GSM BASED AUTOMATED WATERING SYSTEM FOR PLANTS

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Abstract —
In a country with a tropical monsoon like India, where rainfall is unpredictable, unreliable, and variable, irrigation is the most crucial agricultural input. Until and unless a sizable planted area is brought under guaranteed irrigation, India cannot make sustained growth in agriculture. Modernizing irrigation systems with the use of intelligent technologies is the sole suggested answer to this problem. The goal of this study is to create an automated irrigation system that uses multiple sensors and is "GSM based." On the field, sensors are positioned, and these sensors continuously measure the crop parameters and communicate the information to the farmer. Farmers can know about the parameters without going to the fields. A farmer can operate the system based on the parameters from his mobile phone through SMS, even in a faraway location. However, the system will automatically turn on without the farmer's permission to maintain the right water level in the field if the water level rises to a dangerous level. By keeping an eye on the soil's moisture level and the weather, it provides the crop with the amount of water it needs, preventing water resources from being wasted. Farmers will also benefit greatly from it.

Keywords — Automatic irrigation system, Arduino, GSM, crops, cell phone, sensors.

I. INTRODUCTION

The purpose of this paper is to demonstrate an intelligent irrigation system that can be used in areas where a water shortage is a problem. In the past, water had to be delivered to the field through hand pump, canals, tube wells, etc. in the country's arid regions. These types of conventional irrigation systems have a number of issues, including an increase in the effort of farm workers and a tendency to cause issues like over- or under-irrigation.

So, we suggest a smart irrigation system is thought to be a key remedy. This project uses Arduino to create a GSM-based automated irrigation system that automatically waters crop fields and updates farmer through text message. In this irrigation system, certain sensors examine crop characteristics including soil moisture, temperature, and humidity. Based on the parameters, the system will get operated automatically and whenever he wants to ON & OFF the pump can operate through SMS also. Also, the user get updated about the parameters & whenever the system gets ON & OFF through GSM module. This technique is great for farms, gardens, homes, and other places. This can also be used in green houses where a certain crop is cultivated under certain atmospheric conditions as they require humidity & temperature parameters. There is no much requirement for human involvement in this fully automated system.

II. LITERATURE SURVEY

Y. P. Patil [1]: The author of this research proposed an autonomous system based on ARM and employed GSM technology for communication. Internet technologies and wireless sensor networks, such as Zig-bee, were used to irrigate utilizing an automatic irrigation technique. Plant roots have temperature and soil moisture sensors. When the water level rises above the danger threshold, the soil moisture sensor detects it and turns off the motor to provide precise supply to the fields. An algorithm is created for measuring the threshold values of temperature sensors and soil moisture sensors, and it was put into a microcontroller to control the amount of water. Photovoltaic cells are employed to give an efficient power source. The motor will automatically shut down and it will not operate if the water level reaches a dangerous level. Karan Kansara [2]: In this author proposed an Irrigation Control System Using Android and GSM for Efficient Use of Water and Power. Automatic microcontroller based rain gun irrigation system in which the irrigation will take place only when there will be a need of water as a result it saves a large amount of water as it is avoiding wastage of water. Android is used for mobile devices that include an operating system. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. This application makes use of the GPRS feature of mobile phone as a solution for irrigation control system. These systems covered lower range of agriculture land and not economically affordable. The system supports water management decision, used for monitoring the whole system with GSM (RS-232) module. The system continuously monitors the water level and provide accurate amount of water required to the fields. The system continuously checks the temperature and humidity of soil in order to retain the nutrient composition of the soil so that. The system uses sensors for remote monitoring and controlling devices which are controlled via SMS using a GSM using android mobile. Automated irrigation system uses valves to turn motor ON and OFF and these valves are operating using microcontroller. These valves are automatically turned OFF and ON depending upon the need of supply. When there is a intense need of supply these valves will be ON and when water reaches at danger level these will be OFF. The system provides essential nutrients and enrich plant growth. Field is equipped with wireless communication sensors that avails better facilitated sensor communication and covers wider field area. The main aim of this paper is to provide automatic irrigation to the plants which helps in saving money and water. The entire system is controlled using 8051 Microcontroller which is programmed as giving the interrupt signal to the sprinkler. A wireless application of drip irrigation automation supported by soil moisture sensors. The author further added that if different kinds of sensors (that is, temperature, humidity, and etc.) are involved in such irrigation in future works, it can be said that an internet based remote control of irrigation automation will be possible. Conserves electricity by reducing the usage of grid power and conserves water by reducing water losses.

