IOT BASED SMART AGRICULTURE MONITORING AND COMTROL SYSTEM

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Abstract:

The Major developing advancement technology in upcoming future is Internet of Things, commonly known as IOT is a promising area in technology that is growing day by day. Agriculture plays vital role in the development of agricultural country. In India about 80% of population depends up on farming and one third of the nation's capital comes from farming. The problems based on agriculture have been always hindering the development of the country. The highlighting features of this project includes wireless network sensors to connect multiple sensors data and to display big-data through Thing speak channel software to perform tasks like weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance. The development includes smart irrigation with smart control and intelligent decision making based on accurate real time field data. Which also includes temperature maintenance, humidity maintenance and weather reports. Controlling of all these operations will be through any smart mobile or computer connected to Internet and the operations will be performed by interfacing sensors. The data can be completely updated faster when compared to other wireless computing.

Keywords: Internet of Things, Wireless sensor Networks, Micro keel version, Thing speak, Big data collection, cloud computing.

INTRODUCTION

Agriculture is the unquestionably major process provider in India. With rising population, there is a need for increased agricultural production. In order to support greater production in farms, the requirement of the amount of fresh water used in irrigation also rises. Currently, agriculture accounts 93% of the total water consumption in India. Unplanned use of water continuously results in wastage of water. This suggests that there is an urgent need to develop systems that prevent water wastage without imposing pressure on farmers. Agriculture is considered as the basis of life for the human species as it is the main source of food grains and other raw materials. It plays vital role in the growth of country's economy. It also provides large ample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, many farmers still use the traditional methods of farming which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. Farmers could be able to smear the right amount of water at the right time by irrigation. Avoiding irrigation at the wrong time of day, reduce run off from overwatering saturated soils which will improve crop performance. The available traditional methods of irrigation are drip irrigation, ditch irrigation, sprinkler system. This problem can be easily rectified by making use of the automated system rather than the traditional systems. The current irrigation methodology adopted employ uniform water distribution which is not optimal. The client and server

programming condition which could improve the data over big data collection` Large number of entries could be over seen with online portal services. In addition to the standalone monitoring station, Wireless Sensor based monitoring system been developed which is composed of number of wireless sensor nodes and a gateway. This system here provides a unique, wireless and easy solution with better spatial and temporal resolutions. This could also include the farm security from animals attack without injuring the animals like in manual method.

Motion detector is used to sense the temperature of the animals and to be thrown away from farm land. The farmer is notified about the decision whether to irrigate or not through a either a web app or mobile app which is developed using WEB. Based on the decision received from the machine learning process, The farmer can trigger the irrigation process through his mobile phone .same is also provided through a web interface.

LITERATURE SURVEY

The older method and one of the oldest ways in agriculture is the manual method of checking the parameters. In this method the farmers only by themselves verify all the parameters and calculate the readings that's why to overcome this stress and relief from stress, It focuses on developing devices and tools to manage, display and alert the users using the advantages of a wireless sensor network method. It aims at making agriculture smart and modern using automation and IoT technologies. It provides a low cost and effective wireless sensor network technique to acquire the soil moisture and temperature from various location of farm and as per the need of crop controller to take the decision whether the irrigation is enabled or not. It proposes an idea about how automated irrigation system was developed to optimize water use for agricultural crops. In addition, a gateway unit handles sensor information. The atmospheric conditions are monitored and controlled online by using Ethernet IEEE 802.3.It is designed for IoT based monitoring system to analyze crop environment and the method to improve the efficiency of decision making by analyzing harvest statistics. The source of power can be powered by photovoltaic

