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Smart Soil Parameter Monitoring System for Agricultural Production

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Abstract: The continuously increasing population in India demands for the rapid improvement in food production technology. Indian economy is mainly based on agriculture. While farming, some important soil parameters such as ph., moisture, humidity and temperature are measured for getting high yield from soil.

The method which is used for measurement of these parameters is completely based on chemical process on soil sample. The process is generally carried out in near Agriculture Offices. Soil Parameter Monitoring with Automatic Irrigation System includes the measurement of these parameters on the field so that the farmer doesn't need to go somewhere else. This system also consists of a fully automated irrigation system which will turn on and off a water pump as per the level of moisture in soil.

Key Words: Automatic Irrigation System, PIC Microcontroller, GSM, Moisture sensor, Temperature Sensor, ph. Sensor, Humidity Sensor.

I. INTRODUCTION

Aim our project is to provide a device to farmers which can measure the various parameters of soil. It is it possible to every farmer that to go and check the soil as the testing laboratories are not available in each village and the process is also to lengthy. So here we focused on manufacturing a device for farmers which will help them to check verity of parameters related to soil easily at their location point. So it is better way to develop device because its fully configure with GSM, Moisture sensor, Temperature Sensor, ph Sensor, Humidity Sensor device and it can easily at any location.

II. LITERATUREREVIEW

Ravi Yadav, A.K Daniel, In proposed system design for agricultural purpose India is diverse country having variety in the agricultural crop for meeting the need of living being in different part of the country. Agriculture is one of the major sources of the economy for the people of India. The continuous demand for quality foods forces for innovation in food production technology as greenhouse farm. Food production mainly depends on whether condition and agriculture methods.

The uncertainty nature of weather makes agriculture difficult for good crop cultivation. The scarcity of rainfall forces farmer to uses continuous other sources of water (tube-well, water pump) for crop cultivation. The crop proposes a fuzzy based system leading to smart farming for effective growth of agriculture in India. The objective of model is used to monitor farm for efficient utilization of water. The proposed model shows the significant utilization of water in irrigation and is beneficial for the limited water area.

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Block Diagram of System

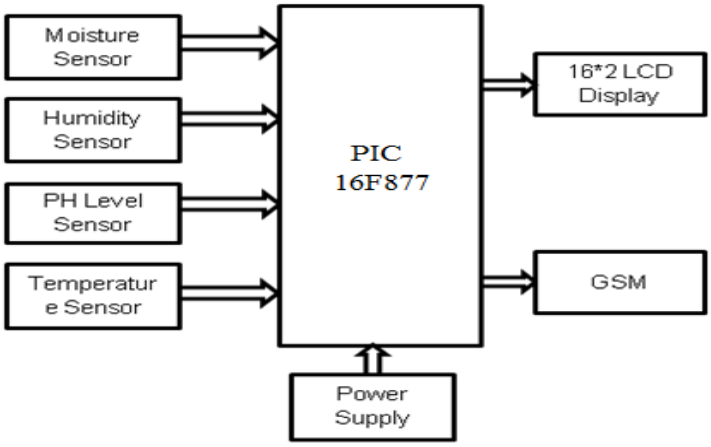

Fig No .1 Proposed Block Diagram

We search on every difficulties of farmers who had face in their regular life related to their farm. Hence we develop a hardware of soil parameter testing system and We assemble this project for farmers so that the can check soil related parameters at any location without any help of other people. So there is saving not only time but also cost. This soil testing system is a hardware machine in which there are mainly three sensors and GFM.With help of these electronic devices we can easily check quality of soil. concentrate on every one of the difficulties we face the Automation of the irrigation system is gaining importance as there is need to use water resources efficiently and also to increase the field productivity. The system is used to turn the valves ON or OFF automatically as per the water requirement of the plants. The system is used for sensing, monitoring, and for controlling purpose. The proposed system block diagram is shown in Fig No.1 it consists of four sensors, PIC microcontroller, LCD display, relays and a water pump or motor.

The working of the project is divided in two sections. First section is parameter measurement and second section is irrigation system The ph, moisture and temperature sensors are inserted in the soil while the humidity sensor is kept above the ground level. All the sensors will record the value and give it to PIC microcontroller. PIC Microcontroller then displays this value on a LCD screen. The values will be displayed on the screen one by one at an interval of 10 seconds. 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. This predefined value can be set by us as per the crop because different crops need different amount of water. If the moisture level in the soil drops to a particular value of 2 copper conductors that are located at small distance from each other.

The relay switches as soon as the moisture makes a connection that is more or less electrically conductive between the 2 electrodes Moisture Sensor Soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neurons, as a proxy for the moisture content. The sensor used here is VH400.E The PIC microcontroller used in the circuits It is a 40 pin microcontroller from Atmel which belongs to m Its operating frequency is DC 20 Mhz. LCD Display A 16X2 LCD module has been used as a display that means it can display 16 character per line and there are 2 lines. LCDs are preferred over LEDs and seven segment displays because they are economical and easily programmable. Relays are electromechanical device which are actuated by an electric current. To function relays properly, a relay driver circuit should be used in the circuit

III. EXISTING SYSTEM

The existing system contains the Automatic Irrigation System, PIC Microcontroller, GSM, Moisture sensor, Temperature sensor, Humidity sensor etc. Detect moisture, temperature and other parameters related to soil and then display it on display.

