A Review On IOT Based Smart Agriculture For Sugarcane

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Abstract - Agriculture is practiced on a large scale in India and its contribution is also maximum in the Indian economy.The traditional farming practices like dependency on monsoon, poor infrastructure and less usage of technology has affected agricultural sector. In this paper we have proposed IOT based smart agriculture for sugarcane. Here soil and environment properties are sensed and periodically sent to agro-cloud through IOT. Agro-cloud storage is used to store continuously the details of soil and environmental parameters sensors data.Analysis on the agro-cloud data is done for fertilizer requirements. This model will help the farmer to take right decision is taken at right time and increase his yeild.

Index Terms - Cloud, IOT, Smart agricultural system, Wi-Fi, WSN.

I. INTRODUCTION

India has agriculture as its primary and main occupation. As per IBEF (Indian Brand Equity Foundation), 58% of people that are living in rural areas in India are dependent on agriculture. According to Central Statistics Office, agriculture contributes roughly and around 8% to the Gross Value Addition which is very significant contribution. Under such a situation lot of fresh water is used by agriculture uses 85% of available fresh water resources worldwide and this percentage will continue to dominate because of population growth and increased food demand.The evolving problem of global water crisis: The available fresh water is getting contaminated due to man-made activities like mixing of industrial waste with rivers etc. can harm the aquatic life.The system consists of microcontroller and sensors like soil ph sensor, soil moisture sensor, soil temperature sensor, air temperature and humidity sensor.Here IOT based smart agriculture system is proposed.The intention for approaching smart agriculture is to increase its agricultural productivity and its incomes. In the proposed system we are going to monitor real time parameters of soil and environment through various soil and environmental monitoring sensors. The data from these sensors are periodically sent to agro-cloud through IOT. Agro-cloud stores the details of these sensors and analysis is done on the stored agro-cloud data for proper management of fertilizer requirements etc. This model is useful to increase agricultural production.

II. LITERATURE SURVEY

In [1] authors have proposed a system in which soil and environmental properties are sensed and periodically sent to agro-cloud through IOT (Beagle black bone). Big data analysis is done for fertilizer requirements and best crop sequence analysis can be done. In [2] authors have studied and reviewed sensor technology and wireless network integration of IOT technology based on actual situation of agricultural system . They have proposed remote monitoring system and they have collected real time data of agricultural production and sms will be sent to the farmer and advises on weather pattern can be given.In [3] authors have proposed a system which monitors the environmental status and this is sent to agricultural monitoring server then the server sends data to user. The user analyse the data is below the specified value then necessary action will be taken.In [4] authors have proposed a system in which supply of water is needed when the farm is dry without human presence and thus avoiding water wastage in irrigation process. It also monitors the soil parameters like temperature, humidity and soil moisture level and helps to control remotely different operations of the field from anywhere anytime by mobile as well as web application.In [5] authors have published a paper which confers study of weather station and mobile data logging type monitoring. It's an application which consists of hardware through which a farmer can monitor and as well as control certain parameters of field. They also gave information regarding multi-devices, communication protocol, sensors and system which are used to monitor smart farming and algorithm used for such purposes.In [6] authors have proposed a system in which farmer can monitor and control all activities which are necessary during farming and be advised 24*7 from pre-farming to post-farming through mobile device. In [7] authors have proposed a low cost and low power IOT network for smart agriculture For monitoring soil moisture content use of an in house developed sensor is done. In [8] authors have developed a system which can monitor temperature, humidity, moisture and also movement of animals which may destroy the crops through sensors using Arduino board and SMS will be sent to the farmer. In [9] based on the information sent by the sensors authors have proposed a system which can estimate the quantity of water needed. For this two sensors are used for getting data to the base station and then it calculates the water quantity which is required for irrigation. In [10] For doing automation of various agriculture tasks, a GSM based smart agriculture system is proposed. Here automation is proposed by smart irrigator that moves on mechanical bridge slider arrangement. Through GSM module the smart irrigator receives signal from smart farm sensing system and sensed data is transferred to irrigator system to perform automatic actions.In [11] Intelligent farming system is proposed which consists of two parts namely sensor part and control part. Here focus is on control part which has two main subsystems they are watching and roofing subsystems. The system uses statistical data from

sensors and then Kalman filtering theory is applied so that data becomes more accurate. For outdoor farming we consider both the sensed data and weather information. For predicting weather condition a set of decision tree model is developed which helps in making automatic decision on weather watering and roofing systems should be on or off.

