

IOT BASED AGRICULTURE MONITORING AND SMART IRRIGATION SYSTEM (CROP SUGGESTION) USING ARDUINO

Prof. Anjali Deore¹, Deshashri Kakade², Pradyumna Lokhande³, Ashwini Chavanke⁴,
Sunny Magar⁵

¹Assistant Professor, Department of Computer Engineering Sandip Institute of Technology and Research Centre, Nashik, Savitribai Phule Pune University, India

²⁻⁵BE.Student, Department of Computer Engineering Sandip Institute of Technology and Research Centre, Nashik, Savitribai Phule Pune University, India

Abstract: Agriculture is the biggest livelihood provider in India. With growing population, there is a need increasing agricultural production. For providing support for greater production in farms, the requirement for amount of fresh water used in irrigational rises. As of now according to survey agriculture accounts 83 percent of the total water Consumption in India. Unplanned use of water in results in shortage and wastage of water. Agriculture is the primary occupation in India for ages. But now people shifted from rural to urban there is lack in agriculture activity. To overcome this problem we prefer to use smart agriculture techniques using IoT. This project includes various aspects like IoT based soil monitoring, humidity sensing, moisture temperature, crop suggestion and proper irrigation facilities. It makes use of wireless sensor networks for receiving the soil properties and environmental factors continuously. Various sensor nodes are placed at different locations in the farm. Controlling these parameters with the help of remote device or internet services and the operations are performed by interfacing sensors. This concept is created keeping in mind the farmer and for welfare of farmers. So making smart Plant Irrigation System using Arduino, which automatically provides water to plants. In this System, the Soil Moisture Sensor checks the moisture level in the soil and if moisture level is low then Arduino switches on a water pump to provide water to the plant. Water pump gets automatically off when system finds enough moisture in the soil. System will also provide feature to measure the temperature and humidity of soil and suggest the crop suggestion according to the sensed value by sensor. If guest user just to know about crop suggestion then user just log in and enter the city name the system will automatic fetch the temperature and humidity of that location and systems how the crop suitable for that location. This system is very useful in Farms. This system is completely automated and there is no need for human intervention for watering the farm.

Keywords: IOT, arduino, automated irrigation, Smart Irrigation, moisture sensors, temperature & humidity sensors, Android

Introduction

Irrigation is a very important source of yield and a good alternative to the monsoon Indian agriculture. The system was developed to make use of a wireless sensor network to fetch temperature, humidity and moisture levels, and of the sensor node necessary to understand the nature of the farm and the monitoring devices.

Monitoring these factors, however, is not a complete solution for increasing the yield and saving water. There are lots of other factors that decrease productivity. Hence, automation must be done in agriculture overcome these problems. Though it has been implemented at the research level, it is not distributed to farmers as a product so they can benefit from their sources. Crop yield can be improved using automatic machinery.

There is a need to implement modern science and technology in the agricultural sector to increasing the average yield a piece of land produces. In this system, the Soil Moisture Sensor checks the moisture level in the soil and if moisture level is below a certain threshold then the Arduino switches on a water pump to provide water (moisture) to the plant. The water pump automatically turns off when system finds enough moisture in the soil. The System also measures the temperature and humidity of the soil and gives crop suggestions according to the values sensed by the sensor. If a guest user wants to know about crop suggestions then he/she can just log in and enter the city name, and the system will automatically fetch the temperature and humidity of that location show suitable crops for the area. This system is very used in Farms. This system is completely automated and there is no need for human intervention for watering the farm. Thus, this paper deals about developing smart agriculture.

