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SMART IRRIGATION SYSTEM USING ARDUINO

Ms.Elakya.R [1], A Venkata Sai Krishna [2], P.Bala Saravan Teja[3], Kandula Venkata Sai Harsha [4], M.Sai Ajay [5]

[1]Assistant Professor, Department of Computer Science Engineering, SRM IST Ramapuram, Chennai-600089.

[2,3,4,5]Student, Department of Computer Science Engineering, SRM IST Ramapuram, Chennai-600089.

Abstract

This paper proposes a general solution to deal with the problems faced in agriculture. Water is main resource for Agriculture. Irrigation is one method to supply water but in some cases, there will be lot of water wastage. . The management of irrigation can be improved using automatic watering system. In this proposed system, we are using various sensors like temperature, humidity, soil moisture sensors that sense the various parameters of the soil. In addition, based on soil moisture value land is automatically irrigated by ON/OFF of the motor. . A system that will help a farmer to know his field status in his home or he may be residing in any part of the world

Keywords: automatic,Smart irrigation, Arduino, wireless sensor network**,**.IoT

1. INTRODUCTION

In the present era one of the greatest problems faced by the world is water scarcity and agriculture being a demanding occupation consumes plenty of water. Therefore a system is required that uses water judiciously. Smart irrigation systems estimate and measure diminution of existing plant moisture in order to operate an irrigation system, restoring water as needed while minimizing excess water use. Also the sensors used require routine maintenance for proper performance. Intelligent automatic plant irrigation system concentrates watering plants regularly without human monitoring using a moisture sensor. The main objective of this project is to provide an automatic irrigation system thereby saving time, money & power of the farmer. The traditional farm-land irrigation techniques require manual intervention. With the automated technology of irrigation the human intervention can be minimized.

Numerous researchers have worked with automatic water irrigation system. They opted for different metrics for determining the soil condition and quantity of water. They also discussed about different sources of power for the sensors. Besides, the technology for creating network among the sensors and design of control system were also heavily discussed by the scholars.This paper design a model of automatic irrigation system which is based on microcontroller. Sensors sense water level continuously and give the information to farmer through cellular phone. Farmer controls the motor using cellular phone without going in field. If the water level reaches at danger level, automatically motor will be off without conformation of farmer.

The aim of this paper is to modernizing agriculture technology by programming components and built the necessary component for the system. The system is real time based and extracts the exact condition of field. There is one central node used which to control other node. The main function is to pass the message to the node and operate the system.

2. PROPOSED WORK

The majority of the farmers depend on bore wells with electric motors for irrigating their field due to lack of sufficient rainfall. But frequent power failures have been a major hindrance in the field production. Also the farmer needs to travel to the field every time to switch on/off the motor, hence wasting his time if there is no supply at the field. With the proposed work, the farmer can save his time by turning on/off the motor with just a phone call from his cell phone. The power detection unit and battery backup unit at the field messages back the information about the power availability and the moisture content of the soil to the farmer's phone (fig 3). The action taking place in the field is messaged to the farmer through the modem. Also the system switches off the motor automatically when the moisture level of the soil has reached a sufficient value.

3. COMPONENTS USED IN MODULES

Soil Moisture Sensor - The Soil Moisture Sensor (SMS) a sensor connected to an system controller that measures soil moisture content in the active root zone before each scheduled irrigation event and bypasses the cycle if moisture is above a user defined set point.

Arduino - An open source platform which consists of both a physical programming circuit board (Micro controller) and a piece of software (Integrated development Environment).

GSM/GPRS module - Used to establish communication between a computer and a GSM/GPRS system. A GSM Module is basically a GSM Modem (like SIM 900) connected to a PCB with different types of output taken from the board – say TTL Output (for Arduino, 8051 and other microcontrollers) and RS232 Output to interface directly with a PC (personal computer). The board will also have pins or provisions to attach mic and speaker, to take out +5V or other values of power and ground connections. These type of provisions vary with different modules. **Relay** - Switches that open and close circuits electronically and eelectromagnetically. Control one electrical circuit by opening and closing contacts in another circuit.

Temperature Sensor- A Resistance Temperature Detector(RTD) is used to measure temperature as a function of resistance. As the temperature of the soil increases, the resistance of the soil also increases. RTDs readings are more accurate and more repeatable.

Servo Motor and Rotating Platform- to take the water pipe to water the target plot. In order to control the spray distance and angle, we use a servo motor.

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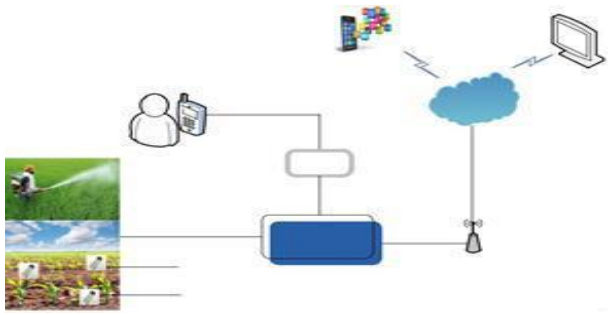

Figure 1:proposedmodel

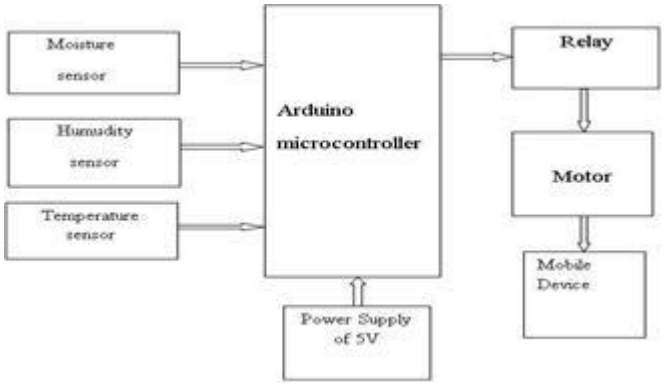

Fig.2.Block Diagram

FUTURE WORK

Our project can be improvised by adding a Webscaper which can predict the weather and water the plants/crops accordingly. If rain is forecasted, less water is let out for the plants. Also, a GSM module can be included so that the user can control the system via smart phone. A water meter can be installed to estimate the amount of water used for irrigation and thus giving a cost estimation. A solenoid valve can be used for varying the volume of water flow. Furthermore, Wireless sensors can also be used..

CONCLUSION

In this paper, we are providing a design which uses the microcontroller in the development of GSM controlled automatic irrigation system which can prevent the wastage of water and also saves the crops from being over-irrigated. This system uses soil moisture sensor to measure the moisture or water level within the soil and hence automatically irrigates the field as required. The GSM module is incorporated within the system which sends the prior generated message to the cellular phone of the farmer and the farmer can control the irrigation from the phone only. As in many countries, the farmers are totally dependent on the manual operated irrigation system which affects the production in

the negative direction. So, this system can help those farmers in the irrigation. Also, continuous vigilance is not required as the technology will do its work. With more advancement in the field of IoT expected in the coming years, these systems can be more efficient, much faster and less costlier. In the Future, this system can be made as an intelligent system, where in the system predicts user actions, rainfall pattern, time to harvest and many more features which will make the system independent of human operation.

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