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# Automated Greenery Irrigation System

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*Abstract*-**Watering is the most important cultural practice and most labour intensive task. Knowing when and how to water are two important aspects of watering process. To make the gardener works so easily, the automatic plant watering system is created. This system uses Arduino UNO board, it is programmed in such a way that it will sense the moisture level of the plants and supply the water if required. This type of system is often used for general plant care, as part of caring for small and large gardens This system can be effectively used from small gardens to a large crop field, thus also conserving water. We can implement the above prototypeusing sprinklers or drip emitters for effective irrigation. For largescaleimplementation, wecanusesolar panelstoconserve energy.**

**Keywords—wateringprocess, automatic plant watering, Arduino UNO microcontroller board, green house.**

## INTRODUCTION

Solar energy is a clean source of renewable energy which can be used to provide power. For large scale implementation we can thus make use of solar panels.Automatic water starters are also available in the market but they have many drawbacks. Farmers have to manually switch ON and OFF the machine and moreover, plants mostly get over-irrigated since there is no measure of moisture content of the soil. Automatic plant watering system is an effective method to apply since it switches ON and OFF automatically by measuring the moisture content of the soil. This system is cheap and economical compared to other systems and saves labour time as the work done by system is automatic [3][4][5][6].

## I. PROBLEMSTATEMENT

Many times, due to busy schedules, people forget to water their plants, which hinder their healthy growth. Also, it is very difficult for farmers to water their fields manually and to provide accurate amount of water for healthy growth of plants. Management of water also becomes a huge task due to waterscarcity,since manualirrigationleadsto wastageof water. Also, to avoid empty tank user should be notified to switch ON the motor to fill the tank. To solve this problem we implement the methodology described in figure 1.

## II. METHODOLOGY

Based on our problem statement ,we have created a prototype to implement aautomatic plantwatering system considering all aspects of small gardens to large crop fields. The main components of the project are Arduino UNO, soil moisture sensor,water level sensor ,water pump and GSM module. Using ARDUINOIDE software we can program ARDUINO in such that it irrigates the plants based on the feedback of moisture content provided by the soil moisture sensor. When moisture content is lower than a prescribed limit, water pump starts irrigating. We can use sprinkler or drip system for irrigation[7]. When moisture content reaches the maximum limit, the water pump automatically switches off. The user will be notified when ever water content is low and also after the field gets irrigated with the details of temperature and moisture. The water level sensor will be placed inside the tank. When the water level reaches a lower limit in the tank the user will be notified to switch ON the motor to fill the tank. Also, to avoid overflow, the user will be notified when the water level reaches the maximum limit so that they can switch OFF the motor [8].

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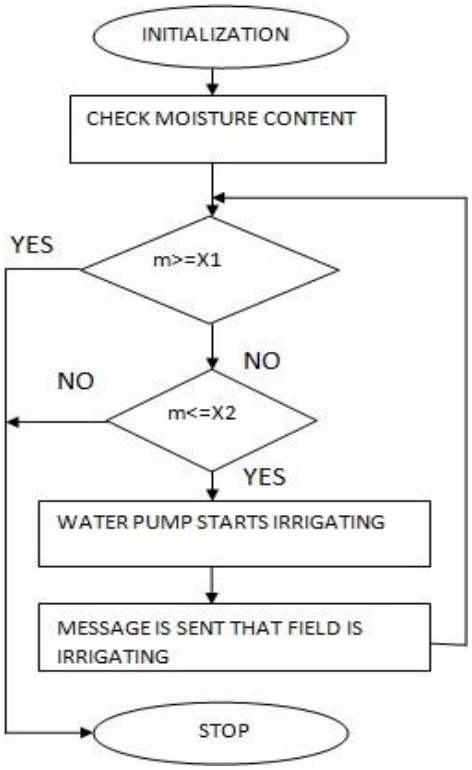


Figure1:MethodologyFlowchart

## III. COMPONENTSUSED

### *A. ARDUINOUNO*

Arduino is an open-source platform based on easy touse hardware and software which can be used as per requirements by the user. The board is based on Microchip ATmega328Pmicrocontroller,consistingof14digitalpins, 6 analog pins, reset pin and is programmable with the Arduino IDE via a type B USB cable as shown in Figure 2. The board will be programmed such that it measures the moisture amount in the soil as well as water level in the water tank and notifies the user with the readings [9].


Figure2:ARDUINO UNO

### *B. SOILMOISTURESENSOR*

This sensor (in Figure 3) measures the soil water content using few properties of the soil, such as dielectric constant,electricalresistance,orinteractionwithneutrons, as a substitute for the moisture content. The two probes allow current to pass through the soil through which it evaluates the resistance value and thus concludes to the moisture value. Wet soil is a good conductor of electricity, i.e., less resistance. Thus, high moisture level is detected. Dry soil is a bad conductor of electricity, i.e., more resistance, i.e., the moisture level will be low [10].

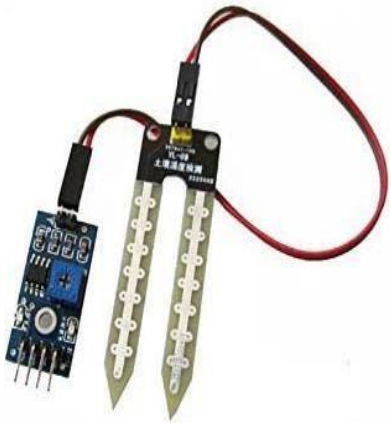

Figure3:SoilMoistureSensor

### *C. WATERLEVELSENSOR*

WaterlevelsensorasshowninFigure4,detectslevelof water in the tank. When water level is below a certain limit the output pin will be high and the user will be notified to switch ON the motor. When the water level reaches a maximum limit, the output pin will be low and the user will be notified to switch OFF the motor [11].

