

# Agriculture Field Motor Control System using Global System for Mobile Communication (GSM)

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**Abstract:-** This paper is aimed to design a Controlling field Motor using wireless technology GSM. In this paper we are using Arduino micro controller, which is interfaced with a GSM modem to send the message about the motor for particular member. Here how it works: In this paper we interfacing Dc Sprinkler, Moisture Sensor ,GSM Modem to the Microcontroller. When the moisture sensor detect no water in the field the information immediately send to the particular member through GSM modem, automatically motor gets ON. When Moisture Sensor detect water in the field the information immediately send to the particular member through GSM modem, automatically Motor gets off. If there is heavy rain the water level is more in the field that information goes to the Particular member, by that he can control the motor in the field through GSM modem.

**Keywords:-** GSM, Arduino, Moisture Sensor, Agriculture, Power Supply.

## I. INTRODUCTION

India is fundamentally a horticultural nation ,and every one of its assets rely upon the rural output. with the fast advancement of farming in India, many programmed innovations have been acquainted in with agricultural productions. The precipitation in a specific zone might be either insufficient, or sick timed. In request to get most extreme yield, it is basic to supply the ideal amount of water, and keep up right planning of water. This is conceivable just through a methodical water system framework by gathering water during the abundance precipitation and discharging it to the harvest as and when it is needed. By development of appropriate conveyance system, the yield of harvest might be expanded due to controlled water supply. The various techniques for providing water to the fields are surface irrigation, sub-surface water system and sprinkler irrigation. The put away or occupied water is sent to the agricultural fields through some suitable dissemination system. Hence, there square measure presently squeezing wants for keen water system framework.

The point of the paper is to build up a financially savvy arrangement that will give remote control[1] to acceptance engines through cell phones utilizing messages or missed calls. The portable client on the planet has a gigantic ascent during the previous few years. Remote monitoring[1] of processes, machines and so forth., is famous because of advances in innovation and decrease in equipment cost[2]. Cellular systems give short messaging services(SMS)and multimedia messaging services((MMS)[2], approach offers basic interface with just goal wireless location and message prerequisite with no header/protocol[3] overhead. So this strategy is reasonable for remote checking of frameworks with moderate unpredictability.

## II. SYSTEM ARCHITECTURE

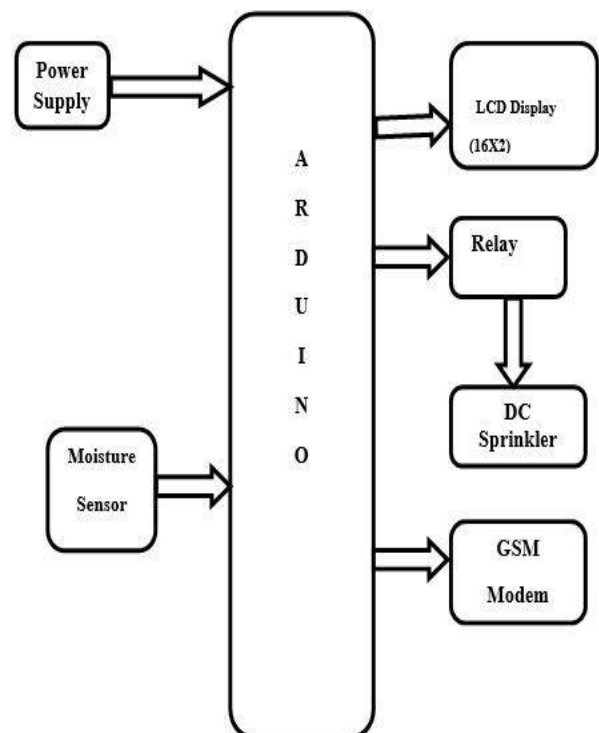


Fig 1:- System Architecture

The above square chart shows the cost of the whole paper which has been talked about over the equipment prerequisites are very restricted and effectively accessible just as less feasible. The directions and message will show on LCD display (Liquid Crystal Display) [4].

### III. HARDWARE DESCRIPTION

#### A. GSM

Global System for Mobile communications (GSM) [4] is an open, advanced cell innovation utilized for transmitting portable voice and information administrations.

