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Automatic Soil Moisturizing System Using IoT

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Abstract: *Now a day's water is becoming very precious due to scarcity in obtaining clean water for domestic purposes including irrigation. To optimize the use of water, a mechanism to develop water conversation is the need of the hour. Also, automation in agricultural systems is a necessity to optimize water usage, reduce water wastage, and implement modern technology in agriculture systems. The soil moisture sensor is a novel device that senses the moisture content in the soil, and with a suitable mechanism allows water to be irrigated depending on the moisture content of the soil. Automation of farm activities can transform the agricultural domain from being manual and static to intelligent and dynamic leading to higher production with lesser human supervision.*

Keywords: Optmize, Scarcity, Materialized, Novel, Irrigated.

I. INTRODUCTION

India is mainly an agricultural country. Agriculture is the most important occupation for most Indian families. In India, agriculture contributes about sixteen percent (16%) of total GDP and ten percent (10%) of total exports. Over 60 % of India's land area is arable making it the second-largest country in terms of total arable land. Water helps in transpiration, which is very essential for maintaining the absorption of nutrients from the soil. Water regulates the temperature and cools the plant. So, water is applied externally, if availability seems limited through the soil, not sufficient to meet the requirement due to drought or excess losses. We call the external application of water to the soil to supplement the requirement as `Irrigation'. In India, most irrigation systems are operated manually. These techniques are replaced with semi-automated and automated techniques. The available techniques are ditch irrigation, terraced irrigation, drip irrigation, and sprinkler system. The global irrigation scenario is categorized by increased demand for higher agricultural productivity, poor performance, and decreased availability of water for agriculture. These problems can be appropriately rectified if we use automated irrigation.

II. LITERATURE SURVEY

In Sensor-based Automated Irrigation System with IOT mentioned using sensor-based irrigation in which the irrigation will take place whenever there is a change in temperature and humidity of the surroundings. The flow of water is managed by a solenoid valve. The opening and closing of the valve are done when a signal is sent through a microcontroller. The water to the root of the plant is done drop by drop using a rain gun and when the moisture level again becomes normal the sensor senses it and send a signal to the microcontroller and the value is then closed. The two mobile are connected using GSM.

III. METHODOLOGY / ALGORITHM

This project is designed to develop an automatic irrigation system that switches the pump motor ON/OFF on sensing the moisture content of the soil. In the field of agriculture, the use of the proper method of irrigation is important. The advantage of using this method is to reduce human intervention and still ensure proper irrigation.

The system is a combination of hardware and software components. The hardware part consists of an embedded system and the software is the webpage designed using PHP. The webpage is hosted Localhost and consists of a database in which readings from sensors are inserted using the hardware. Moisture Sensing Section Two YL-69 soil moisture sensors along with LM393 comparator modules were placed in different soil conditions for analysis. The sensor YL-69 is made up of two electrodes. It reads the moisture content around it. A current is passed across the electrodes through the soil and the resistance

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to 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 on the other hand when the soil moisture is low the sensor module outputs a high level of resistance. This sensor has both digital and analogue outputs.

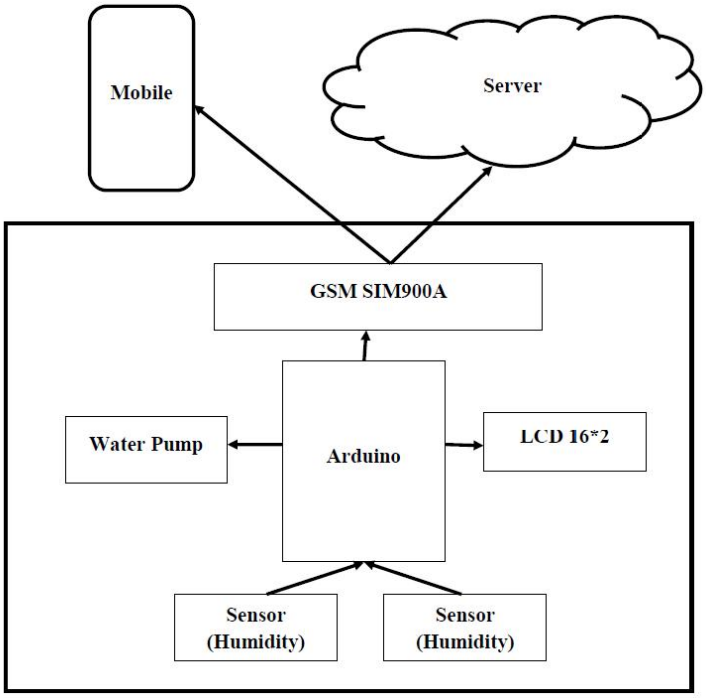

Figure: Flow of System

3.1 Moisture Sensor

When the soil moisture is low the sensor module outputs a high level of resistance. This sensor has both digital and analog outputs. The digital output is simple to use but is not as accurate as the analog output.It reads the moisture content around it. A current is passed across the electrodes through the soil and the resistance to 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.

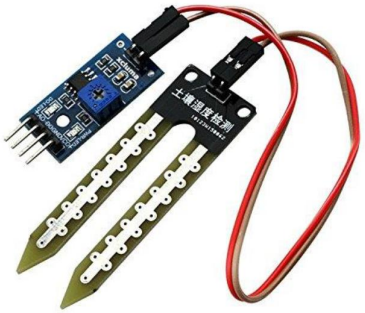

Figure: Moisture Sensor

3.2 Arduino

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards can read inputs - light on a sensor, a finger on a button and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. Arduino programming language is based on Wiring and the Arduino Software (IDE), based on Processing Arduino microcontroller.

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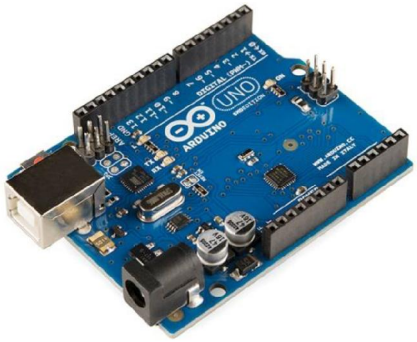

Figure: Arduino UNO

3.3 LCD 16x2

These LCDs are ideal for displaying text/characters only, hence the name 'Character LCD'. The display has an LED backlight and can display 32 ASCII characters in two rows with 16 characters on each row. If you look closely, you can see the little rectangles for each character on the display and the pixels that make up a character. Each of these rectangles is a grid of 5×8 pixels. Although they display only text, they do come in many sizes and colors: for example, 16×1, 16×4, 20×4, with white text on a blue background, with black text on green, and many more.

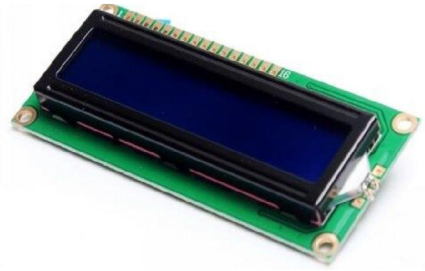

Figure: LCD Screen

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