A Review on E- Health Agricultural Monitoring System through WSN

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Abstract:- In a country like India, the agriculture plays an important role in the economy and development of the country as about 60% of the population is indulged in agriculture. Agriculture is one of the fields where water is required in tremendous quantity. The water level required by each soil type varies tremendously. The improper maintenance of water in agriculture leads to water scarcity. The farmers working in the farm lands are solely dependent on the rain, river and bore wells for irrigation of the land. Along with that scorching summers threatens our planet every year, our farmers are unable to cultivate our traditional crops at their suitable seasons.. Temperature dependence of crop depends on whether that crop belong to "wet harvesting crops" or "dry harvesting crops". Wet harvesting crops are those crops which depends on temperature or season, also they can be grown throughout the year. Hence with change in temperature, their water requirement changes Soil water level can be manipulated and accordingly irrigation can be done which can save a huge water that applied in the field in surplus amount. This research focuses on the design of a prototype using WSN to provide complete automation for the irrigation proces In this modern era of agriculture the farm lands have water-pumps, drip irrigation system, but also manual controlling by farmers is required to turn the pump on/off whenever needed. The process can be turned to so simple if the whole irrigation process can be controlled automatically. Irrigation depends on a large number of factors. But here few of them have been considered. They are

- PH level
- Soil moisture
- Temperature
- Soil type

Keywords— Soil Moisture sensor, Ph sensor, Salinity sensor, arduino, wsn, power supply

Literature Survey

K. A. Patil et al. (2017) proposed that climate changes and rainfall has been erratic over the past decade. Due to this in recent era, climate-smart methods called as smart agriculture is adopted by many Indian farmers. Smart agriculture is an automated and directed information technology implemented with the IOT (Internet of Things). IOT is developing rapidly and widely applied in all wireless environments. In this paper, sensor technology and wireless networks integration of IOT technology has been studied and reviewed based on the actual situation of agricultural system. A combined approach with internet and wireless communications, Remote Monitoring System (RMS) is proposed. Major objective is to collect real time data of agriculture production environment that provides easy access for agricultural facilities such as alerts through Short Massaging Service (SMS) and advices on weather pattern, crops etc.

Meonghun Lee et al. (2013) this paper presents the IoT-based agricultural production system for stabilizing supply and demand of agricultural products while developing the environment sensors and prediction system for the growth and production amount of crops by gathering its environmental information. Currently, the demand by consumption of agricultural products could be predicted quantitatively, however, the variation of harvest and production by the change of farm's cultivated area, weather change, disease and insect damage etc. could not be predicted, so that the supply and demand of agricultural products has not been controlled properly.

R. Nageswara Rao et al. (2018) Agriculture plays vital role in the development of agricultural country like India. Issues concerning agriculture have been always hindering the development of the country. The only solution to this problem is smart agriculture by modernizing the current traditional methods of agriculture. Hence the proposed method aims at making agriculture smart using automation and IoT technologies. Internet of Things (IoT) enables various applications crop growth monitoring and selection, irrigation decision support, etc. A Raspberry Pi based automatic irrigation IOT system is proposed to modernization and improves productivity of the crop. Main aim of this work to crop development at low quantity water consumption, In order to focus on water available to the plants at the required time, for that purpose most of the farmers waste lot time in the fields. An efficient management of water should be developed and the system circuit complexity to be reduced. The proposed system developed on the information sent from the sensors and estimate the quantity of water needed. A two sensors are used to get the data to the base station the humidity and the temperature of the soil, the humidity, the temperature, and the duration of sunshine per day. The proposed systems based on these values and calculate the water quantity for irrigation is required. The major advantage the system is implementing of

Precision Agriculture (PA) with cloud computing, that will optimize the usage of water fertilizers while maximizing the yield of the crops and also will help in analyzing the weather conditions of the field.

Divya J. et al. (2017) Agriculture plays the major role in economics and survival of people in India. The purpose of this project is to provide embedded based system for soil monitoring and irrigation to reduce the manual monitoring of the field and get the information via mobile application. The system is proposed to help the farmers to increase the agricultural production. The soil is tested using various sensors such as pH sensor, temperature sensor, and humidity sensor. Based on the result, the farmers can cultivate the appropriate crop that suits the soil. The obtained sensor values are sent to the field manager through the Wi-Fi router and the crop suggestion is made through the mobile application. Automatic irrigation system is carried out when the soil temperature is high. Crop image is captured and it is sent to the field manager to suggest pesticides.

