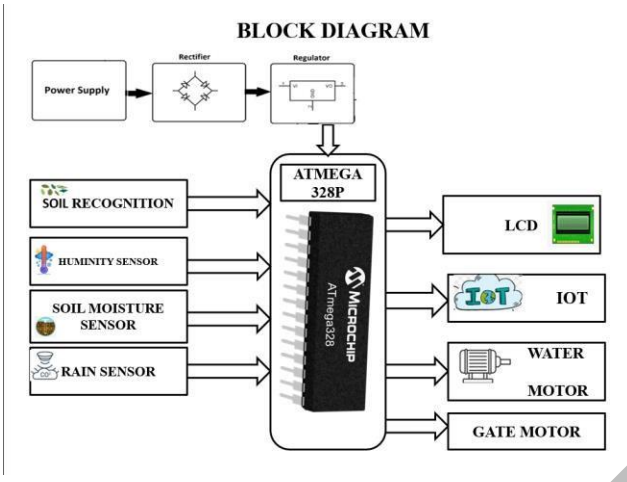
To control the Arduino processing IDE is used, the webpage can be communicated using the processing IDE.

6) Mobile Application :-

The mobile application will be developed in android. The mobile application helps to monitor an controlled filed from anywhere.



CONCLUSION

In this paper, we presented a smart agriculture system based on deep reinforcement learning. Specially, the deep reinforcement learning models are used to make smart decisions to adjust the environment to adapt to the crow growth. We presented recently developed representative deep reinforcement learning models and algorithms. Although deep reinforcement learning has shown a great progress in model design and training algorithms, it cannot achieve the human-level performance in adaptation to dynamic environments and solving complex tasks. In the future, efforts can be made on deep reinforcement learning to improve its performance in the following directions. The first direction is to design the incremental models to speed up the training for deep reinforcement learning in dynamic environments for smart agriculture systems. Integrating different memory units such as long short-term memory and neural turing machine to deep reinforcement learning to improve its performance for active reasoning and cognition. Another direction is to apply more effective transfer learning methods to deep reinforcement learning for the settings which are short of training data. Cloud computing should be used to improve the training efficiency of large-scale deep reinforcement learning for complex tasks. Finally, improving the versatility of deep reinforcement learning by combining multitask learning and deep computation is also an important topic for smart agriculture in the future.

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