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AUTOMATIC IRRIGATION SYSTEM USING IOT

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Abstract

The design and development of a smart Drip Irrigation system in Agriculture environment in real time has been reported in this paper. The system principally uses sensors to get the status of field and update to the cloud using IoT and also required parameter also switching on or off based on the need as per the threshold values mentioned in the program. The system can monitor the status send, if the conditions get abnormal. The concerned authority can monitor and control the system through web interface. In this paper proposed system is based on IoT that uses real time input data. This system can be used in agri environment to reduce the man power in the fields which will reduce the physical presence all the time. The system will be used with ATMEGA32 processor used in the implementation of sensor module and other communication environment. The system offers a complete, low cost, powerful and user friendly way of real-time monitoring and remote control of agri field. A prototype model is developed and tested with high accuracy result.

Keywords: Irrigation, ATMEGA32 processer, IOT.

I. INTRODUCTION

Most of the families across India are depending on Agriculture. Water consumption for agriculture is high with the existing methods. Improving farm yield is essential to meet the rapidly growing demand of food for population growth across the world. Prediction of productivity, crop quality can be done by collecting data from the sensors placed at the farm such as soil moisture, ambient temperature and humidity etc. Here in this IoT deployment was done to collect the information for the future use.

"IoT encompasses many new intelligent concepts for using in the near future such as smart home, smart city, smart transportation, and smart farming" [1]. Here in this we can send the information field device to split accurate amount of fertilizer, water, pesticide etc. to enhance productivity and excellence. Sensors are hopeful device for smart agriculture. The real-time environmental parameters like soil moisture level, ambient temperature and tank water level have continuous influence on the crop lifecycle. By forming sensor network, good monitoring of water regulation in the agriculture field can be achieved. This paper presents irrigation monitoring and controlling system. The system uses the wireless sensor network to monitor the environmental conditions such as temperature, soil moisture content, humidity and water level of agriculture land for controlling the irrigation. The system has automatic and manual mode. The real time sensed data is stored on the cloud server for decision making and controlling actions. The user can monitor the controlling actions taken at the farm as well as control the irrigation via android app on farmer's mobile phone

II. Literature Survey

Few research papers have been studied and it was observed that few sensors used to monitor the data such as temperature, soil moisture, water level, humidity and it has been

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collected information to server. After the research in agriculture field, researchers found that the yield of agriculture goes on decreasing day by day. We use of technology in the field of agriculture plays important role to increasing the production as well as reducing extra man power, water requirements. A fully automation accessing of irrigation motor where Prototype includes number of sensors node placed in different directions of Polly house farm field. Each sensor is integrated with a wireless networking device and data received. Arduino is used for closed loop irrigation system and determined irrigation amount based on distributed soil water measurements. Irrigation systems can also be automated through information on volumetric water content of soil, using dielectric moisture sensors to control actuators and save water, instead of a predetermined irrigation schedule at a particular time of the day and with a specific duration. The technological development in Wireless Sensor Networks made it possible to use in monitoring and control of greenhouse parameter in precision agriculture.

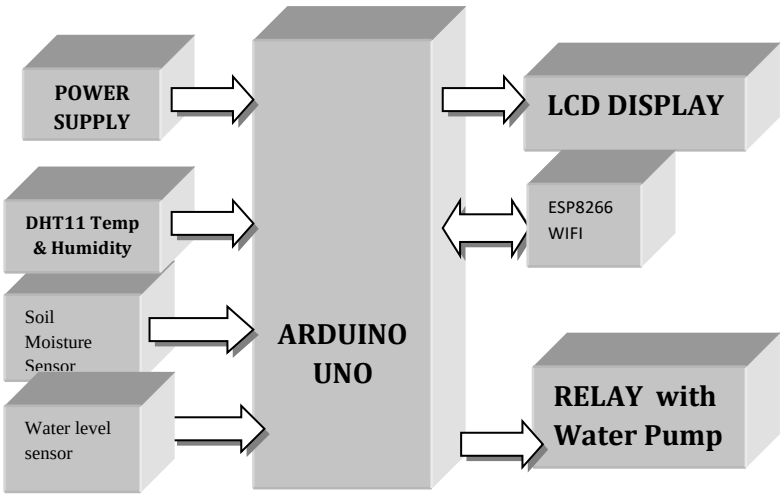
The new scenario of decreasing water, drying up of rivers and tanks, unpredictable environment, present an urgent need of proper utilization of water. To cope up with this use of temperature and moisture, sensors are placed at suitable locations for monitoring the crops. After research in the agricultural field, researchers found that the yield of agriculture is decreasing day by day. However, use of technology in the field of agriculture plays an important role in increasing the production as well as in reducing the man power. Some of the research attempts are done for betterment of farmers that provide systems which use technologies helpful for increasing the agricultural yield. The cloud computing devices create a whole computing system from sensors to tools that observe data from agricultural field and accurately feed the data into the repositories. This idea proposes a novel methodology for smart farming by linking a smart sensing system and smart irrigation system through wireless communication technology. It proposes a low cost and efficient wireless sensor network technique to acquire the soil moisture, Humidity, temperature from various locations of field and as per the need of crop water motor is enabled. It proposes an idea about how automated irrigation system was developed to optimize water use for agricultural purposes.