Wang Ke Qiang and Cai Ken (2010) -Through the Internet of Things technology embedded technology neural networks image processing and information management technology to integrate develop monitoring and warning system of field information collection. One of the features of the system is the use of Internet of things to make intelligent individual monitoring sites, mainly in the monitoring sites on the implanted sensor network node, using wireless communication networks and Internet networks are connected with each other and use the information collected field data to establish agricuIture hazard warning model, the corresponding decision support program.

Suhas Athani et al. (2017) Suitable soil water amount is an obligatory condition for ideal plant growth. Also, water being a crucial element for life nourishment, there is the prerequisite to circumvent its excessive use. Irrigation is a supreme consumer of water. This calls for the need to control water supply for irrigation purposes. Pasture should neither be over-irrigated nor under-irrigated. Soil Monitoring is one tool to provide soil information. Over time, systems have been applied so as to approach register this aim of which computerized procedure are the most accepted as they permit data to be gathered at high persistence with less work demand. Size of the current structure engage micro-processor based systems. These systems provide several technological supremacy but are high-priced, large, hard to sustain and less welcomed by the technologically untrained operators in the pastoral scheme. The objective of this project is to outline a manageable, facile to install technique to detect and specify the level of soil moisture that is endlessly managed with a view to attain pinnacle plant growth and concomitantly augment the obtainable irrigation resources. In this project we use the information obtained from the input sensors which is handled using the neural networks algorithm and correction factors for monitoring. Soil monitoring, providing a series of assessments showing how soil conditions and/or properties change over time. The use of simple obtainable components decreases the manufacturing and maintenance costs. This makes this system more economical, appropriate and a low maintenance solution for applications, mainly in rural areas and for small scale agriculturists.

Ramya Venkatesan and Anandhi Tamilvanan (2017) The Internet of Things (IoT) is an element of worldwide data that comprise of web associated items, or things implanted with gadgets, software, sensors and also different instruments which are becoming an integral component of future internet. This work developed a system which will automatically monitor the agricultural field as well as performing live video streaming for monitoring the Agriculture field from the server itself, through raspberry pi camera. The agriculture fields are monitored for environmental temperature, humidity and soil moisture. The automatic irrigation will be performed based on the set points of the temperature, humidity and soil moisture sensor. The data collected from the field are monitored in IoT, the data are then processed and necessary information is passed through the field owners for counter measures.

Prathibha S et al. (2017) proposed that Internet of Things (IoT) plays a crucial role in smart agriculture. Smart farming is an emerging 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 environmental factors is the major 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. Camera is interfaced with CC3200 to capture images and send that pictures through MMS to farmers mobile using Wi-Fi.

Zhaochan Li et al. (2017) In this paper a smart system of greenhouse management based on the Internet of Things is proposed using sensor networks and web-based technologies. The system consists of sensor networks and asoftware control system. The sensor network consists of the master control center and various sensors using Zigbee protocols. The hardware control center communicates with a middleware system via serial network interface converters. The middleware communicates with a hardware network using an underlying interface and it also communicates with a websystem using an upper interface. The top web system provides users with an interface to view and manage the hardware facilities; administrators can thus view the status of agricultural greenhouses and issue commands to the sensors through this system in order to remotely manage the temperature, humidity and irrigation in the greenhouses.

Yu Gu Beijing et al. (2011) —Based on the introduction of supply chain management of fresh agricultural products and the internet of things (IOT), this paper proposes three specific applications of IOT in fresh agricultural products supply chain

management, namely perfecting the monitor of the fresh agricultural products, quality to control the food security sources strictly, building management information system of fresh agricultural products based on IOT to increase supply chain integration level, and reducing supply chain management costs to improve supply chain efficiency.

S. RAJESWARI et al. (2017) Nowadays, the traditional database paradigm does not have enough storage for the data produced by Internet of Things (IoT) devices leads to the need of cloud storage. These data's are analyzed with the help of Big Data mining techniques. Cloud based big data analytics and the IoT technology performs an important role in the feasibility study of smart agriculture. Smart or precision agricultural systems are estimated to play an essential role in improving agriculture activities. Mobile device usage is very common by everyone, including the farmers. In that, in the daily life of farmers the Information and Communication Technologies (ICT) play a vital role to get the agricultural Information. The IoT has various applications in Digital Agriculture domain like monitoring the crop growth, selection of the fertilizer, irrigation decision support system, etc. In this paper, IoT device is used to sense the agricultural data and it is stored into the Cloud database. Cloud based Big data analysis is used to analyze the data viz. fertilizer requirements, analysis the crops, market and stock requirements for the crop. Then the prediction is performed based on data mining technique which information reaches the farmer via mobile app. Our ultimate aim is to increase the crop production and control the agricultural cost of the products using this predicted information.