Literature Review

Dr. N. Suma, Sandra Rhea Samson, S. Saranya (2017) proposed a paper in which uses technics of wireless sensor networks for noting the soil values & properties and environmental factors continuously. Various sensors are deployed at different locations in the farm. Controlling these values of parameters are through any remote device automatically or internet services are performed by interfacing sensors, Wi-Fi, camera with micro controller. This method is created as a product use to given to the farmer's welfare. V.Vinoth Kumar, R.Ramasamy (2017) proposed a paper in which the Micro controller transmits that information on the internet through a network of IoT in the form of Wi-Fi module ESP8266 that is attached to it. This develop the automated irrigation as the water pump can be switched on or off through information given to the controller and it is used to get the chlorophyll content and nitrogen content of the leaf using LDR and Laser. K.Lokesh Krishna, Wasswa Fahad Malende (2017) proposed a paper in which proposed wireless advanced robot is equipped with various sensors for measuring different environmental parameters. The main features of this novel is intelligent wireless robot is that it can execute vary us tasks such as moisture sensing, scaring birds and animals, spraying pesticides, moving forward or backward and switching ON/OFF electric motor. The proposed wireless automatic mobile robot has been tested in the fields, readings have been monitored and satisfactory results have been observed which indicate that this system is very much useful for smart agricultural systems. Prathibha S R, Anupama Hongal, Jyothi M P (2018) Internet of Things (IoT) plays a crucial role in smart agriculture. Smart farming is an wast concept, because IoT sensors capable of providing information about their agriculture fields. The paper aims making use of evolving technology i.e. IoT and smart agriculture using automation. Monitoring the environmental factors is the important factor to improve the yield of the efficient crops. The feature of this paper includes monitoring temperature and humidity in agricultural field through sensors using CC3200 single chip. Dr. SUJATHA S, PREETI KUMARI "Smart Farming using K-means Clustering and SVM Classifier in Image Processing" International Journal of Science, Engineering and Technology Research (IJSETR) Volume 6, Issue 11, November 2017, ISSN: 2278 -7798 In paper authors described image segmentation technique for plant disease detection. In image segmentation algorithm, K-means clustering algorithm is applied for separating foreground and background images. Clustering in segmentation is based on subtracting the clustered leaf images and intensity mapping for highlighting leaf area. Mrs. Krishna priya C B , Dr. S. , Dr.

S. Venkateswari "Describing of Management zones in field of agriculture using Farthest First Clustering Algorithm" International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 20 (2018) pp. 14479-14482

In this paper the Farthest first traversing algorithms are used to find the clusters of the soil. The following are the organized form of this paper. Related Work gives a brief description about the related works in the area. Source and selection methods of the input data set is explained in the paragraph Input data set .Methodology gives the description of the techniques and algorithms used in this study .Discussion of the result and analysis is explained in Result analysis. Future enhancements regarding the study is discussed in paragraph conclusion.

V. Ragavi, Jayasudha Subburaj, P. Keerthana and C. Soundaryaveni is published the paper in which Smart Agriculture use to Increase Farmers Profitability using Internet of Things Indian Journal of Science and Technology. This technology is use to improve the farmers' income through smart agriculture Hariharr C Punjab used the cloud platform named Thingspeak where data is save on hardware are uploaded On the Thingspeak, one can create a graph, from this graph it take actions and also analyzes the data. Anand Nayyar have implemented the Smart Sensor Agriculture Stick in the real-time situation and have used cloud computing to get all the data.

Methodology

In the field section, various sensors are deployed in the field like temperature sensor, moisture sensor, water motor and humidity sensor. The data collected from these sensors are connected to the Arduino UNO. The received data is verified with the threshold values. It checks if moisture level is low then Arduino switches on a water pump to provide water to the plant automatically. Water pump gets automatically off when system finds sufficient moisture in the soil. Updating the level of water and soil moisture. An irrigation system for efficient water management and crops suggestion according to temperature, humidity and moisture level which is sensed by Implemented sensors. Parameters like moisture, temperature, humidity are measured by using different sensors. In present, is added which is a platform to control the Arduino that supports hardware platform. Monitoring the temperature, humidity and moisture level by using sensor and sending the status to the webpage via Comodule. Watering will be done automatically by predefined time delay.

- *Admin:* Admin can add user devise with unique id also update and delete user devise. Admin can also add the crop suggestion according to range, temperature, humidity.
- *Farmer:* Farmer can firstly register itself and then get log in to the system. Farmer can view his farms sensor values any time. Water motor can be automatically on/off according to moisture level of the farm which is sensed by the moisture sensor. The registered farmer also view the crop suggestion according to the temperature and humidity. The smart agriculture system is a web application in which the guest farmer also want to know about crop suggestion. He just login itself on this system and enter the city or location of farm. The system will auto calculate the temperature and humidity of that location and give suggestion of crop which is better for that temperature. According to this the guest farmer's also know his future crop.