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IV. METHODOLOGY AND EXPERIMENTATION

Automation of the irrigation system is gaining importance as there is need to use water resources efficiently and also to increase the field productivity. The system is used for sensing, monitoring, and for controlling purpose. The system block diagram is shown in Fig.1. It consists of four sensors, a microcontroller, a LCD display, relays and a water pump or motor. The ph, moisture and temperature sensors are inserted in the soil while the humidity sensor is kept above the ground level. The values will be displayed on the screen one by one at an interval of 10 seconds.

Second part of the circuit is automatic irrigation system. A moisture sensor is inserted in the soil. 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. During this time, the moisture sensor will continually send the moisture value in soil to the microcontroller. After some time when moisture level in the soil reach to a particular level, the water pump will automatically get switched off. In this way, the circuit performs the task of irrigation.

A. Temperature sensor The LM35 series are precision integrated-circuit temperature device with an output voltage linearly proportional to centigrade temperature sensors calibrated in Kelvin, as the user temperature.

B. ph. probes the sensor which has been used for the measurement of ph is ph100. At the heart of the Stevens-Greenspan pH Sensor is a gel-filled electrochemical sensor which is very selective and sensitive to hydrogen ions. Coupled earth loop currents, a frequent source of errors with high impedance pH probes, are eliminated through the use of optically isolated signal conditioning electronics. Built-in temperature compensation removes temperature related errors.

C. humidity sensor this humidity sensor consists of 2 copper conductors that are located at small distance from each other. The relay switches as soon as the moisture makes a connection that is more or less electrically conductive between the 2 electrodes

D. Moisture sensor Soil moisture sensors measure the volumetric water content in soil. Since the direct

V. RESULTS

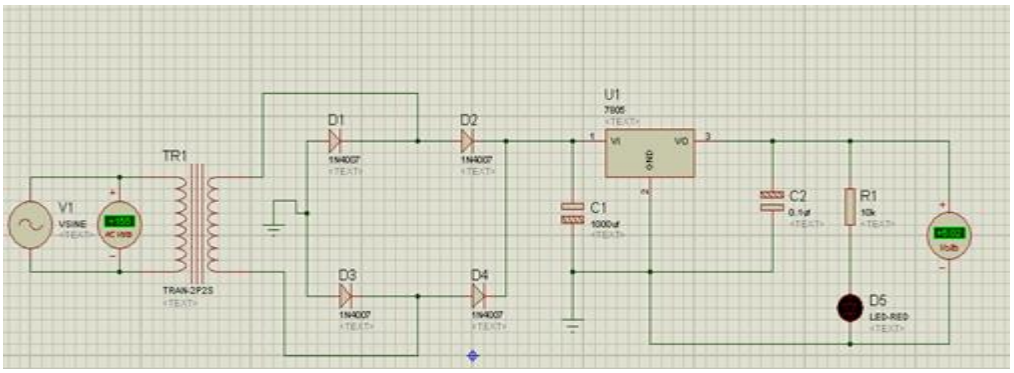

Fig No.2 Simulink result of Power supply

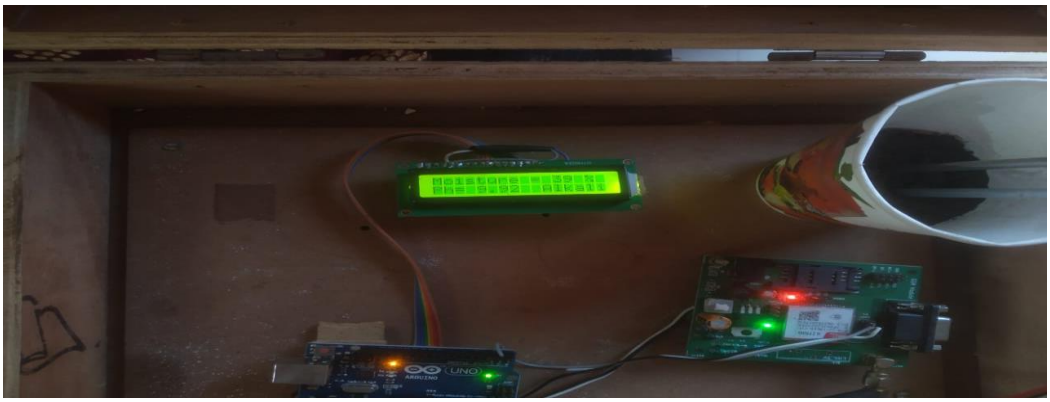

Fig No.3 Result of Project

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Fig No 4 Updated information to the farmers via; SMS

VI. ACKNOWLEDGMENT

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VII . CONCLUSION

We have tried implementing the idea of bringing the vision level of the blind very close to the normal ones. The project proposes a smart android app which enhances participation of the visually impaired by enabling them to be more effective in social interactions with the help of advance technology related to face recognition, location service and text to speech using smart phone in the proposed system, we propose a smart Agriculture System that can analyze an environment and intervene to maintain its adequacy. The system has an easy-to-upgrade bank of inference rules to control the agricultural environment. The proposed system mainly looks at inputs, such as, dust, infertile sandy soil, constant wind, very, low humidity, and the extreme variations in diurnal and seasonal temperatures. The system provides increased productivity, enhanced safety, instant interventions, and an advanced life style. The system is ubiquitous as it enables distant access. The proposed system is an addition to the current state-of-art Internet-of-things

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