panels and can have a duplex communication link based on a cellular-Internet interface that allows data inspection and irrigation scheduling to be programmed through a web page .Various techniques agricultural applications like seed sowing, sloughing, water irrigation, crop cutting and etc. like this several operations were done with IOT. Various companies in INDIA and globally have been proposed in using micro controller based controllers for various have come with novel solutions using automated systems for various application with specific individually (www.smartagriculture.com). Most work carried out in literature and organizations have their inherent advantages and disadvantages. These manufacturers do not have multiple agricultural applications integrated in a single hardware. To eradicate such errors or disadvantages we are introducing a multi functional design using wireless sensor networks. The system was based upon an automated irrigation system by using mainly a soil moisture sensor and an Android smart phone. With this system, people can have a better control on their irrigation time and can also save water. In this prototype, different soil samples and crops for calibration at various moisture levels was tested. However, to improve this analysis, various soil samples from different places could have been tested and also during different weather conditions. Apart from soil moisture, other factors of the soil could have also been monitored. The cloud computing that could improve the advanced technologies using big data collection through the fast updates of data's through online entries. In an updated wireless network sensor system, the data that could be updated through faster applications.

PROPOSEDSYSTEM

The system is a combination of hardware and software components. The hardware part consists of programming microcontroller AT-mega328 which could connect the other sensors to collect the data. Solar panel which act as an renewable source of energy that is to be connected as an rechargeable power source to save the power. The moisture sensor that could recover the dry or wet condition of the soil and thereby the intimation could be sent to the farmers through web browser or GSM module. Then the centrifugal pump could be turned

ON/OFF by the farmers from anywhere or anyplace through the online channel creation using Thing speak. Thing speak is the webpage designed using PHP. The webpage is hosted online and consists of a database in which readings from sensors are inserted using the hardware. soil moisture sensors along with LM38 comparator modules were placed in different soil conditions for analysis. It reads the moisture content around it. A current is passed across the electrodes through the soil and the resistance to is made the current in the soil determines the soil moisture. If the soil has more water resistance will be low and thus more current will pass through. An Intelligent IOT Based Automated Agriculture has been proposed so as to reduce the wastage of water and security to the crops. The system mainly monitors the behavior of soil moisture, air humidity, air temperature and secures the crops from animal attack and sees how it contributes to evaluate the needs of water in a plant. The data is taken from the sensors and is transferred through internet to the mobile application or web app and water pump turn ON/OFF using web app
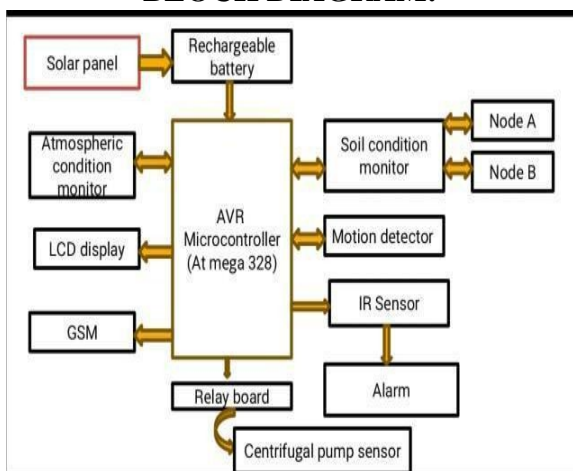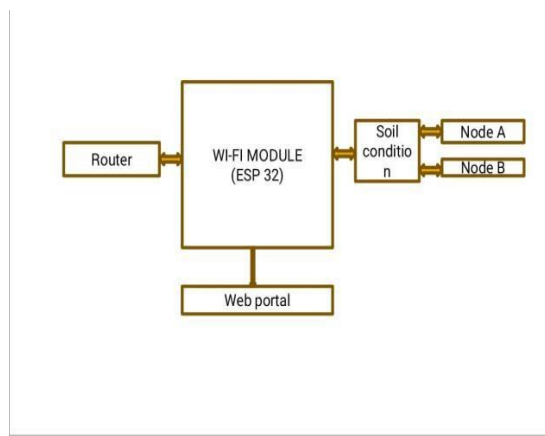
BLOCK DIAGRAM:

Fig. HARDWARE S ECTION

Which also includes temperature maintenance, humidity maintenance and weather reports. Controlling of all these operations will be through any smart phone will be performed by interfacing sensors. The WI-FI module that could be interconnected with the moisture sensor at various nodes of node A and node B. This collects the data continuously and to be entered through online portal using thing speak software. The major advantage of this method is secured

and maintained complete data for farmers convenience.

