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Recommender System For Smart Agriculture Using Iot

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Abstract: *Recommender system is defined as system which recommend the most suitable schemes, product or service to particular farmer based on related information about the farmer and data collected from sensors. e.g .Kisan seva , Krishi mantra, etc.*

The recommender system will provide the agricultural information about fertilizers, soil, climate, crop rotation, various government schemes and helping hand for business and solve the problems such as lack of information, advancement in technology. The farmer can able to grow the number of crops in their field by using this information. The system will suggest helpful information to farmer to improve the agriculture production. This can be an IoT system with app using Arduino with sensors. REST API architecture will be useful to build client/server network applications. The user can access information through application. The system will help farmers to gain advance information about agriculture and increase their crop yields.

Keywords: *Arduino, Government schemes, IoT, Recommender system, Smart Agriculture*

I. Introduction

The main objective of the proposed system is to focus on improving the agriculture performance. It is mainly used for providing the agriculture related information and solving the problems related to agriculture area. This agricultural system contains the details of fertilizer, soil, crop rotation, genetic manipulation of crop plants, the query communication between the user and admin can be performed in this system. The information is divided into category wise such as cattle, crop protection, vegetables, grains and etc. English category information is also included. The agriculture information is exchanged between the browser and the server. The data should be in the form of text. Farmer can able to grow more number of plants in their farms by using this information. Farmers need proper guidance and information to cultivate their agriculture land. Recommender System contains the details of fertilizer, soil, climate, crop rotation and genetic manipulation of crop plants. With powerful and responsive admin panel can manage web application profile information, change admin username and password. The system consists of temperature sensor, pH sensor, Humidity sensor and Moisture sensor. All this sensors can measure the corresponding weather parameters in soil. The system includes a micro-controller to process all the operations of the sensors and other peripherals. The other communication technologies like ZigBee, RF Link can make the communication nearly in the same range of Wi-Fi but they can't broadcast the information as they can only communicate peer to peer. The system has sensor devices which acts as client and sends the data to web server. For establishing a connection between the sensor network and internet, we used a Wi-Fi module as an additional communication interface controlled by the microcontroller. The criteria of connecting all the sensors to the internet is Internet of Things (IoT)[2]. The concept of connecting the electronic devices, sensors, and automobile equipment together via internet. The aim of the project is to give the suggestions based on timely information of soil to farmers by using sensors and IOT technologies.

For efficient agricultural development, reliable and timely information on crop area, crop production and land use is of great importance to planners and policy makers. Also for taking decisions on procurement, water quantity , Fertilizer selection , etc.

The remaining paper is organized as follows- Literature survey, proposed work followed by implementation details.

II. Literature Review

Till now many authors have done research on smart agriculture. D.N Suma et.al. have done research on IoT based smart agriculture. The authors have focused on GPS based remote controlled monitoring, moisture & temperature sensing, intruders scaring, security, leaf wetness and proper irrigation facilities. They used wireless

sensor networks for noting the soil properties and environmental factors continuously[1]. In [2] Gondichwar, R.S.Kowitkar have done research on irrigation with smart control and intelligent decision making based on accurate real time field data.In this paper, they have used different nodes. Every node is integration with different sensors and devices and they are interconnected to one central server via wireless communication modules. The server sends and receives information from user end using internet connectivity. There are two modes of operation of the system; auto mode and manual mode. In auto mode system takes its own decisions and controls the installed devices whereas in manual mode user can control the operations of system using android app or PC commands[2].

Divakar KM et.al. have designed a system which focuses on the measurement of physical parameters such as soil moisture content, nutrient content ,and pH of the soil that plays a vital role in farming activities[3].

III. Proposed Work

Smart agriculture recommender system is an IoT system, will be used by the farmers to gain advance information in agriculture domain. The system provides information about crops and various government schemes to farmers based on various parameters such as income, acquired land, number of family members, etc. It will be helpful for the farmers to gain crop yield by using appropriate fertilizers suggested by the system. The information is provided in English as well as in Marathi. The system can be used by the farmers using smart phones. It is possible to aware farmer about resources that helps to recover losses and provide information about the benefits of "Modern Agriculture Technology''.

The proposed system is as shown in Fig.3.1 .In this system, a Arduino microcontroller board is connected with a ESP8266 WiFi module to connect the wireless system to the Android Application. We have connected a moisture sensor and temperature sensor to detect changes in moisture and temperature .Also a motor for ON/OFF purpose .We have created a database to collect data obtained from the application.

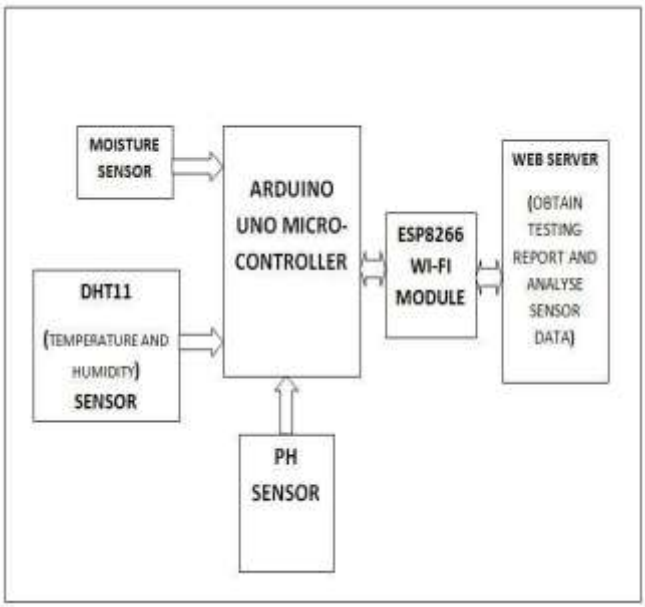

Fig.3.1:Proposed system

3.IMPLEMENTATION

For implementing our system we require following components-

- Arduino (Microcontroller) Board : For interface
- Esp8266 (wifi module): For use of internet
- DHT11 (temperature and humidity sensor) & Moisture sensor: to sense the soil parameters
- PH sensor: to find pH of soil and type of soil
- LCD Display: for output

IV. Conclusion

Thus we proposed an application that provides recommendations based on the timely information provided by the sensors as well as previous data from the database. This application is a combination of an IoT and Database Technology. With the evolution of technologies in agriculture, it is possible to predict suitable fertilizers, crop and it's duration , seeds better for efficient farming. This application will be helpful for the

farmers to enroll and to be aware about the latest government schemes and crop related suggestion. Since farmers will get the knowledge about government policies from this application, there is indirect success of government initiatives for farmers.

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