

# GSM based Automated Irrigation Control using Raingun Irrigation System

R.suresh<sup>1</sup>, S.Gopinath<sup>2</sup>, K.Govindaraju<sup>3</sup>, T.Devika<sup>4</sup>, N.SuthanthiraVanitha<sup>5</sup>

PG Student, Embedded System Technologies, Knowledge Institute of Technology, Salem, India<sup>1,2,3</sup>

Assistant professor, Department of Electrical & Electronics Engineering, Knowledge Institute of Technology, Salem India<sup>4</sup>

Professor & Head, Department of Electrical & Electronics Engineering, Knowledge Institute of Technology, Salem, India<sup>5</sup>

**Abstract:** The green house based modern agriculture industries are the recent requirement in every part of agriculture in India. In this technology, the humidity and temperature of plants are precisely controlled. Due to the variable atmospheric conditions sometimes may vary from place to place in large farmhouse, which makes very difficult to maintain the uniformity at all the places in the farmhouse manually .The proposed system implemented GSM is used to report the detailed about irrigation. The report from the GSM is send through the android mobile. The keil software is used for simulated the result

**Index Terms:** Microcontroller, Raingun Irrigation, Android mobile, GSM Module, Sensors

## I. INTRODUCTION

The modern raingun irrigation systems, water is supplied half of the land zone of the plants by raingun due to which a large quantity of water is saved. At the present era, the farmers have been using irrigation technique in India through the manual control in which the farmers irrigate the land at the regular intervals. The global irrigation scenario, however, is characterized by poor performance, increased demand for higher agricultural productivity, decreased availability of water for agriculture, increasing soil salinity and possible effects of global warming and climate changeThis process sometimes consumes more water or sometimes the water reaches late due to which the crops get dried. Water deficiency can be detrimental to plants before visible wilting occurs. Slowed growth rate, lighter weight fruit follows slight water deficiency. This problem can be perfectly rectified if we use automatic microcontroller based raingun irrigation system in which the irrigation will take place only when there will be intense requirement of water.

## II. LITERATURE SURVEY

In Veena Divya,k, AyushAkhouri “A Real time implementation of a GSM based Automated Irrigation Control System using drip Irrigation Methodology”deal GSM based Irrigation Control System, which could give the facilities of maintaining uniform environmental conditions. For this, a software stack called Android is used for mobile devices that include an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Mobile phones have almost become an integral part of us serving multiple needs of humans. This application makes use of the GPRS feature of mobile phone as a solution for irrigation control system.

This system covered lower range of agriculture land and not economically.

In Mansour ”Impact The Automatic Control Of Closed Circuits Raingun Irrigation System On Yellow Corn Growth And Yield” this research paper deals of automatic control of closed circuits drip irrigation system as a modified irrigation system on yellow corn crop vegetative and yield parameters under (KSA) Saudi Arabia conditions at Al-Hasa region. The field experiment carried out under automatic irrigation system for three irrigation lateral lines 40, 60, 80 m under the following three drip irrigation circuits (DIC) of: a) one manifold for lateral lines or closed circuits with one manifold of drip irrigation system (CM1DIS); b) closed circuits with two manifolds for lateral lines (CM2DIS), order to compensate for ETc and salt leaching requirement. and take more power.

In M. Guerbaoui ,elafou,a.ed-dahhak ” GSM based automated drip irrigation system ” we proposed a system contribution to the development of greenhouse production in Morocco. The proposed solution involves the development of an integrated system for automate the drip fertilizing irrigation in green house. The solution adopted involves a data acquisition card PCL-812PG controlled by PC. The irrigation is provided by a hydraulic circuit based on an electric pump. Water needs are evaluated by measuring soil water status by soil humidity sensor.

