



Design and Development Web Server and Embedded Based Agriculture Automation with Remote Monitoring System

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ABSTRACT -Today, man has occupied all the suitable land but the land located far away from the human settlement is not developed properly and not utilized fully because it requires more man power, time and expenditure. But now a days it is possible to pay more attention with the help of modern available controlled devices like computer, microprocessor, sensor, integrated circuits and microcontroller. In the present work a Microcontroller based the remote irrigation system is developing for the agricultural plantation. The developing system is places at the remote location and required water provides for plantation whenever the humidity, temperature and moisture level of the agro land goes below the set-point value. After the motor is turned On/Off and then scans the next channel. In this way provides right amount of water at right time. And then the microcontroller use to controlling and displaying the resultant sensor values in our own mobile phones at any time.

KEYWORDS- ARM7TDMI Core, GSM, Remote irrigation system, Humidity, Set-point value.

I. INTRODUCTION

Digital agriculture is a new mode of agriculture based on informatization, it will achieve the digital, networking and information-based agriculture production, constructs digital driven system of production and management of agriculture with the integration of data acquisition, digital transmission, data analysis/processing, digital mechanism of agriculture. Finally the digital, networking and automatic agriculture production will be realized. Wireless sensor network is one kind of intelligent system with data collection, data fusion and transmission independently, it developed with the developing of MEMS technology, it is one kind of micro-sensor node with the capability of communication and calculation, it is an intelligent detection and control network system with function of completing some task independently according to the environment. Wireless sensor network involves many advanced technology such as: embedded system technology, computer network technology and communication technology, it is an autonomous unit with the ability of information collection, transmission and processing, it has a better prospect in the network monitoring system. Apparently, wireless sensor network can be used in the realization of digital agriculture, it can take an important role to promote our agriculture to a better level with automation, efficiency, accuracy of mechanism and intelligent production, wireless sensor network will be utilized in the fields of environment monitoring, zoology supervisory and so on, especially in the environment with hard and execrable conditions, it has the advantages to fulfill the task comparing to the traditional detection technology.

II. RELATED WORK

Mahajan, A. et al.,used a concept for a smart wireless sensor web technology for optimal measurements of surface-to-depth profiles of only soil moisture in-situ sensors, takes as the part of operation but accuracy improve more, Jing

Huang, reliable communication can be established over short distance range but here develops no limitation on distance to communicate and controlling the functions, Singh S. N., Monika, technics to control of water supply from storage tank fed from reservoir and supplemented through ground water in rural areas. The control action has been simulated and validated, for its satisfactory performance, by fuzzy control logic. The control system optimizes water consumption, leading to improvement in the ground-water life cycle and increasing the life of pumps and bore wells. High energy wastages to be reduce this method of implementation. A new server based embedded remote monitoring system to be develops on here.

III. SOFTWARE DESCRIPTION

MPLAB IDE is a Windows-based Integrated Development Environment for the Microchip Technology Incorporated PIC microcontroller (MCU) and ds PIC digital signal controller (DSC) families, it Create source code using the built-in editor, Assemble, compile and link source code using various language tools. An assembler, linker and librarian come with MPLAB IDE. Fig.1. software developer design C compilers are available from Microchip and other third party vendors, Debug the executable logic by watching program flow with a simulator, such as MPLAB SIM, or in real time with an emulator, such as MPLAB ICE. Third party emulators that work with MPLAB IDE are also available, also make timing measurements, and view variables in Watch windows.

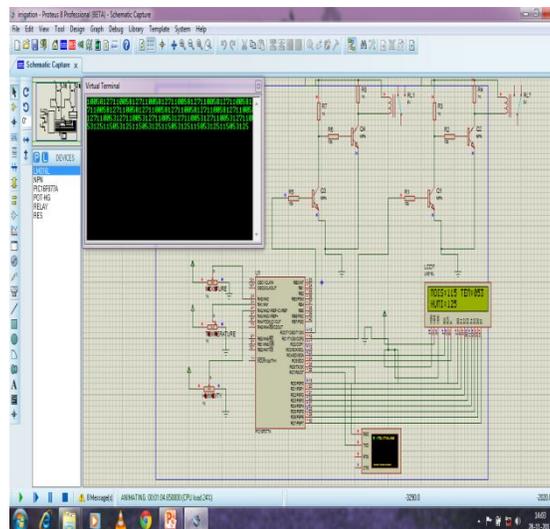


Fig.1. software developer design

The PRO MATE II is a Microchip microcontroller device programmer. High level java based C language and PRO MATE II may be uses with MPLAB IDE running under supported Windows OS's with the command-line controller PROCMD or as a stand-alone programmer. The PIC start plus software running under MPLAB provides for full interactive control over the programmer. Java language is preferred for these reasons: simple, object-oriented and familiar, robust and secure, architecture-neutral and portable, high performance, interpreted, threaded, and dynamic.

