

“Android Application for Automatic Irrigation System with Fertilizer Recommendation”

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Abstract: - Indian economy is mainly based on agriculture .While farming some important parameters such as humidity, temperature, light intensity, rainfall are measured for getting high yield from farm. Automation is increased day-by-day in our daily life. It makes an efficient use of the electricity & water it reduces much wastage. By using sensor we will make the system smart and automated. System once installed has no maintenance cost and is easy to use.

In this system of irrigation mechanism which turns the pumping motor ON & OFF on detecting dampness of soil. The benefit of employing these sensing techniques is to decrease human interface and avoid the excess use of fertilizer which also affects growth of crops. This project work is suggesting the fertilizer according to the environment parameters like humidity, temperature, light intensity, rainfall, which affects on crops. Project brings into play on arduino board ATmega328 microcontroller is programmed to collect the input signals this application also use GSM module to inform the user about the extra field condition and according to this the android application suggest the fertilizer to the farmer. The environment condition can be examined by sensors.

Keywords:- Arduino-board, Automated Irrigation System, Fertilizer Recommendation, Sensors.

I. INTRODUCTION

Irrigation and fertilizers in agriculture is one of the main tasks. It is very much important to water the crops as per their need. Very less watering or too much watering can damages the crops. Similarly it happens with fertilizers much use of fertilizer and less use of fertilizer also effects on growth as well as health of crop. In present irrigation system, a farmer cannot check the moisture level of soil. Hence sometimes it may happen that the watering is more than the need of the crop and sometimes water doesn't reach up to the roots of the plants. This will waste the water and efforts. If water doesn't reach up to the plants roots and excess use of fertilizer or less use of fertilizer then it will directly affect the plant growth and profit. Traditional irrigation system and fertilizer requires manpower. Hence, it becomes necessary to do something so that the irrigation will become more convenient.

In automatic irrigation mechanism moisture sensor output can take into consideration while irrigating the land. If the moisture content of soil is very low and the temperature is very high then there is need of irrigation for plants. Because if the

temperature is very high then the evaporation rate is also very high and hence we have to provide water for more time in order to attain the proper moisture level in the soil. In opposite side when moisture content of soil is high then there is no need of watering to crop. According to the readings of moisture sensor water pump will working as when moisture in soil is less the motor is ON if moisture in soil is proper then the status of motor is OFF.

In fertilizer recommendation mechanism humidity, Rainfall, light-intensity, temperature sensors output can take consideration; these parameters are effects on the crop health and growth. Fertilizer, natural or artificial substance containing the chemical elements that improve growth and productiveness of crops and also it enhance the natural fertility of the soil. The most important nutrition for growth of crop is nitrogen, phosphorus, potassium. According to recommendation mechanism it will consider the sensors reading and it compare values to the saved values at database if the value is less then there is no need of fertilizer if the its greater then it will give you message on phone which fertilizer is required for crop.

II. LITERATURE REVIEW:

The system give the idea behind the soil parameter monitoring which take more time in the manual testing of soil, the process for testing of soil manually takes two days maximum that can be reduced by using sensors. According to the reading of moisture sensor motor will automatically on or off on the basis of moisture of the soil[1][7].This paper presents an automatic irrigation system to provide water to the farms based on soil and temperature conditions using an android application, WSN and GPRS modules. An algorithm is developed such that soil moisture sensor and temperature sensor values are continuously fed to arduino UNO micro controller. The sensor information is compared with the threshold values and based on that, decision will be taken to water the crops [10]. This paper is gives the water deployment system supporting water management for agriculture using Zigbee and GSM technology through which it receives and sends all information easily for particular range [9].This review is proposed to supports aggressive water management for the agricultural land. Microcontroller in the system promises about increase in systems life by reducing the power consumption resulting in lower power consumption. It is considered to be used at Cricket stadiums or Golf stadiums and also in public garden area for proper irrigation[4][8]. In this article the system has been tested to function automatically the moisture sensor measure the moisture level of the different plant if the moisture level found to be below level the sensor sends the signal to the arduino board which triggers the water pump to turn ON and supply water to the crop [6].

By using this system an intelligent system can be developed for their crop production which will lead to sufficient use of water and fertilizers. The all process is handled by GSM [5].The system used for greenhouse based modern agriculture in which the humidity and temperature are main parameters that are precisely controlled by using the sensor reading. The drip irrigation system is handled automatically by using android application, GPRS and GSM [3].The other system in which automatic fertilizer supply to the crop with water that termed as fertigation. Excess or less uses of fertilizers are directly affects on the growth and health of crop as well as the profit. To

nutrient management and incorporate the concept of balanced plant nutrition the system provides balanced plant nutrition by managing pH and electrical conductivity level of fertilizer solution according soil pH and electric conductivity [2].

III. IMPLEMENTATION:

i. Humidity and Temperature sensor:

This DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability.This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, offering excellent quality, fast response, anti-interference ability and cost-effectiveness.

ii. Light intensity sensor:

Photosensitive sensor module is the most sensitive for the environmental light intensity and it is generally used for detecting the ambient brightness and intensity of the environment. Without light intensity it will not reach the threshold resulting for low level output but, when the external environment light intensity exceeds the set threshold it will result for a high level output.

iii. Rainfall sensor:

The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity though a potentiometer.

iv. GSM Module:

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM).It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services.GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A

GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates.

v. Arduino Board:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

IV. BLOCK DIGRAM AND WORKING:

For automatic irrigation system it consist of four sensors, a microcontroller, a LCD display, relays and a water pump or motor. The working of the project is divided in two parts. First is parameter measurement and second is irrigation system. All the sensors will record the value and give it to the microcontroller. Microcontroller then displays this value on a LCD screen. The values will be displayed on the screen one by one at an interval of s8 seconds.

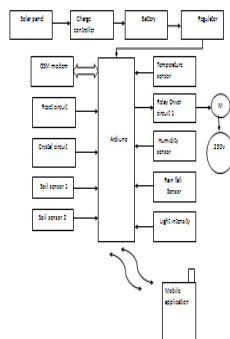


Fig. 1:Block Diagram of System

Second part of the circuit is automatic irrigation system. A moisture sensor is inserted in the soil. This sensor will record the moisture level in the soil and send this value to the microcontroller. Microcontroller then compares this value with a certain predefined value. If the moisture level in the soil drops to a particular value, the water pump will get on and the process of irrigation will begin. For fertilizer recommendation system consist the reading of sensors and that values are compare to the value saved in database according to that comparison which disease will occurs on that basis fertilizer will be suggested through the android application.

V. CONCLUSION:

The main objective of this paper is to design a fully automated irrigation system and fertilizer recommendation. The system provides a real time feedback control system which monitors and controls all the activities of irrigation and fertilizer system efficiently. Thus the system monitor and control. Using this system, one can save manpower, water and proper fertilizer to improve production and ultimately increase profit.

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