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Real Time Agriculture/Paddy Crop Field Monitoring System using ARM

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Abstract:
The paper "ARM Based Agriculture Field Monitoring System using GSM" is mainly focused on modernizing the irrigation technology in agriculture and also to provide adequate irrigation in particular area.The set up consists of mainly ARM7TDMI core and GSM. GSM serves as an important part as it responsible for controlling the irrigation on field and sends them to the receiver through coded ignals.GSM operate through SMS and is a link between ARM processor and centralized unit. ARM7TDMI is an advanced microprocessor and forms the heart of the system. Our project aims at modernizing the agriculture technology by programming the components and building the necessary hardware to automate farming. This project is mainly used to detect the exact field condition as well as weather condition in real time.

Keywords: GSM modem, Microcontroller, ARM7TDMI

I. INTRODUCTION

This paper deals with the irrigation industry. Automated is an interesting application. For real time irrigation of agricultural environment for advancement of agriculture ARM7TDMI processor is general purpose microprocessor in embedded world which is used in industrial level applications. GSM, a as we know, is the most widely used mobile technology, using a simple subscriber identity module(SIM). It has taken the world of mobile communication to new height. GSM has stood its strength due to its efficiency and simplicity. In our project, we basically concentrating on following applications such as:To continuously monitor and control the soil moisture.To continuously monitor and control the water level of well.To monitor the de point content, temperature and humidity so as to forecast the wheather condition.To control the hole system through GSM modem. It gives the detail information about the field condition to the user through SMS. Maintain faithful irrigation of the farm field by constant monitoring 3-phase supply and other field parameters. The system consists of a centralized unit, much like a mobile base-sation consisting of the subscriber number whichforms the link between the user and the device. The hole system works in the form of network being connected to the centralized unit as anode. The centralized unit is connected to many such nodes for receiving and sending the data. The user communicates with the central unit by sending and receiving SMS, which will be receive with help of the SIM card on GSM device.

II. PROPOSED METHOD

The circuit is mainly consisting of LPC2148 Microcontroller, GSM modem, LCD display, temperature sensor, humidity sensor& soil sensor the explanation of this circuit component is as shown below.

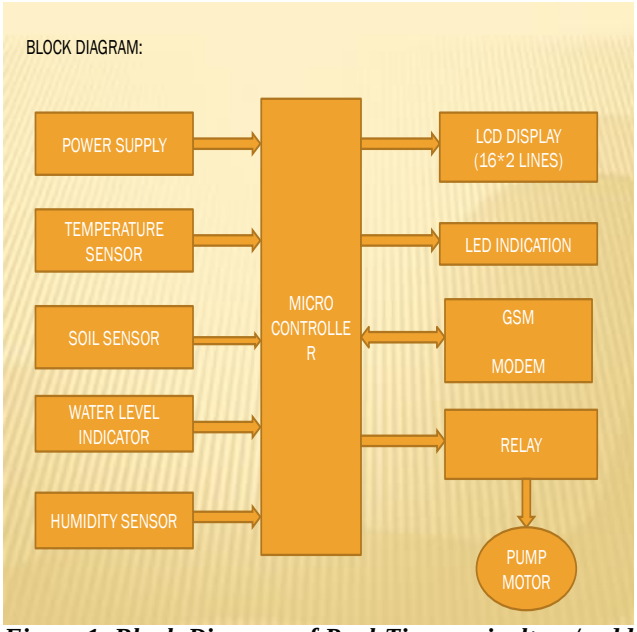

Figure.1. Block Diagram of Real Time agriculture/paddy crop field monitoring system using arm

A. Microcontroller (LPC2148):

The NXP (founded by Philips) LPC2148 is an ARM7 based high-performance 32-bit RISC Microcontroller with 512KB on-chip Flash ROM with In-System Programming (ISP) and In-Application Programming (IAP), 32KB RAM, Vectored Interrupt Controller, Two 10bit ADCs with 14 channels, USB 2.0 Full Speed Device Controller, Two UARTs, one with full modem interface. Two I2C serial interfaces, Two SPI serial interfaces Two 32-bit timers, Watchdog Timer, PWM unit, Real Time Clock with optional battery backup, Brown out detect circuit General purpose I/O pins. Cpu clock up to 60 MHz, On-chip crystal oscillator and On-chip PLL. Due to their tiny size

and low power consumption, LPC2148 are ideal for applications where miniaturization is a key requirement. Such as access control and point-of-sale.