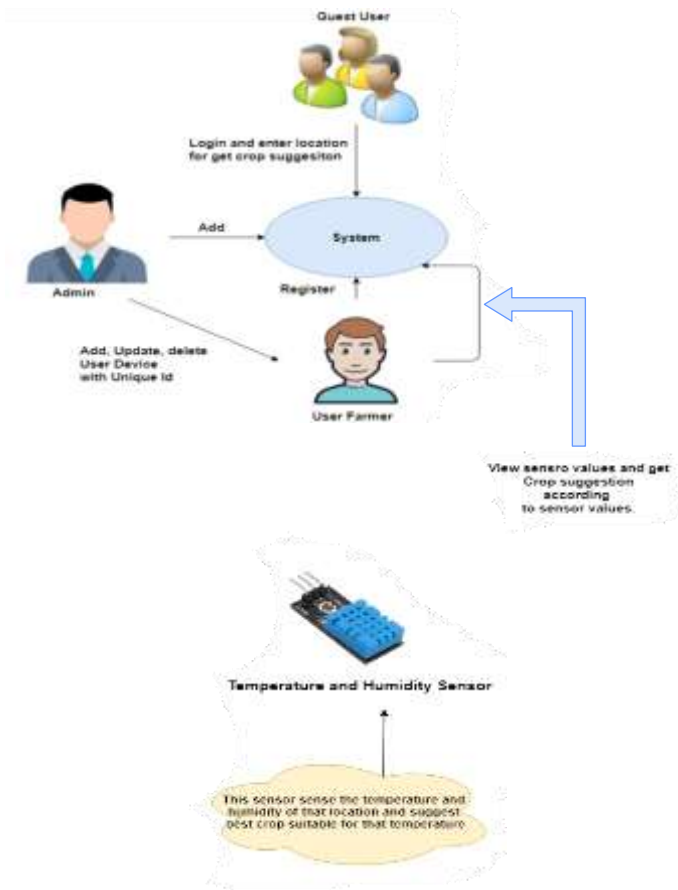
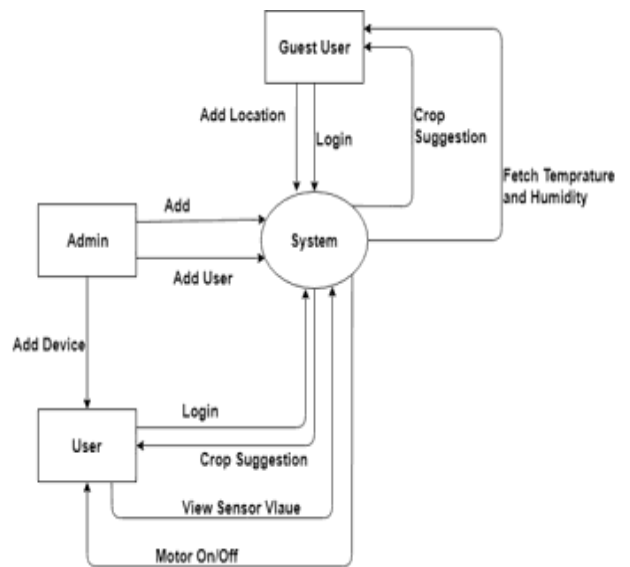


Fig 2. Data flow Diagram



DATA FLOW DIAGRAM

A data flow diagram (DFD) is a graphical representation of the flow of data through an information system, modeling its process aspects. A DFD is open used as a preliminary step to create an overview of the system, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design). ADF show what kind of information will be input to and output from the system, where the data will come from and go to, and where the data will be stored. It does not show information about the timing of processes, or information about whether processes will operate in sequence or in parallel. Data flow diagram (DFD) is also called as Bubble Chart is a graphical technique, which is used to represent information flow, and transformers those are applied when data moves from input to output. DFD represent system requirements clearly and identify transformers those becomes programs in design. DFD may further partitioned into different levels to show detailed information of e.g. level 0, level 1 etc. In Proposed system, it is the web application in which we have various module and their work given below:

CONCLUSION

'Internet of Things' is a system of interrelated computing devices. This agriculture monitoring system serves as a reliable and efficient system and corrective action can be taken. Wireless monitoring of field reduces the human power and increase the yield of crop. It is cheaper in cost and consumes less power. The smart agriculture system has been well designed and synthesized. The developed system is more efficient and beneficial for farmers. It gives the information about the temperature, humidity of the air in agricultural field to the farmer. The application of such system in the field can definitely help to advance the harvest of the crops and global production. In future this system can be improved by adding several modern techniques like irrigation method, solar power source usage .For future improvement it can be developed this system for large area of land. Also the system can be integrated to check the quality of the soil with the help of sensor and give proper

suggestion regarding crop. The sensors and micro controller are successfully interfaced and wireless communication is achieved between various nodes. All research and experimental tests prove that this project is a complete solution to field activities and irrigation problems. Implementation of such a system in the field can definitely help to improve the yield of the crops and overcome the problem.

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