III. PROPOSED SYSTEM

As per the system mentioned in Figure 1 we have to monitor real time parameters of soil and environment like soil temperature, soil moisture, soil ph, air temperature and humidity (measuring physical parameters of soil and environment) for sugarcane. Here we are using different sensors like soil temperature sensor: which will measure the temperature of the soil, soil moisture sensor: which will measure water content in the soil, soil ph sensor: to check the nature of the nature of soil as like is it acidic or basic in nature, air temperature and humidity sensor, reset circuit, clock circuit and power supply is also provided to the microcontroller. Sensors give output in the form of electrical parameter we have to convert it into unit; temperature sensor's output should be in degree celcius therefore we have to do programming on microcontroller. The processed data is displayed on LCD display and this data is given to ESP8266 Wi-Fi module. Soil and environment properties are periodically sensed and sent to cloud. Cloud stores the details of periodic soil properties of farm and current environmental conditions .Further analysis on cloud data is done by IOT based system which helps in providing advice of proper fertilizer requirements. On the of basis analysis of real time data of soil and environment the farmer will get advice about what should he do now on analyzing real time data of soil and environment through sms which helps him to take right decisions at right time.

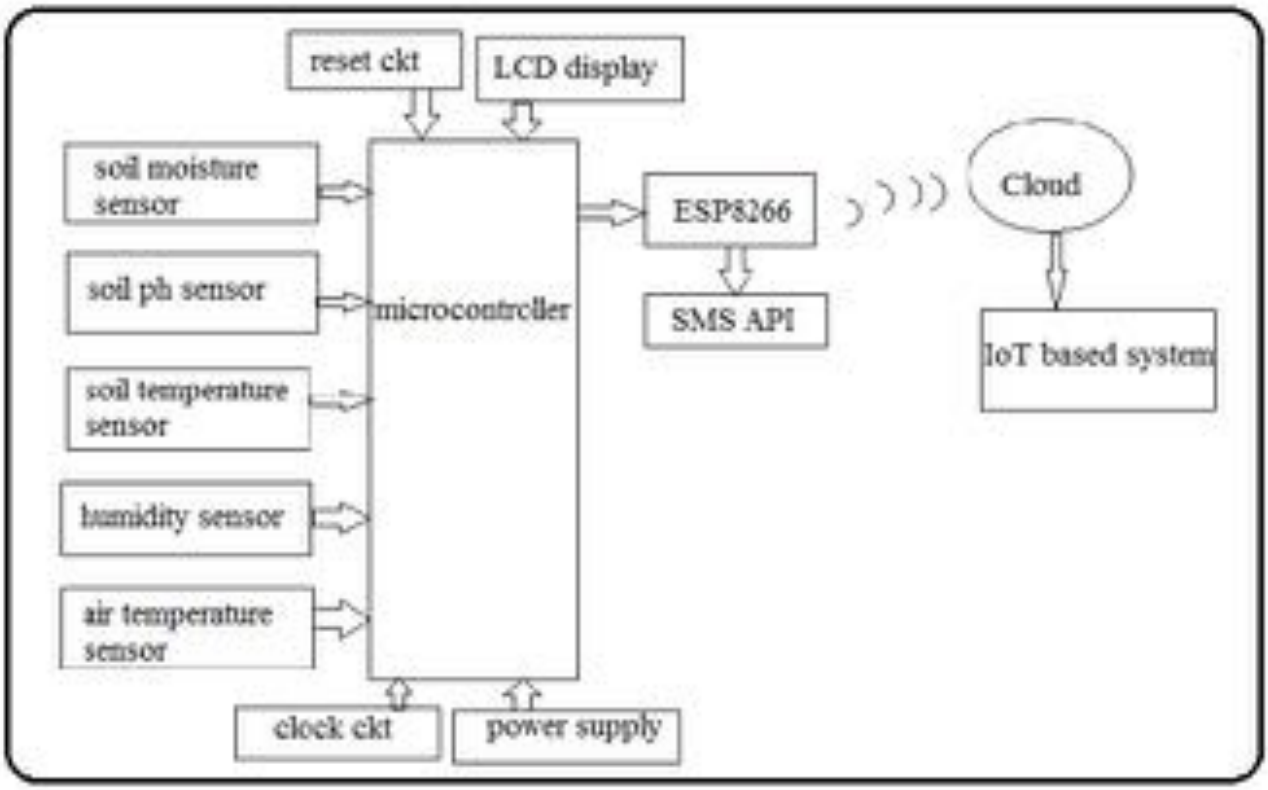

Fig. 1. Block diagram of Proposed System

IV. CONCLUSION

IOT based smart agriculture system proves to be helpful for farmers as over usage of fertilizer and as well as less irrigation is not good for agriculture. Threshold values for climatic conditions like humidity, temperature, moisture can be fixed on the basis of environmental conditions of that particular region. Through real time sampling of soil and environmental parameters, farmers will be able to get to know about current fertilizer requirements or adequate water requirement for the crop. Thus, this is an essential requirement towards agricultural sector in India to get improved crop production with reduction in cost of fertilizer requirements keeping soil health intact.

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