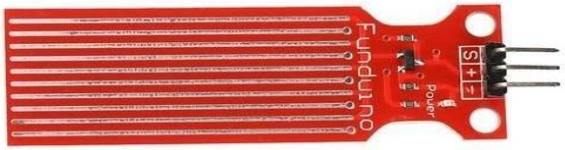

Figure4:Waterlevelsensor

### *D. GSMMODULE*

GSM(inFigure5)isatransceiversystemthatmakesuse of a network provider to connect to and convey information.

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It is used as a wireless system to send the user message, about the status of the system procedure, even if the user is not in proximity of the field/garden [12][13].

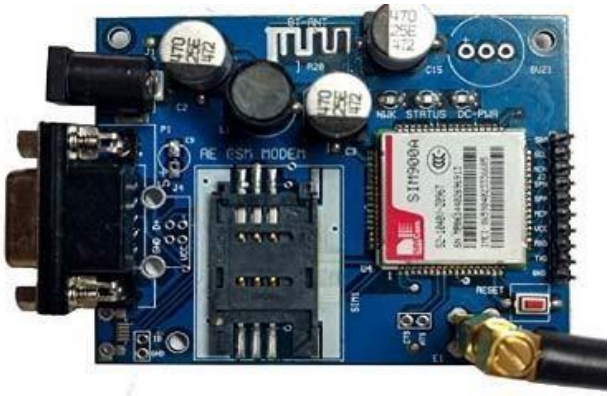

Figure5:GSMModule

*E. MOTORSHIELD*

The motor shield (in Figure 6) allows us to direct the motor rotation direction and speed using Arduino board and also allows an added motor with an external power supplyup to 12V.


Figure6:MotorShield

IV. WORKING

The data pins of soil moisture sensor is connectedto A0 pin of Arduino board and its probe is placed near the roots of the plant. and Vcc pin is connected to 5 V pin of board and GND of sensor and motor driver is connected to GND of board. Probe of soil moisture sensor should be inserted near the roots of the plant.

6V pump is connected to L293d motor driver. It is connected in this way because the amount of power that is given to the motor directly by Arduino is not sufficient to run it.The data pin of motor driver is connected to pin 9 of board.

Working is as follows: the probe connected to the sensor sends some amount ofcurrent into the soil. Ifthe soil is having high moisture content, then it will allow thecurrent to pass through it easily. Output pin will be low and motor will remain OFF.If the soil has less moisturecontent, then it will not allow the current to flow through. Output pin will be high and motor will remain ON [14][15]. By comparing the difference in the rate of flow of current, the moisture in the soil is calculated.

The moisture sensor measures according to the code transferred into the Arduino board. If the readings of the sensor reaches more than X1 (as coded), a SMS will be sent to user using GSM, stating that the field is irrigated.

Based on the input of water level sensor placedinside the tank GSM will notify the user to switch ON the main water motor, to fill the tank, if the water level reachesa lower limit. It will also notify the user to switch OFF the motor once it reaches the maximum threshold. We have shownconnectionsofcomponentsthroughblockdiagramin Figure 7.

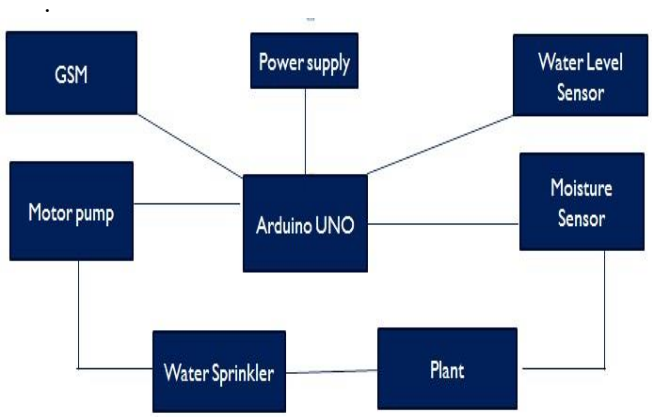


Figure7:BlockDiagram

V. CONCLUSION

This is a low budget project which the farmers of the country can easily afford and can be further improved using technology. This project solves the problem of manual watering and saves a lot of time user. It also focuses on conserving water with increased accuracy in water distribution to the crops and energy. This project includes monitoring soil moisture and supplying water uniformly to the plants using sprinkler or drip system. It also keeps the track of water level.

REFERENCES

[1]N. S. Ishakl , Aziati H. Awang, N. N. S. Bahri, A. M. M. Zaimi,"GSM Activated Watering System Prototype", IEEE,Kuching, Sarawak,2015

[2]YandongZhao,JunfuZhang,WeilunYinWeilunYin,Jinfeng

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,,"Study onPrecision Water-saving Irrigation Automatic Control System by PlantPhysiology", IEEE, Beijing,China,2009

[3]BezaNegashGetu, Hussain A. Attia, "Automatic Control ofAgricultural Pumps Based on Soil Moisture Sensing", IEEE, Ras AlKhaimah, UAE, 2015

[4]NerminĐuzić, Dalibor Đumić, "Automatic Plant Watering System viaSoil Moisture Sensing by means of Suitable Electronics and itsApplications for Anthropological and Medical Purposes",IEEE,Coll.Antropol. 41,2017