

Smart Agriculture: An Iot Based agriculture by Introducing Energy Harvesting

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ABSTRACT: Internet of Things is the most effective area of research where sensor nodes and smart devices can collect the information from different sources and communicate it with the server without human involvement. These sensor nodes are distributed randomly in the specified area for collecting and sensing the information. This network nowadays is effectively used for advanced agriculture monitoring and managing many applications automatically through the technology. These sensor nodes will charge by solar energy and are used to monitor the crop management, water management, and climate monitoring. In this paper an IoT based wired sensor system is proposed which uses the concept of energy harvesting in the area of agriculture for developing, monitoring and controlling the growth and productivity of the system.

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

I. INTRODUCTION

Agriculture is major source of income for the large population in India and is a major contributor for Indian economy. In the past decade it is observed that there is no much crop development in the agriculture sector. Food prices are continuously increasing because the yield rate has declined. There are a number of factors which are responsible for this; it may be due to water waste, low soil fertility, Fertilizer abuse, climate change or diseases etc. It is very essential to make effective intervention in agriculture and the solution is IoT integration with wireless sensor networks (WSN). Internet of things (IoT) is a method of connecting everything to the internet - it is connecting objects or things (such as cars, home, electronic devices, etc...) which are previously not connected with each other. Main purpose of IoT is ensuring delivery of the right information to

right people at right time. In agriculture irrigation is the important factor as the monsoon rainfall is unpredictable and uncertain.

II. LITERATURE SURVEY

An IoT based crop field monitoring and irrigation automation system is explained to monitor a crop field. A system is developed by using sensors and according to the decision from a server based on sensed data, the irrigation system is automated. By using wireless transmission the sensed data is forwarded towards the web server database. If the irrigation is automated then that means if the moisture and temperature of the fields fall below the potential range. The user can monitor and control the system remotely with the help of an application which provides a web interface to the user. [1]

Prof. K. A. Patil and Prof. N. R. Kale proposed a wise agricultural model for irrigation with ICT (Information Communication Technology). The complete real-time and historical environment is expected to help in achieving efficient management and utilization of resources. [2]

IoT based Smart Agriculture Monitoring System develops various features like GPS based remote controlled monitoring, moisture and temperature sensing, intrusion, security, leaf wetness and proper irrigation facilities. [3]

Mahammad Shareef Mekala, Dr. P. Viswanath demonstrated some typical applications of Agriculture IoT Sensor Monitoring Network Technologies using Cloud computing as the backbone. [4]

III. OBJECTIVES

Agriculture is the basic source of livelihood for people in India. It plays a major role for the economy of the country.

But now a day due to many factors the productivity decreased to a great extent. Hence automation must be implemented in agriculture to overcome these problems. An automatic irrigation system thereby saving time, money and power of farmers. So to overcome this problem we go for smart agriculture techniques using IoT.

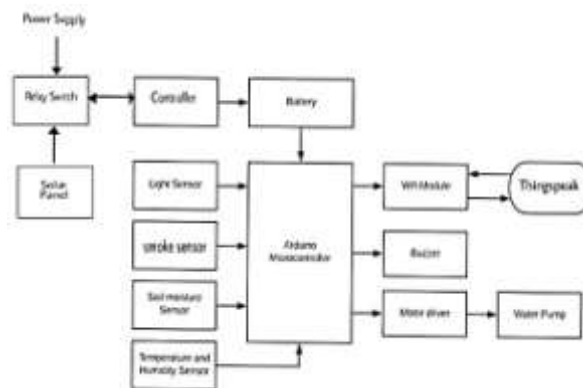
The main objective of this dissertation work is, to design a smart agriculture system which will help to reduce man power. With the automated technology of irrigation, the human intervention can be minimized. Continuous sensing and monitoring of crops by convergence of sensors with Internet of things (IoT) and making farmers aware about crops growth, harvest time periodically and in turn making high productivity of crops and also ensuring correct delivery of products to end consumers at the right place and right time. It is very simple and easy to operate. An unskilled labour can also operate this safely and efficiently. Hence harvesting any crops and maintaining them will not be a difficult task anymore with the use of this technology. By using this system it will reduce the work pressure on farmers and help to improve the overall yield.

IV. METHODOLOGY

Smart agriculture includes the latest technologies in order to improve the production ratio and also the quality of production. Here energy harvesting using solar power is used to minimize the system energy. Different sensors are placed throughout the land to collect relative information like soil moisture value, temperature monitoring, light monitoring etc. and transfer this information to ThingSpeak cloud. With the help of IoT technologies farmer can receive all useful information on the system and monitor all applications in one touch.

These sensors are well designed for sensing the movements or any differences if occurred. Different sensors are capable of different tasks for example temperature sensors can observe the all temperature regarding parameters, soil moisture sensor can sense the availability of moisture in soil. Since solar is not available throughout the year especially during rainy season, a hybrid combination of solar with electric power supply is being used. Through this work farmer can easily monitor the performance of agriculture. It totally reduces the human efforts and possibilities of errors. This flowchart shows the step by step working of the system for better understanding the concept of the proposed work.

Fig: 1 Block Diagram



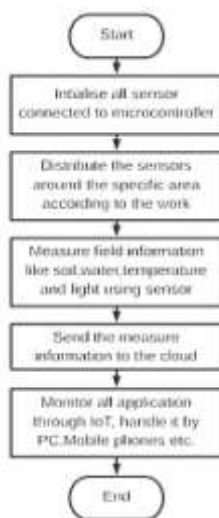


Fig: 2Flow Diagram

V.EXPECTED OUTCOMES

Sensors data received from the field is compared with already fixed threshold values. Based on the data sensed by the soil moisture sensor, motor will be switched ON automatically if the soil moisture value falls below the threshold value and vice-versa. Hence there is no need of manpower to turn the motor ON and OFF. Buzzer will beep if there is any smoke or rise in the atmospheric temperature, for which the data is obtained from the CO₂ sensor and temperature sensor.

Through this IoT based smart agriculture farmers would be able to smear the right amount of water at the right time by automatic irrigation. Avoiding irrigation at the wrong time of day reduces runoff from overwatering saturated soils which will improve crop performance. It is a precise method for irrigation and a valuable tool for accurate soil moisture control in highly specialized greenhouse vegetable production.

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