III. BLOCK DIAGRAM

Fig 1. shows the block diagram of the system. The GSM module is used to transmit alert messages to the user on his cell phone, and the Arduino is used to regulate the entire process. The sensors continuously measure the characteristics of the soil. On the LCD, values and the status of the pump will be shown continually. The pump opens as a result of a signal the microcontroller sends to it. The sensor detects an appropriate level of moisture, sends a signal to the microcontroller, and the pump turns off as a result. Using GSM, the two mobile devices are connected. MAX232 is used to link the GSM module to the microcontroller. A 12V relay is used to control the 220V AC small water pump.
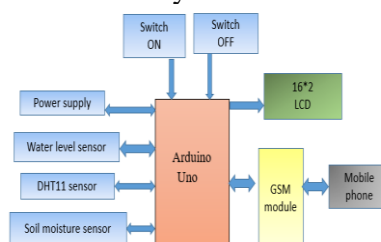

Fig 1. Block diagram

IV HARDWARE REQUIREMENTS

The hardware requirements for the SMART IRRIGATION SYSTEM include:

Arduino: the Arduino is the main component of the system as it controls all the functions of the system.

1. **Soil moisture sensor:** It monitors the moisture level of the crop and sends information to the user.
2. **DHT11 sensor:** It monitors the temperature and humidity of the crop and updates the user.
3. **Gsm module:** It is the component used to communicate with the system from the remote place through cell phone.
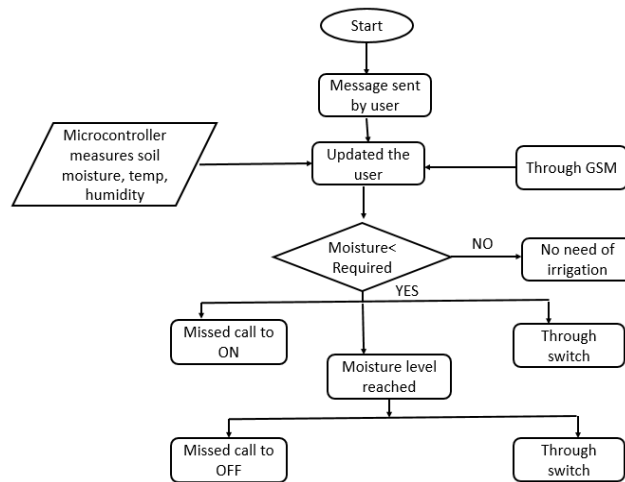
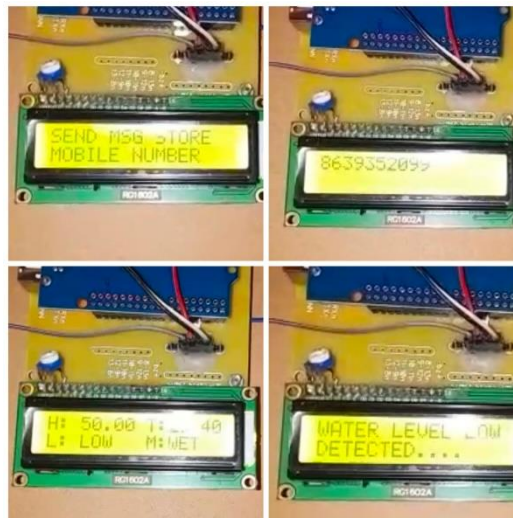## V FLOW CHART

Fig 2. Flow chart

VI RESULT

Fig 3. Results of the system showing the storage of mobile number and displaying the parameters & status of the field.

ADVANTAGES

➢ Conserves Water and Time:
➢ Preserves Soil Structure and Nutrients:
➢ Gardening Flexibility
➢ The design is low power, low cost, small size, robust and highly versatile.
➢ The system provides optimum water distribution in fields based on manual settings, SMS from cell phone.

➢ It uses buzzers & SMS for alert purpose

CONCLUSION
As man's generation progressed, he created a variety of irrigation techniques to supply the area with water. Water conservation is extremely important in the current situation. Attempts are being made right now to preserve the natural resources that are available to humanity. We can manage the water flow and so lessen waste by continuously checking the condition of the soil. Water flow can be controlled by sending a message from our mobile device by using moisture and temperature sensors to monitor the status of moisture and temperature using GSM. By implementing this project, farmers will have less work to do and the irrigation system will operate more effectively.

FUTURE SCOPE
This system can be modified to include a variety of other features, such as mobile application control of the motor and Wi-fi controlled monitoring, by using it as a framework. These will increase the prototype's operational capacity and effectiveness. Using the sprinkler concept, it can be utilised not only in agriculture but also in gardens anywhere. When combined with IOT, it has a broad application. This will give automation a new level. The following suggestions can be taken into account as there is a lot of future potential that can be used with this effort to increase the system's efficacy and efficiency. With this method, the concept of IOT irrigation may be put into practice. With the use of this system, additional farming tasks can be added, like managing cattle, detecting fires, and controlling the environment.

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[10] "GSM Based Automated Irrigation Water Controller System" by Vaibhav M. Patil and Pooja K. Jadhav: In this study, we present the design and implementation of a GSM-based autonomous irrigation system, which employs sensors to measure soil moisture and a GSM network to activate an irrigation pump.