B. Temperature sensor:

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature

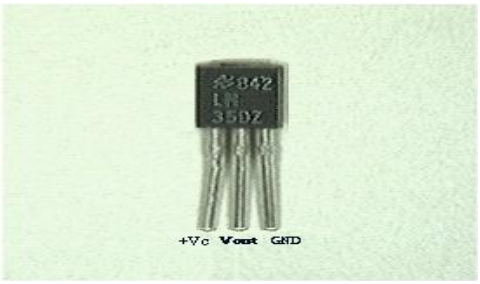

Figure.2. Temperature Sensor

C. LCD display:

A Liquid Crystal Display are widely used in display modules. These LCDs are used to display numbers, characters and special symbols of 5x7/5x10. Here we see how to interface and display a single character with 16x2 character LCD with PLC2148. The following are the basic commands used for LCD are shown in Table.1.

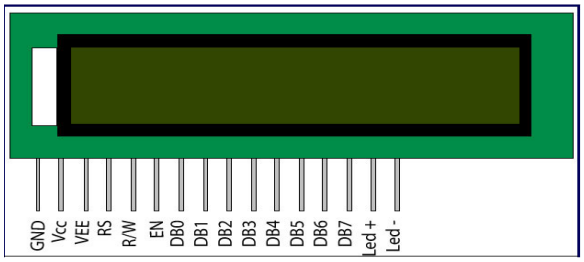

Figure.4. LCD display

Table.1. Commands&function

S.NO	COMMANDS	FUNCTION
1	01H	Clear screen
2	38H	Select 5*7 matrix
3	0EH	Turn ON display, Turn ON Cursor
4	80H	Select Top row
5	C0H	Select bottom row

D. GSM Modem (SIM808):

A GSM modem is a wireless modem that works with a GSM wireless network. Modem is controlled by computer using AT commands. Both GSM modems and dial-up modems support a common set of standard AT commands. But the main difference between them is adial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. GSM is one of the most vital components in our set up since all the communication between the user and centralized unit takes place through line while a wireless modem sends an receives data through radio waves. The module is controlled by AT command via UART and supports 3.3V and 5V logical level.

Figure.5. GSM modem

E. HUMIDITY SENSOR:

Humidity sensor works on the principle of relative humidity and gives the output in the form of voltage. This analog voltage provides the information about the percentage relative humidity present in the environment.

Figure.6.Humidity sensor

High resistance to chemicals and contaminants . High sensitivity and reliability small package . Fast response time. Enclosed in a moulded, creame coloured body. 5mm pitch termination.

F. DC MOTOR

An electric motor i an electromechanical device that converts electrical energy into mechanical energy.

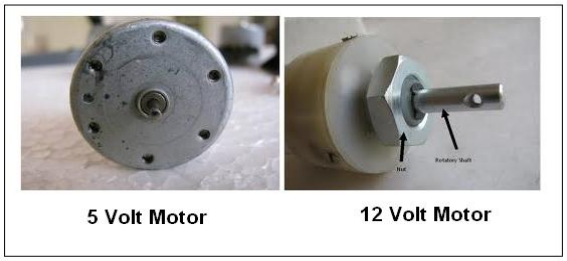

Figure.7.DC motor

Mot electric motors operate through the interaction of magnetic fields and current-carrying conductors to generate force. The reverse process, producing electrical energy from mechanical energy, is done by generators such as alternator or a dynamo, some electric motors can also be used as generators, for example, a traction motor on a vehicle may perform both tasks. Electric motors and generators are commonly referred to as electric machines.

III. PROJECT METHODOLOGY AND DISCCUSSION

The proposed system architecture has several types of nodes deployed in the crop field area. It captures the physical conditions such as temperature, humidity, waterlevel, soil sensor can be continuously monitored in a paddy cropfield. All sensed data from various places of crop field area is transmitted to the central global system of mobile (GSM) node or coordinator node. From the GSM node sensor, the data are sent to the data base. A server is connected to the database, which has minimum and maximum threshold value of temperature, water level, soil sensor stored in software.

Software Used:

1. KEIL µ Vision IDE:

KEIL µ Vision is an IDE (Integrated Development Environment) which is used to develop an application program compile and run it even the code can be debugged.It is a simulator where we can check the application code even in the absence of the hardware board.

2.Flash Magic:

Flash Magic is used for burning the developed code on KEIL in to the microcontroller Chip. the serial port of PC is connected to the port of microcontroller through MAX232 to burn the program into the microcontroller.

