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Automatic Water Saving Irrigation System Using GSM Modem

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Abstract: ***In India, agriculture plays an important role for increment in food production. In our country, agriculture depends on the monsoons which is not sufficient source of water. So the irrigation system is used in agriculture field. In this system depending upon the soil type, water is provided to plant. The developed system is a machine based system, which automates the irrigation of land by combining software and hardware approaches together to find exact field information and to provide instant across the field. This system is based on ARMs and GSM module. This involves some sensors, LCD display, GSM and ARM7LPC2148 processor.LCD will be on field display purpose.GSM module will contains a subscriber identity module (SIM) user can communicate with this SIM-number. An automated irrigation system was developed to optimize water use for agricultural crops. The system has a distributed wireless network of soil-moisture and temperature sensors placed in the root zone of the plants. In addition, a gateway unit handles sensor information, this information then pass to the user. An algorithm was developed with threshold values of temperature and soil moisture that was programmed into a microcontroller-based gateway to control water quantity***

Keywords— Soil moisture sensor, Temperature sensor, GSM, Humidity sensor and Irrigation system

I. INTRODUCTION

Indian economy is basically depends on agriculture. Agriculture uses most of the fresh water resources and this use of fresh water resources will continue to be increase because of population growth and increased demand of food. The automated irrigation system is feasible and cost effective for optimizing water resources for agricultural production. Increasing energy cost and decreasing the water supply point out the need for better water management. irrigation water management involves more than just turning on the irrigation system. Detailed in farmer is far from the agricultural land, he will not be noticed of current condition. To overcome all above disadvantages we are developing our system which is based on ARM7LPC2148 and GSM.

This work implements the emerging application of GSM technology. Using GSM network a control system has been proposed that we will act as an embedded system which can monitor and control agricultural motor and other devices locally using built-in input and output peripherals. These technique, irrigate using following technique.

A. GSM-SMS protocols using GSM module individually or in combination with internet technologies.
B. Monitoring using wireless sensor networks.
C. Wireless monitoring using Bluetooth, Wi-Fi, Zigbee and GSM.

II. LITERATURE SURVEY

A. In this paper, soil moisture sensor ,temperature sensor, Humidity sensor are placed in root zone of the plant and gateway unit handles the sensor information and transmit data to a user. One algorithm was developed for measure threshold values of temperature sensor, soil moisture sensor and humidity sensor that was programmed into a microcontroller to control the water quantity.

B. This paper design model of automatic irrigation system which is based on microcontroller. Various sensors are placed in root of plant. Sensors sense water level continuously and give the information through cellular phone. Farmer controls the motor using cellular phone without going to farm. If the water level reaches greater than threshold value, automatically motor will off without confirmation of farmer.

C. The automatic system based on ARM and for communication GSM technology is used. The GSM is an important part of this system. system communicate using GSM. GSM operate through SMS and link between ARM processor and centralised unit. This system detect climate condition and field condition in real time. This information send to user in the form of SMS and

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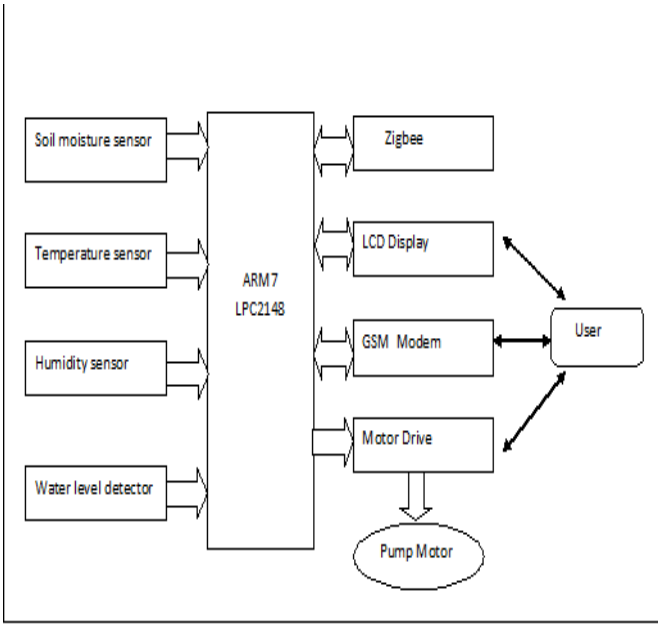
GSM modem is controlled with the help of standard set of AT commands. These commands are used to control majority of the functions of GSM model.

III. SYSTEM DESCRIPTION

The following figure shows the block diagram of modem agricultural system. The sensors as discussed in the block diagram will monitor the field and give the accurate results to the user. Here the new and important things is Level detector sensor means, this condition is very harmful to plant, So immediately release the water into the soil and make it wet. For this we will use the level detector sensor. Temperature and humidity are useful in the case of monitoring the weather conditions. The LPC2148 microcontroller are based on a 32-bit ARM7TDMI with real-time emulation and embedded trace support that combine microcontroller with embedded high speed flash memory up to 512 KB. A 128- bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. Due to their tiny size and low power consumption, LPC2148 are ideal for application where miniautherization is a key requirement, such as access control and point-of- sale. Serial communication interfaces ranging from a USB 2.0 Full-speed device multiple UART, SPI, SSP to I2C-bus and on-chip SRAM of 8 KB up to 40 KB, make these devices very well suited for communication Gateway and protocol converters, Soft modem, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10- bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edges or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical control.

