

## GSM Based Irrigation System

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**ABSTRACT:** Irrigation is defined as the artificial flow of water into the land or underground. This form of irrigation can be used to grow crops and protect the landscape at a certain point in time when rainfall is insufficient. The automatic irrigation machine can complete the work of the machine without manual intervention. Any irrigation equipment, such as drip irrigation, sprinkler irrigation, and surface irrigation, can be automated through household digital devices and sensors (such as computers, timers, sensors, and various mechanical equipment). An irrigation machine was developed that records the moisture content of the soil material and turns on or off the submersible pump through a relay. The main advantage of this irrigation machine is to reduce human intervention and ensure proper irrigation. The purpose of this document is to control the mechanical devices of related hydroelectric motors with the help of soil moisture sensors. Finally, the facts of the farmland (engine operation) are sent to the user in the message box or SMS. An automatic irrigation device for effectively controlling water has been proposed.

**Keyword:** GSM Module, Conservation of Water, Easy Monitoring.

### I. INTRODUCTION

On Gift Day, in agriculture, farmers face a major problem when watering their plants. It is due to the fact that they do not have a proper idea of the power supply. Even if much is available, you will have to scoop up the water and wait until the spheres are sufficiently watered. This will prevent you from playing other sports. This may be more important to them, as a result of which they lose valuable time and effort. But maybe there is a solution - Automatic plant irrigation machines are no longer the most useful, but also reduces lot of human work.

This computerized irrigation system senses moisture in the soil and automatically switches the pump on when the power is turned on.

The main cause is the lack of land, the proper use of irrigation tools which wastes a large amount of water due to dehydration and unplanned water use. For these reasons, we use this automatic plant watering system, which is very practical in all climates.

If the soil dries out, there will be a large voltage drop due to excessive resistance, which will be detected by the soil moisture sensor. The relay is connected to the electricity bill input, and the electricity bill output is transmitted to the vegetation through the pipeline.

### II. LITERATURE SURVEY

Automation of irrigation gadgets refers to gadget work with no or minimal manual intervention. Irrigation automation is justified when large irrigation areas are divided into smaller segments called irrigation blocks, the segments are irrigated in series to match the available discharge from the water supply. The work we investigated in this regard is a kind of computerized irrigation technology, how they actually achieved their goals, and explains the biggest differences between our project and the literature we think. Regarding this element, the current work "Agricultural Implementation Engineering" [1], "facts acquisition gadget and irrigation controller"[12] and "Automation in Micro-Irrigation" [13], employs subsurface drip irrigation the usage of drip tapes and are time based totally structures within which irrigation clock controllers, or timers, are a fundamental part of an automatic irrigation gadget. Timer is the most important device to use an important amount of water during the right time. This time, a period of time can cause or water if the benefits are not appointed or not Calculated with the correct amount of water. It is calculated when working as the extension of the water needed, and the amount of water starts or puts band technology. See automatically for events based on time that does not operate the device and displays automatically.

The papers titled "remarks manage for surface Irrigation management" [2] and "manipulate and Automation in Citrus Micro-irrigation structures" [16], employs open loop structures during which the operator makes the choice on the number of water to be applied and therefore the temporal order of the irrigation occasion. The controller is programmed correspondingly and therefore the water is applied according to the popular schedule. Open loop management systems use either the irrigation length or an explicit applied volume for manipulate functions. Open loop controllers usually embrace a clock that's accustomed begin irrigation. Termination of the irrigation will be primarily based} altogether on a pre-set time or is also based altogether on an exact extent of water passing through a float meter. In an open loop machine, the operator makes the selection on the amount of water on the thanks to be applied and whereas the irrigation event can occur. This facts is programmed into the controller and therefore the water is applied in keeping with the required schedule. Open loop manage systems use each the irrigation length or a particular applied extent for manipulate functions. the disadvantage of open loop systems is their lack of ability to retort robotically to changing conditions within the environment. similarly, they will additionally need frequent resetting to attain high ranges of irrigation potency.

The works titled "Tomato Drip Irrigation Plan"[4] and "Designing a Micro-irrigation Device Mainly Based on a Volume Control Method"[15] use an extended system. A variable volume automatic metering valve can be used to dispense a predetermined amount of water on site. The results show that the volume control structure is more active than the time control system. Regardless of whether there is an uninterruptible power supply, the amount of water supplied by these systems is constant; they are more popular because they are cheaper. The quantity counter is connected here, pulses are emitted after the selected amount of water is dispensed, and the control device measures these pulses to perform a dispensation check. Papers entitled "Irrigation Water Utilization Efficiency" [10], "Announced Irrigation Control Models for Multiple Crop and Sample Pads" [14] and "Irrigation Technology Productivity" [17] gift a version that they not only provides optimizing the area of each plot, as well as water budgets and multi-plot field forecasts, with enhanced simulation and prioritization, utilizing both water and time, We guarantee daily vegetation irrigation to meet

modern needs. Conspiracy to irrigate primarily on the basis of uncooked deficits and net sales.