In Purnima, S.R.N Reddy, “Design of Remote Monitoring and Control System with Automatic Irrigation System using GSM-Bluetooth”,proposed artificially supplying water to land where crops are cultivated. Traditionally hand pumps, canal water and rainfall were a major source of water supply for irrigation. This method has led to severe drawbacks like under irrigation, over-irrigation which in turn causes leaching and loss of nutrient content

of soil. Changing environmental conditions and shortage of water have led to the need for a system which efficiently manages irrigation of fields. Automated irrigation system is a machine based system, which automates the irrigation of land by combining various software and hardware approaches together for field irrigation. This paper deals with a detailed survey of various GSM based automated farm irrigation systems. GSM serves as an important part since it is responsible for controlling the irrigation facility and sends them to receiver through coded signal. Our study is concentrated on comparison of various GSM approaches.

To overcome the above drawback, using rain gun irrigation system saves more than 50% of the water used by flood irrigation system and electricity. Rain Gun Irrigation plays the role of Nitrogen fixation. One of the major nutrient plant requires is Nitrogen. Atmospheric air contains 78% of nitrogen. As our Rain Gun resembles Rain, the water dissolves the nitrogen from air and gives it to soil, thereby adding nutritive value to soil. This is one of the reasons for increase in yield. Clogging problem and less maintenance

### III. PROPOSED SYSTEM HARDWARE

A pipe is connected from water pump and the other opening is kept near the root of the plant, with raingun irrigation mechanism attached to it. The flow of the water from the pipe is controlled by a solenoid valve. The opening and closing of solenoid valve is done by microcontroller. The microcontroller gives signal to the valves which causes it to get open. The water is given to the root of the plant drop by drop, and when the moisture content becomes sufficient, the sensor senses this and gives back the signal to the microcontroller and the buzzer becomes off. Then by pressing the button in the calling function again, the valve is made of f. The power supply needed by the controlling system is +5V.

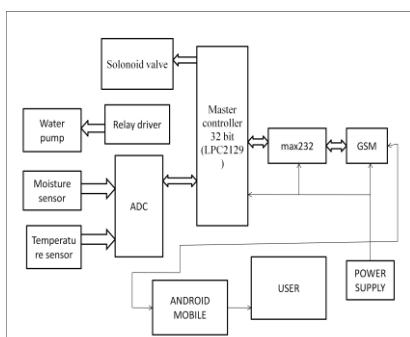


Fig-1 Block diagram for proposed System components

The connections between the two mobiles are done using GSM. The GSM module and microcontroller are connected using MAX232. When the moisture sensor senses that the moisture content of the soil has become low, it gives a signal to the microcontroller. The microcontroller then gives a signal to the called mobile (which is kept in the auto answering mode). The called mobile activates the buzzer. Therefore when calling mobile calls, that buzzer is heard indicating the valve needs to be open. By pressing the button in the called function the signal is given back to the microcontroller.

Raingun irrigation is popular because it can increase yields and decrease both water requirements and labors. When compared with drip systems, raingun irrigation leads to less soil and wind erosion. Raingun irrigation can be applied under a wide range of field conditions..

These are applications written in Java. Some of basic applications include an calendar, email client, SMS program, maps , making phone calls, accessing the Web browser, accessing your contacts list and others. This layer consists of Android libraries written in C, C++, and used by various systems. These libraries tell the device how to handle different kinds of data and are exposed to Android developers via Android Application framework. Some of these libraries includes media, graphics, 3d, SQLite, web browser library etc. The Android runtime layer which includes set of core java libraries and DVM (Dalvik Virtual Machine) is also located in same layer. Runtime Android: This layer includes set of base libraries that are required for java libraries. Every Android application gets its own instance of Dalvik virtual machine Linux-Kernel: This layer includes Android's memory management programs ,security settings, power management software and several drivers for hardware, file system access, networking and inter-process communication. The kernel also acts as an abstraction layer between hardware and the rest of the software stack.

The Global System for Mobile Communications is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe technologies (2G and 3G).