IV. SYSTEM BLOCK DIAGRAM



A. Soil moisture sensor

Measuring soil moisture is very important in agriculture to help farmer for managing the irrigation system. This sensor measures the content of water. Soil moisture sensor use the capacitance to measure the water content of soil. It is easy to use this sensor. Simply insert this rugged sensor into the soil to be tested and the volumetric water content of the soil is reported in percent

B. Temperature and Humidity sensor

Temperature and humidity are important factors which influence growth of plants. A digital component manufactured by sunroom technologies is used to measure the temperature and relative humidity, the schematic diagram of the sensor shown in figure . In the digital component LM35 IC which was manufactured by national Semiconductor is used to measure temperature and HS1101 is used to measure relative humidity. This sensor read the temperature and humidity values and convert to digital. The output in simple serial interface of two types, Serial and SPI output. The sensors work on a 5V DC supply, and current supply of 20mA. The operating temperature range of LM35 sensor is 60°C. The accuracy of LM35 is ±2°C. Humidity value range from 1 to 100% RH.

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The accuracy of humidity sensor is ±5% RH. The read values of the sensor are connected through the data line.The proposed model using ARMLPC2148 which is fully based on GSM module. This project develop agriculture field and increase the growth of food production and provides excellent water management .This can also useful for increasing the economic and demand of food necessity .This system is reduces use of water because it provide as per requirement of plant .

V. RESULT

A. When soil moisture value is less than the threshold value then the motor is start automatically but at that time water level is also checked.

B. As there is no water in tank then motor remains off.

C. There are different conditions for the automation of the irrigation system.

	Threshold Value	Motor (On/Off)	Threshold Value	Motor (On/OFF)
Temperature Sensor	<30C1	ON	>30C0	OFF
Soil Moisture Sensor	<720	ON	>720	OFF
Humidity Sensor	<100%	ON	>100%	OFF
Water level Detector	<16CM	ON	>16CM	OFF

VI. CONCLUSION

The proposed model using ARMLPC2148 which is fully based on GSM module. This project develop agriculture field and increase the growth of food production and provides excellent water management .This can also useful for increasing the economic and demand of food necessity .This system is reduces use of water because it provide as per requirement of plant .

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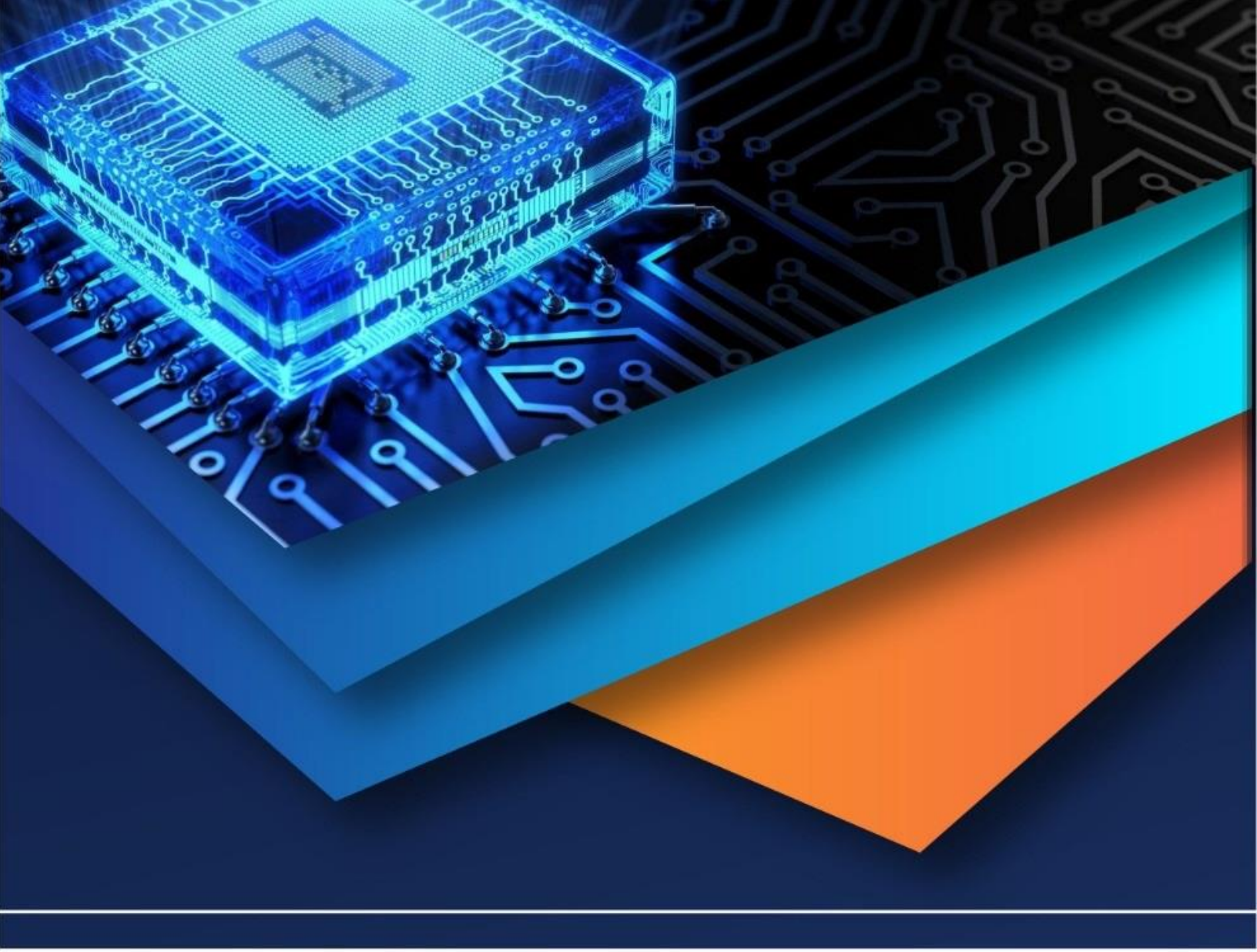

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