GSM (Global System for Mobile communication) is a computerized cell phone framework that is generally utilized in Europe and different countries or regions of the world. GSM utilizes a variety of Time Division Multiple Access (TDMA) [4] is broadly utilized of the three computerized remote phone advances (TDMA, GSM, and CDMA). GSM digitizes and packs information, at that point sends it down a channel with two different surges of client information, each time permitting space. It works at either the 900 MHz or 1,800 MHz frequency band. It supports voice calls and information move rates of up to 9.6 kbit/s, together with the transmission of text message called SMS (Short Message Service).



Fig 2:- GSM Module

#### B. Arduino UNO:

It is an open source microcontroller [5] board based on the ATmega328P (datasheet) consists of 14 digital input/output pins (of which 6 can be utilized as PWM outputs), 6 analog input pins, a 16 MHz crystal oscillator, a USB association, a power jack, an ICSP header, and a reset catch. It contains everything in built expected to help the microcontroller, basically associate it to a PC with a USB cable or power it with an AC-to-DC connector or battery to begin.

It can be controlled by means of the USB association or with an output power supply. Leads from a battery can be embedded in the ground and Vin pin headers of the POWER connector. The board can work with an output power supply of 6 to 20 volts. Whenever provided with under 7V, be that as it may, the 5V pin may supply under five volts and the board might be unstable. In the event that utilizing more than 12V, the microcontroller may overheat and leads damage to the board. The prescribed voltage is 7 to 12 volts.

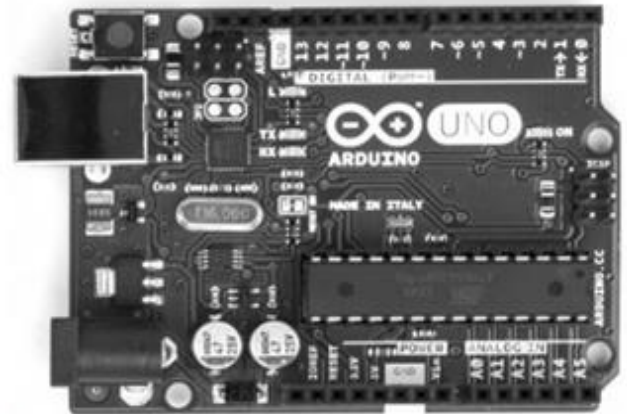


Fig 3:- ARDUINO

#### C. Moisture sensor:

##### ➤ Agriculture

Estimating soil moisture is significant in horticulture to assist farmers dealing with their water system frameworks all the more effectively. In addition to the fact that farmers are ready to commonly utilize less water to grow a harvest, they can expand yields and the nature of the yield by better administration of soil moisture during basic plant development stages [6].

##### ➤ Landscape Irrigation

In urban and rural areas, sceneries and private gardens are utilizing moisture sensors to interface with a water system controller. Interfacing a dirt moisture sensor to a basic water system clock will change over it into a "keen" water system controller that avoids a water system cycle when the soil is wet.

The Moisture sensor [7] is utilized to gauge the water content (moisture) of soil. At the point when the soil is having water deficiency, the module yield is at elevated level, else the yield is at low level. This sensor reminds the client to water their plants and furthermore screens the moisture content of soil. It has been generally utilized in horticulture, land irrigation and botanical gardening [7].

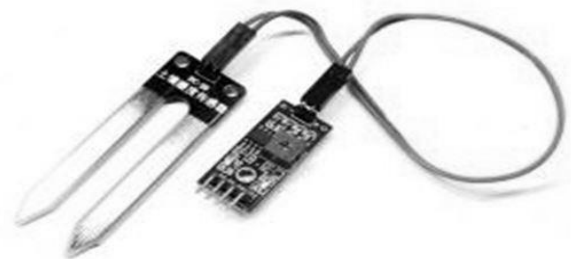


Fig 4:- Moisture Sensor

#### D. DC Sprinkler:

Dc sprinkle[7]r is used for irrigation purpose in agriculture in order to pumping of water .



Fig 5:- DC Sprinkler

#### IV. WORKING PRINCIPLE

This smart agriculture works based on GSM communication[7]. Generally we used 230v voltage for agriculture, But our smart module doesn't take 230v. that's why we need a step down transformer to decrease the voltage level.

This step down transformer converts 230v into 12v. to avoid the fluctuations in this 12v dc voltage we use bridge rectifier and low pass filter. It avoid fluctuations and allow minimum voltage. From this voltage divider board we have TWO 12v terminals and TWO 5v terminals. One of this 12v terminal directly connected to the Arduino(AT mega328P)board and another 12v terminal connect to the GSM module.