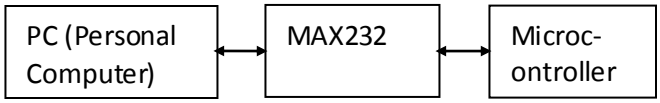

Figure.8. Microcontroller

Schematic Diagram:

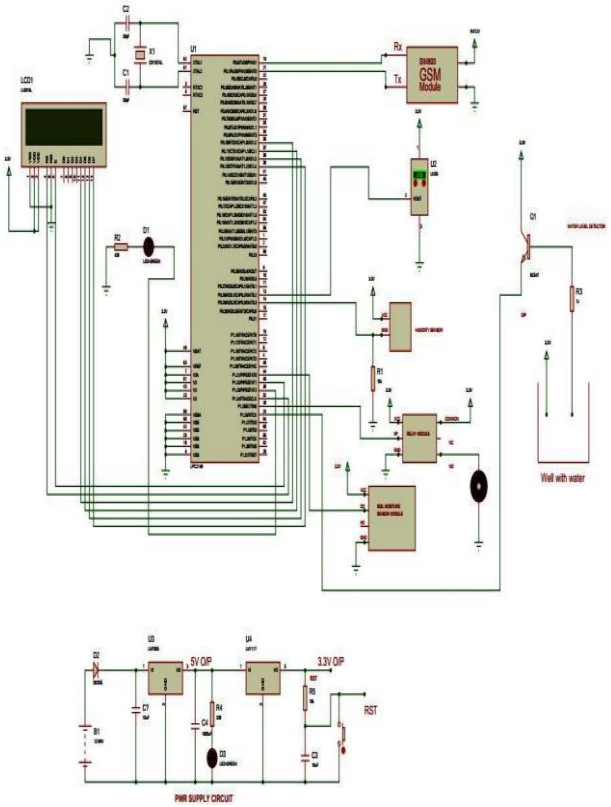

figure.9. schematic diagram

IV.ALGORITHM

In this paper we have discussed about how to utilize the sensor in the paddy crop field area and gives proposed architecture for real time paddy crop field monitoring with GSM wireless network analyzed about real time readings of temperature and humidity sensor deployed in real time. The proposed work gives efficient monitoring of paddy crop field monitoring.

Practical model:

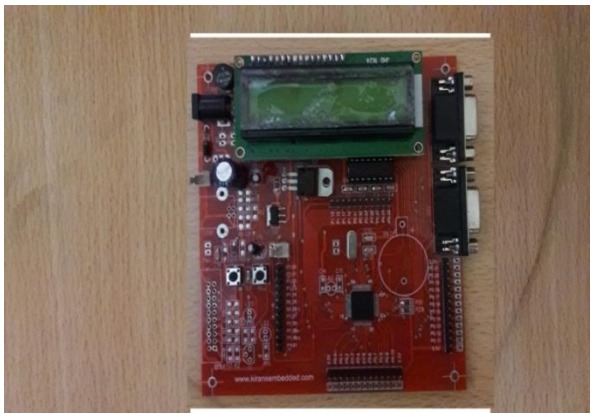

Figure.10. Lcd Displaying Welcome On Power

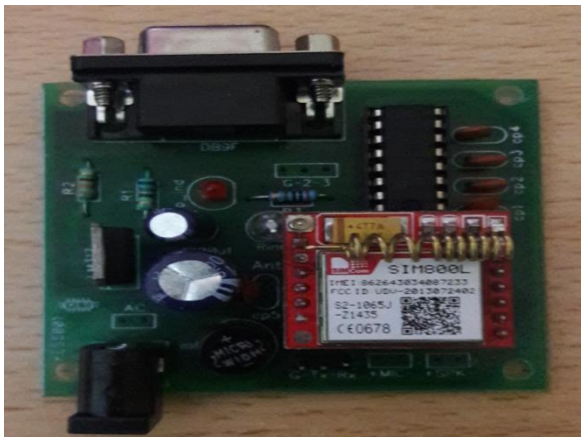

Figure. 11. LCD Displaying 3 Digit Count

APPLICATIONS:

1. This project is used for saving water for farmers help. .
2. Project will display basic information about the sensors

Advantage:

1. Easy to use
2. Low cost
3. Easy to construct

Disadvantages:

1. It is a low range circuit and cannot be implemented in critical condition

V.CONCLUSION

The project entitled "Real Time Agriculture/paddy crop field monitoring system with help of GSM technologies. This project finds application in domestic agriculture field. This can also be used to ensure faithful irrigation of farm field in civilian domain, as well as for horticulture and floriculture areas, since we have

the option of finding out moistu8re level of soil in a particular area.

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