### III. EXISTING METHODOLOGY

Time based automatic system using drip and sprinkler irrigation

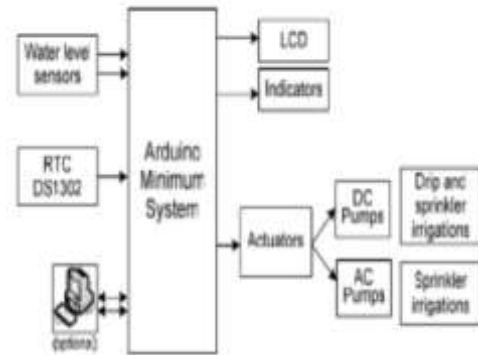


Fig. 1

The country in the coastal regions suffers greatly from weather and climate, as in Banjarsari, Nusawungu, Cilacap Regency, Central Java, Indonesia. There weather is regularly uncertain and fast change in weather is reported, the precipitation depth is approximately 47.3 mm / day and the solar radiation is approximately 109,960 lux [3]. In certain months (called the transition period) the air temperature and the soil temperature are very high (39 ° C and 44 ° C respectively) and the humidity of the air is 36% [3]. Sand body houses, which have a very high infiltration rate of 209 mm / day and the water protection capacity of coffee, require farmers in the coastal region to maintain water availability in the country through very extensive irrigation of life three cases per afternoon so that plant life can develop well. In addition, farmers in addition wish to often screen and do further in depth watering than typical the circumstance of soil wetness. It reasons watering dominates the worth of horticulture cultivation in coastal sand. The normal technique of giving water utilizing a container can be terribly useless and inefficient for a giant region of land. It considerably limits the capability of a farmer to manage a far wider region of land. Whereas the usage of water pumps directly (with out reservoirs) makes the pump, engine flip on-off often which might additionally in addition reason excessive fees and damage to the pump. the amount and stress of water on the thanks to settle for is likewise arduous to live, that if too huge will be the reason for damage to the plant. The package of water deliver automation era is expected to boom farmer's enterprise capability additionally to water usage potency. Lack of understanding of irrigation

technology, coupled with hydrodynamic houses on sandy soils with low water storage capacity, makes optimizing irrigation planning standards an important issue for improving production efficiency (that is, time set factors that determines when to start irrigation). Based on this, the main purpose of the drawing is to develop a completely time-based irrigation planning standard, mainly for sandy soil, and to evaluate the performance of the automatic irrigation system. In the timetable provided, the minimum Arduino device usage has been correctly displayed and the preferred time for efficient irrigation programming is provided. The device also monitors the water level in the water tank and measures the humidity. The verification results show that the device can be drawn according to the block diagram system, and the device is flexible and accurate in the timing of sprinkler irrigation and drip irrigation. Plant for 15 minutes at specific times (7:00, 11:00, and 17:00), and plant onions and cabbage flowers in coastal areas.

#### IV. PROPOSED METHODOLOGY

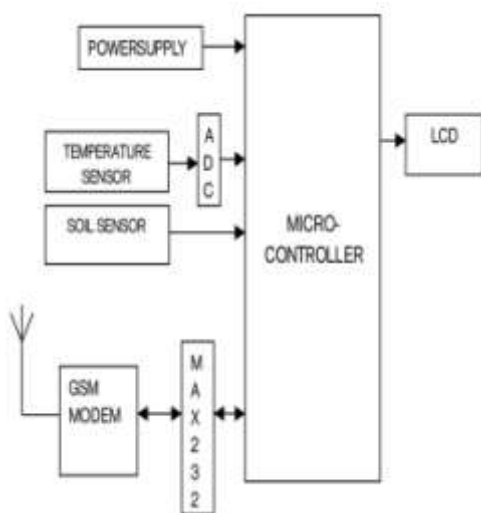


Fig. 2

##### 1. ARDUINO UNO

Arduino Uno is an open source microcontroller board developed by arduino.cc which is equipped with sets of digital and analog input /output pins. It is based on microchip ATmega328P micro-controller with pins interfaced through various expansion boards and other circuits. The boot loader on the board allows uploading new code without external hardware.