General packet radio service (GPRS) is a packet oriented mobile data service on the 2G and 3G cellular communication system's global system for mobile communications (GSM). GPRS was originally standardized by European telecommunications Standards Institute (ETSI) in response to the earlier CDPD and i-mode packet-switched cellular technologies .It is now maintained by the 3rd Generation Partnership Project(3GPP).

The GSM (Global System for mobile communication) module (mobile)is used for Remote Control (for example Gate Control, Temperature Control etc.). GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces(like RS-232, USB, etc.) for computer.fig7.GSM module structure The MODEM is the soul of such modules. They generate, transmit or decode data from a cellular network, for establishing communication between the cellular network and the computer. These are manufactured for specific cellular network (GSM/UMTS/CDMA) or specific cellular data standard (GSM/UMTS/GPRS/EDGE/HSDPA) or technology(GPS/SIM). They use serial communication to interface with the user and need Hayes compatible AT commands for communication with the computer (any microprocessor or microcontroller system).

The MAX232 is an integrated circuit, which converts signals from RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. It's a dual

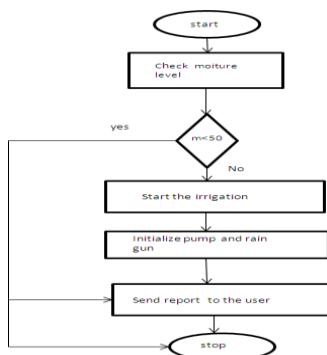
driver/receiver and typically converts the RX, TX, CTS and RTS signals.

The exposed wire is porous; therefore it allows transmission of water vapors into the sensor. These exposed areas are engineered very thinly .Therefore the sensor responds very rapidly to changes in applied moisture ,both when being dried (on process start-up) and when called into action if there is moisture ingress into a process .Despite this extreme sensitivity to changes in moisture content, the Moisture Sensor can be incredibly rugged due to the nature of its construction.

#### IV. SOFTWARE IMPLEMENTATION

The proposed system implemented keil C development tools for the 8051 microcontroller family support every level of developer from the Professional applications engineer to the student just learning about embedded software development. The development .The industry standard Keil C compilers, Macro assemblers, Debuggers, Real time kernels, and single board computers support ALL 8051 compatible derivatives and help you to get your projects completed on schedule. With the keil tools, we can generate embedded applications for virtually every 8051 derivative, The keil software 80541 development tools are designed for the professional; software developer; any level of programmer can use them to get the most out of the 8051 microcontroller architecture. Keil C vision 4 help provide the variation simulation output.

#### Flow chart



#### ALGORITHM

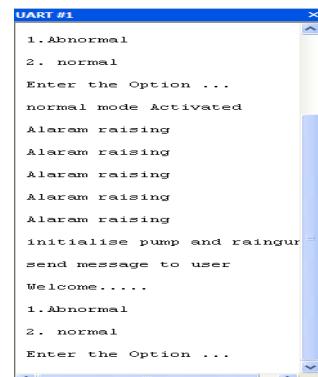
- Step1:** Start the process.
- Step2:** initialize power is supplied to GSM
- Step3:** The moisture level less than or more than.
- Step4:** The level will be more than 50% no need to irrigation
- Step5:** Moisture level less than 50% start irrigation
- Step6:** The initialize the pump and raingun
- Step7:** After the process completed it getting move to original state.
- Step8:** Stop the process.

#### Program:

```
#include<reg51.h>
#include <stdio.h>
char_getkey(void);
void main(void)
{
```

```
char i,j;
SCON=0x50;
TMOD=0x20;
TH1=221;
TR1=1;
TI=1;
while(1)
{
loop:
printf("\n Welcome.....\n");
printf("\n 1.Abnormal \n 2. normal \n");
printf("\n Enter the Option ... \n");
i=_getkey();
switch(i)
{
  case '1':
printf("abnormal ");
goto loop;
break;
  case '2':
printf("\n normal mode Activated\n");
for(j=0;j<5;j++)
{
printf ("\n Alaram raising\n");
printf(" \n initialise pump and raingun \n");
printf(" \n send message to user \n");
goto loop;
break;
}
default:
printf("enter the option 1 or 2");
break;
}
}
}
```

#### V. SIMULATION RESULTS



The mode 1 selected the moisture level above there is no need irrigation. mode 2 selected there is need irrigation start and completed send the message to user through android mobile phone.