Fig , Block diagram of WI-FI section

Fig. ANIMAL ATTACK

MOTION DETECTOR: It will detect the thermal heat from animals body .GSM communication can be used to send immediate notification to farmer Alarm sounds can be activated.

DESCRIPTION: The AT-mega 328 is a low-power, high performance CMOS 28-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with industry standard 80C51 instruction set and pin out. The Flash over on-chip allows the program memory to be reprogrammed in-system or by conventional non-volatile memory programmer. By combining a versatile 28-bit CPU with in-system programmable flash on a monolithic chip, the Atmel 328 is a powerful microcontroller which provides a highly flexible and cost effective solution to many embedded

control applications. The analog to digital converter with 10 outputs has been connected to microcontroller which converts the analog data into digital format. The GSM sim 800 module along with WI-FI interconnect module that could store the data and send the information to the login channel to the farmers. In case of failure of the network connectivity immediately the GSM performs its operation by sending message to the farmers registered number. The combination of both i from the farm land internet and GSM could be performed based on its access and design over the data collection from the farm land.

Fig., GS M module to network connection

FUNTIONAL DESCRIPTION
WATER IRRIGATION

Water irrigation done through the basis of required to the plants and without wastage of the water. Such scientific method of water irrigation done by considering various parameters like soil type, crop type etc. The prevention of soil erosion practices which can drastically decrease negative effects associated with soil erosion such as reduced crop productivity, worsened water quality, lower effective reservoir water levels, flooding, and habitat destruction. Contour farming is considered an active form of sustainable agriculture.

SOFTWARE TOOLS

Software tools used
The software's which are used to developed this project are

• Micro Keil IDE compiler
• Languages used: Embedded C
• Things peak online web entry.

SQL Database and Power BI
At this point, the data found in the database needs to be transformed into a more user represented as will not be understand SQL queries. Hence, to cater for this problem, Power BI is used to reconstruct the data into a visual representation such as a graph.
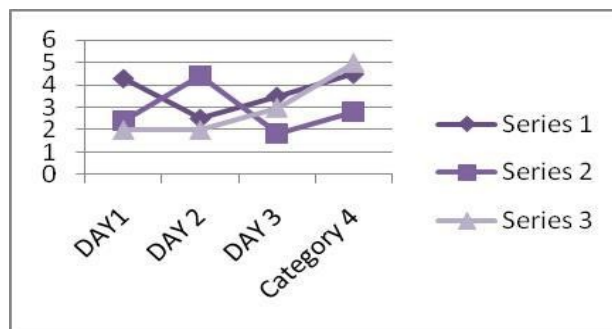

Fig. Graph Representation

Machine Learning

The Thing speak machine learning is the core logic of the proposed system. In general, a dataset is needed to train the machine to in the data in order to decide whether or not. For better precision, aOpenweathermap.com API is with the aim of knowing when the water pump needs to be opened. The pseudo code gives a simple illustration on how the machine learning system works producing code that is portable across wide platforms.

CONCLUSION

This multipurpose system gives an advance method to The system mainly monitors the behavior of soil moisture, air humidity, and air temperature and see how it contributes to evaluate the needs of water in a plant. The system uses machine learning and compares actual values obtained from sensors with a threshold value that has been fed to the machine learning for analysis. Next to this process, the machine learning cross checks the result obtained with weather forecast and then decides whether irrigation needs to be done or not. The farmer receives a notification on his smart phone and he can choose to turn on the Water pump with a button click. Moreover, the system has a web app and is helpful if ever the farmer wants to see the statistical sensor data and assess the change in sensor readings throughout a time period. Furthermore, the system can calibrated for different type of plants, that is, the user is provided with a list of plants choices in his web app and mobile app. With this the user can choose the specific type of plant that is being cultivated and obtained threshold value and thus a more accurate irrigation prediction. Besides, an SMS system can be integrated if in case there is no internet connection. With this, the user would

be notify about the prediction via an SMS and he can choose to switch on or off the water pump by replying to the SMS received. The entries that could also been saved safely for an farmers acknowledgement with date an time condition. The future works of transferring data is in the mode of social networks also through online data storage of cloud computation.

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