III. EXISTING SYSTEM

There are many parameters which must be taken into consideration and investigated in depth when designing a system that should improve cultivation procedures by making the whole process more effective and sustainable. In order to design and build a precision agriculture system that can be widely used by many users and applied in different contexts, many questions need to be addressed.

IV. Hardware Implementation

The paper consists of four major components; ARDUINO, DHT11Sensor, Soil Moisture Sensor, Water level sensor Relay and water pump. The block diagram is shown below:



The design and development of a smart monitoring and controlling system for agriculture environment in real time has been reported. The system principally monitors parameters such as temperature, moisture level, humidity and water level of the agriculture field. Users can monitor and control transducers on active The system offers a complete, low cost, powerful and user-friendly way of real-time monitoring and remote control of field.

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The main goal of designing a precision agriculture system is to introduce additional information and communication technology into cultivation processes in order to enable more effective agriculture, while simultaneous reducing the impact of this cultivation on the environment (i.e., improving the sustainability of agriculture).

V. SYSTEM DESCRIPTION

Establishment of connection with about the use of sensor network which collects the data from different types of sensors and using ATMEGA32 and all these parameters can also be monitored using LCD display. Controlling of motor can be done autonomously based on the need.

Step1: Initialize sensors and collect the data from sensors and store information in Arduino.

Step2: Compare sensor data with predefined threshold limits.

Step3: Store the data in web server for future research purpose.

Step4: Develop statistical model based on the data received through sensors placed at farm for improving smart farming.

Step5: Switch on/off the devices when there is need autonomously using sensor data.

This research will follow the inductive paradigm. The goal is to investigate the previously implemented systems and to find the most suitable technologies that can be applied to focus our research and to build a suitable and valuable system. Since it is not possible to make a hypothesis from the beginning and then justify this hypothesis at the end, the deductive method is not applicable. Since this study will examine wireless sensor network architectures and applications in the agricultural sector - a qualitative method will be used. This method will give us a better understanding of why and how the process should be designed. More specifically, the work can be split into the four following parts: 1. Literature study and design & conduct a survey, 2. Design of a prototype solution, 3. Implementation of the prototype, and 4. Evaluation of the resulting prototype. The literature study provides the background information that is necessary for understanding the feasibility of the design and the previously implemented solutions. The survey utilizes questionnaires and interviews with farmers and agricultural scientists to understand the actual needs and problems. The design of the prototype is based on the prior research and the knowledge gained by interviews, thus giving an optimal architecture and evaluating the best-suited protocols for this application. The implementation follows the rules and guidelines specified during the design. The result of this design should be a prototype that could be adapted to address potential changes in requirements due to the addition of new requirements or deeper interpretation of the needs that arise. Regarding the evaluation of the system, a testing procedure should consider the end-to-end performance in order to find out if there are any problems concerning the system's functionality or robustness. Additionally, a test case scenario should be utilized to attract people whom are interested in or worked with similar applications in order to solicit ideas for future work or to further develop and evaluate the proposed system.

- This system is useful for monitoring all activities related to farming
- Also useful to track the growth of plant
- This system maintains the moisture level to maintain the steady growth of plant so that production will be maintained.
- System will monitor the soil moisture level to control the drip irrigation system.
- This system is also useful to supply liquid fertilizers, for this purpose level maintenance of water and liquid fertilizer will be maintain.

APPLICATION

Outcome:

- Switch on/off the devices when there is need autonomously using sensor data.
- Environmental data can be monitored using various sensors.

- Statistical model based on the sensed data provides effective utilization of fertilizers and water resources.
- The system offers a complete, low cost, powerful and user friendly way of real-time monitoring and remote control of field.

Conclusion:

The system principally monitors parameters such as temperature, moisture level, humidity and water level of the agriculture field. Switch on/off the devices when there is need autonomously using sensor data.

Statistical model can be designed with the available data collected from various sensors.

Users can monitor and control the field motors based on the soil structure, crop status, irrigation, insect and pest detection.

The system offers a complete, low cost, powerful and user friendly way of real-time monitoring and remote control of agri field. A prototype model is developed and tested with high accuracy result.

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