#### VI. CONCLUSION

This system supports aggressive water management for the agricultural land. This architecture is based on the capabilities of current and next-generation microcontrollers and their application requirements. Microcontroller used for the system is promising that it can increase system life by reducing the power consumption resulting from lower power consumption.

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## BIOGRAPHIES



**R.Suresh** is pursuing, PG in the discipline of Embedded System Technologies at Knowledge Institute of Technology, Salem, under Anna University, Chennai, India. He received his UG degree in the discipline of

Electrical and Electronics Engineering from Technologies at AVS Engineering college, Salem, under Anna University, Chennai, India. He has published and presented a number of technical papers in National Conferences and Technical symposiums. He is the Executive member of Embedded Club at Knowledge Institute of Technology, Salem. He is doing minor research works on various fields like DSP, Embedded Systems, Power Electronics and Renewable Energy systems. He got best project award for his project in UG. He is highly appreciated by the Head of the Department



**S.Gopinath** is pursuing, PG in the discipline of Embedded System Technologies at Knowledge Institute of Technology, Salem, under Anna University, Chennai, India. He received his UG degree in the discipline of Electrical and Electronics Engineering at Knowledge Institute of Technology, Salem, under Anna University, Chennai, India. He has published and presented a number

of technical papers in National Conferences and Technical symposiums. He is the Executive member of Embedded Club at Knowledge Institute of Technology, Salem. He is doing minor research works on various fields like Robotics, PLC & SCADA, Biomedical, Embedded Systems, Power Electronics and Renewable Energy systems. He got best project award for his project in UG. He is a university foot ball and Hockey player. He is highly appreciated by the Head of the Department.



**K.Govindaraju** is pursuing, PG in the discipline of Embedded System Technologies at Knowledge Institute of Technology, Salem, under Anna University, Chennai, India. He received his UG degree in the discipline of Electronics and Communication Engineering at KSR College of Engineering, Tiruchengode under Anna University, Chennai, India. He has published and presented a number of technical papers in National Conferences and Technical symposiums. He is the Executive member of Embedded Club at Knowledge Institute of Technology, Salem. He is doing minor research works on various fields like Robotics, SCADA, Biomedical, Embedded Systems, Digital Electronics and Communication system. He got best project award for his project in UG. He is highly appreciated by the Head of the Department.



**T.Devika** is currently working as an Assistant Professor in the Department of Electrical and Electronics Engineering at Knowledge Institute of Technology, Salem. She received his UG degree in the discipline of Electronics and Communication Engineering from Velammal Engineering college under Anna University, Chennai and got PG degree in Applied Electronics discipline from Anna University, Chennai. She has presented papers in National and International level conferences. She has guided number of project for students. Her research interests lie in the field of DSP, Embedded System, Digital System Design and Digital Image Processing.



**Dr.N.SuthanthiraVanitha** is currently working as a Professor and Head of the EEE Department at Knowledge Institute of Technology, Salem. She received the B.E. – Electrical and Electronics Engineering from K.S.R. college of Tech, Tiruchengode in 2000 from Madras University, M.E. - Applied Electronics in Kamaraj University and Ph.D., in Biomedical Instrumentation & Embedded Systems in 2009 from Anna University, Chennai. She is life member of ISTE & CSI. Her research interests lie in the area of Robotics, DSP, MEMS and Biomedical, Embedded Systems, Powers Electronics and Renewable Energy systems, etc. She has published and presented number of technical papers in National and International Journals and Conferences. She has guided number of Projects for UG and PG students, currently guiding 12 Ph.D., scholars.