Mr.O.Pandithurai et al. (2017) The various advancements made in numerous domains using new technologies are seen in many real time applications. Yet, the application of these technologies involved in the field of agriculture still remains a challenging task. The main aim of this paper is to propose a wireless sensor network technology in agronomy, which can show the path to the rural farming community to enhance some of the traditional techniques. This paper proposes an IOT application named 'AGRO-TECH ' that will be used to record, store and update the activities of various sensors which is accessible by farmers to keep track of his field details in terms of soil and crop monitoring. The activities such as soil moisture, level of ph., temperature, humidity, light dependent resistance, water level are monitored and observed by different types of sensors that are included in the proposed system. These sensors collectively combine the information that analyses to increase the yield of crop production. Based on the threshold value of soil moisture sensor the sensor relay triggers either the motor or the irrigation sprinkler to mitigate the impact of water scarcity by the monitoring of water level sensor in the tank and also the temperature sensor. Thus essential information about soil, crop and other environmental factors will be sent and updated to farmers through our proposed system methodology.

Shylaja S.N. et al. (2017)The agricultural yield primarily depends on soil fertility, the moisture level of soil and use of appropriate fertilisers. In the current scenario, the manual method of measuring the soil nutrients is less accurate because of the time difference of soil sample collected at the field and when it is measured in a laboratory. It becomes necessary to create a smarter agriculture practice through Internet of Things(IoT) to address this challenge. Soil nutrient analysis using wireless sensor networks (WSN) enables various application like remote monitoring of soil fertility, analysis, provide a selection of crop and build irrigation decision support systems. In the proposed system, the wireless sensors measure the macro nutrient of soil and transmit the data to the cloud. The user can view the soil fertility at the convenience on their mobile application. It is possible that the farmer may wish to grow a specific crop based on the economic interest. The software system has the intelligence to recommend the fertiliser that is required to be used to suit the needs of the desired crop, thus improving the quality of the soil and in turn, increase the yield. Overall, the proposed system helps farmers to gather real-time information about various soils, their fertility level, suggest crops and fertilisers at the convenience of the mobile app. Finally, this project effort will help farmers to make the right decision, gain better yield and economic advantage.

Monica M. et al. (2017) —India has a population of more than a billion and its requirement for water increases each year as the demand for food increases hence management of water resources to sustain this massive population is of high importance. The agricultural sector, an important sector of our economy accounts for a good percentage of our nation's GDP and of the exports. With advancement in technology we can establish a system that automates the irrigation process such that there is efficient usage of water and create an ease of work load for the farmers. With embedded technology and Internet of Things, in this work we have designed IoT based automated irrigation system for the Indian scenario. Our system is able to deliver optimal water to the plants based on moisture, light and temperature levels which are obtained through sensors. The farmer will be able to monitor the parameters through the mobile app which is integrated with cloud storage. By analyzing and comparing previous year's data and our current data we are able to efficiently find a way to save water.

Sanbo Li (2012) Our country is one of the scarce water resources in 13 countries in the world, hortage of water resources as well as the low utilization of water resources restricts our country economy developing sustainably .In order to effectively reduce the impact of inadequate water resources on China's economy, from modern agricultural cultivation and management perspective, according to the basic principles of Internet, with wireless sensor technology, this article proposes precision agriculture irrigation systems based on the internet of things (IOT) technology, and focuses on the

hardware architecture, network architecture and software process control of the precision irrigation system. Preliminary tests showed this system.is rational and practical.

Conclusion

In the proposed work WSN is used together to provide complete automation to the irrigation process. Sensor module includes Soil moisture sensor, temperature sensor and rainfall sensor. Selection of fields and the soil is done using WSN. Once the data is fed to the system the system follows the same configuration to water the soil. Water level of soil is maintained by switching on/off of pumps. Instead of calculating water requirement by different soils, the value obtained by the researchers in their researches is directly taken as threshold value for this prototype. The main aim of this prototype is to continuously monitor soil water level and irrigate the fields in proper duration with the exact required amount of water. Water requirement of soil varies with the type of soil. WSN is used to automatically water the soil in the required quantity.

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