##### 2. RELAY

Relay board module is used for controlling better cutting edge masses from Arduino uno, PC parallel and microcontroller improvement board.

The relay terminals makes wiring of the board easier. It is accurately pushed through transistor BC547 consequently entering the device, inclusive of Arduino is covering from relay circuit. It consists of a loose wheeling diode similar to the guard microcontroller from relay kick back.

##### 3. GSM MODULE

GSM module also known as GSM modem is a hardware device using GSM mobile telephone technology in providing the data link to a remote network. It essentially provides TTL-Level serial interfaces to their host which are usually apart of an embedded system.

The following operations are carried out by GSM module

1. Receives or deletes SMS messages in sim
2. Reads and adds telephone ee-e book entries of the sim
3. Make, acquire or reject a voice call

##### 4. SOIL MOISTURE SENSOR

Soil Moisture sensors makes use of capacitance to degree dielectric permittivity of the medium in soil which is used for measuring the water content of the soil. The center creates a voltage proportional to the dielectric permittivity and consequently the water content of the soil to be measured. The sensor over a complete period averages the water content material. There is an effect on the flat floor of the sensor due to centimeter sector which has very little sensitivity at the intense edges. It is used to degree the lack of moisture through the years due to evaporation and plant uptake examining the soil moisture contents for diverse plant species screen the soil moisture content in turn manipulating irrigation.

The module needs AT commands to communicate with the processor or controller, and these processors or controllers communicate through serial communication. These instructions are sent by the controller/processor. After the module receives the command, it resends the final result. It can be sent through the processor/controller/PC to interact with the GSM cellular network.

The mainreason for deciding the Arduino uno is that it's mainly based on the ATmega328 microcontroller, which has 14 virtual input/output pins (6 of which can be used as PWM outputs), 6 analog inputs, 16MHz Crystal oscillator, USB connection, force jack, ICSP header, reset button, 32KB flash memory, of which 0.5KB is used for the SRAM 2KB EEPROM 1KB bootloader clocked at 16MHz.

This paradigm computer screen units the amount of soil wetness. A predefined form of soil

wetness is about, and should be numerous with soil kind or crop kind. In case the wetness of the soil deviates from the specified selection, the watering machine is grew to become on/off. Whenever machine switched on/off, a message is dispatched to the person via GSM module change the name of pump and soil wetness, it will prompt the irrigation machine, pumping water for the plants.

The block diagram of the smart irrigation machine is shown in the figure. It contains Arduino Uno (ATmega328), which is the brain of the machine. The soil moisture sensor is connected to the input pin of the controller. The water pump, GSM module and relay are connected to the output contacts. The sensors are placed in the soil, and these sensors use probes to detect the moisture content in the soil. The humidity reading is sent to the Arduino controller. The floor sensor is analog, and the analog warning is virtual converted by the integrated ADC in the Arduino controller. The Arduino now instructs the motor to distribute the specified amount of water to the ground. The motor is programmed to rotate, and the turntable is connected to the motor to provide a second base. When the ground is dry, the humidity sensor reading may be high, so adjust the pump for use by the relay and turn it off when the reading reaches the threshold.

The system integrates an arduino with a GSM module, and the water rate and pump status (ON/OFF) measured through sensors are collected. Farmers may feel familiar with the situation in the cutting-edge field. This fact is displayed on the internet webpage next to the operation button to remotely display or deactivate the water pump. So that farmers can enter information about the situation in the field anytime, anywhere.

## V. FUTURE SCOPE

The smart irrigation system here implemented proves that there is a possibility for a feasible and cost effective way for optimizing water resources for agricultural production. This system also allows cultivation in places with a chance of improving sustainability. Here there is a use of solar power which is significantly an important factor for organic crop and other agricultural production that are isolated geographically with an investment in an expensive electric power supply. For real time system for irrigation is based on zigbee module and GSM which is incredibly versatile and economical.

## VI. CONCLUSION

As the technology evolves irrigation which has been the spine of a human civilization

has advanced its techniques to deliver water to the land. In the existing scenario for conservation of water the constant tracking of the reputation of the soil by managing the amount of water by lessening the wastage is of excessive importance. The understanding of the reputation of moisture and temperature via GSM with the usage of soil moisture and temperature sensors the water wastage can be managed with the aid of a simple mechanism of sending a message to our mobile. Conservation of water and labor can be promoted due to its automatic structure that no longer requires non stop tracking with the usage of labor.

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