The 5v terminal connect to the 5v sprinkle motor. The moisture sensor and 16\*2 display module directly connect to the micro controller board. The GSM module send the data of moisture sensor and sprinkle motor to the host(the GSM module connect to the which mobile)[8]. In the program primary we initialize the sensor value low.

First we check the status of moisture in the field by sending 4-bit command (9999) to the GSM module, When the sensor values low means the moisture is absent then the host send a 4-bit data 1111 to the GSM module, this 4-bit command activate the sprinkle motor. The moisture in the field is sufficient the GSM module send the data of moisture sensor to the host. By using 4-bit command 2222 we can stop the sprinkle motor.

#### V. RESULT

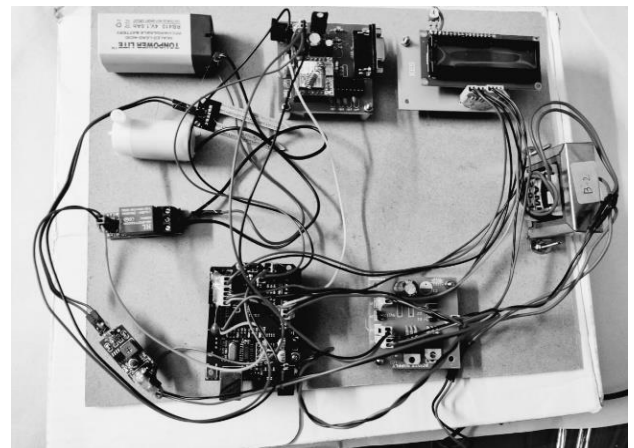


Fig 6:- Kit in OFF State

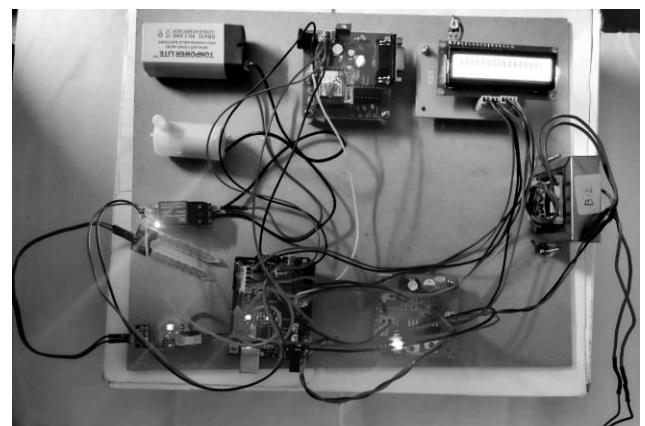


Fig 7:- Kit in ON State

The above kit is in working condition in order to get a exact output in real time we have to follow the commands.If we want to know the status of the field then we have to give the command (Data:9999) through our mobile device the message send to the GSM module and the moisture sensor detect whether the moisture is present or not in the field then we can proceed with either ON or OFF the motor.If we want to ON the motor then give the command(Data:1111) so as to OFF the motor then will give(Data:2222) through our mobile device.It is implemented in order to reduce the work load and increase the productivity as the work of the farmers is affected by the natural conditions such as climate,topography ,etc.

#### VI. CONCLUSION

Thus the developed system enhance the motor control through remote utilizing GSM module( Global System for mobile Communication) in the field ideally. The framework guarantees security of motor against over-burdens, overheating, dry running and stage irregular characteristics. It likewise gives automated restarting if typical conditions are re-established for example at the point when legitimate power rebuilding happens. uniform circulation of water at customary interims, decrease in labour cost, prevention of undesirable water spillage ,minimization of events of motor issues and information to

client about the completion of work are the significant pros of this framework.

The utilization of cell phone has been increasingly basic among the farmers and consequently utilized. The framework demonstrates to be extraordinary aid to farmers whose pump sets are situated far away from their homes because of ability of remote control utilizing phone and information about any anomalous conditions. The framework is intended to have mobile phone with in fabricated protection from unapproved clients. Any phone model can be utilized for correspondence with the goal that the framework improves its flexibility to utilize. Low working cost utilizing messages or missed calls are the significant attractions of this framework.

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