IV. HARDWARE DESCRIPTION

The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complementary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques.

Technology that is used in PIC16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and erasing are other features of PIC16F877. And then PIC start plus programmer gives the product developer ability to program user software in to any of the supported microcontrollers, running under MP lab control over the programmer.

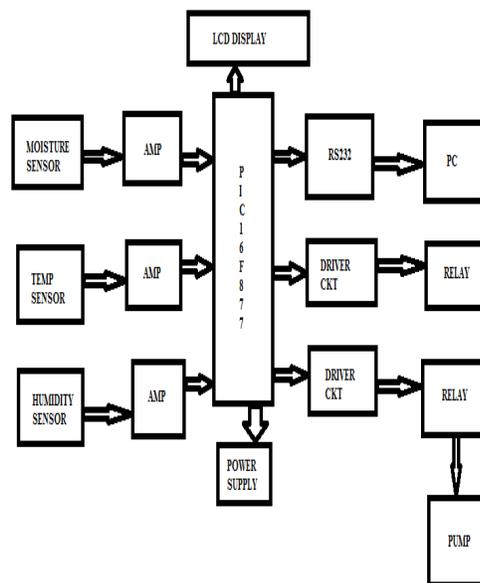


Fig.2.block diagram

V. SENSOR PERFORMANCE

A) Humidity sensor senses relatively with air humidity. This means that it measures both air temperature and moisture. Relative humidity, expressed as a percent, is the ratio of actual moisture in the air to the highest amount of moisture air at that temperature can hold. The warmer the air is, the more moisture it can hold, so relative humidity changes with fluctuations in temperature. The most common type of humidity sensor uses what is called “capacitive measurement.” This system relies on electrical capacitance, or the ability of two nearby electrical conductors to create an electrical field between them. The sensor itself is composed of two metal plates with a non- conductive polymer film between them. The film collects moisture from the air, and the moisture causes minute changes in the voltage between the two plates. The changes in voltage are converted into digital readings showing the amount of moisture in the air.



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B) Measuring soil moisture is important in agriculture to help farmers manage their irrigation systems more efficiently. Not only are farmers able to generally use less water to grow a crop, they are able to increase yields and the quality of the crop by better management of soil moisture during critical plant growth stages. Besides agriculture, there are many other disciplines using soil moisture sensors. Golf courses are now using sensors to increase the efficiencies of their irrigation systems to prevent over watering and leaching of fertilizers and other chemicals offsite. One common type of soil moisture sensors in commercial use is a frequency domain sensor such as a capacitance sensor. Another sensor, the neutron moisture gauge, utilizes the moderator properties of water for neutrons. Cheaper sensors often for home use- are based on two electrodes measuring the resistance of the soil. Here accuracy is low, so using two inverting amplifiers for get more accurate result.

C) The resistance of most common types of thermistor decreases as the temperature rises. They are called negative temperature coefficient, or NTC, thermistors, $-t^\circ$ to the circuit symbol. A typical NTC thermistor is made using semiconductor metal oxide materials. (Semiconductors have resistance properties midway between those of conductors and insulators.) As the temperature rises, more charge carriers become available and the resistance falls.

Finally, fig.2.block diagram basis temperature and humidity sensors use the voltage divider for get better performances on result.

D) A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are doublethrow (changeover) switches. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. SPDT relay for transistor control function.

E) A driver is an [electrical circuit](#), used to control another circuit or other to component, such as a high-power [transistor](#) in AC-to-DC [voltage converters](#). In this driver circuit is using for pic microcontroller in between relay control operation. If transistor1 output is high means relay off, and low means relay is on.

F) PC is using for network connection and android to help controlling and display the sensor rates in every change on the system.

VI. CONCLUSION AND FUTURE WORK

This project finds application in domestic agricultural field. In civilian domain, this can be used to ensure faithful irrigation of farm field, since we have the option of finding out moisture level of soil in a particular area. The universal networking sensor network is a kind of new technology for information acquisition and processing, in some particular field, it has more advantages than traditional technology. This work structured the network monitor system by sensor node design. This kind of wireless detection and control has the advantages than traditional agriculture: set up the network easily, lower cost by one-off structure, strong expansibility, fine flexible, it can improve the mode of existing production and management effectively, promote the production efficiency of agriculture. The future scope of this project is enhanced applications with the addition of the required features.

- One such application is to detect the soil parameter and suggesting the proper fertilizer and its feed time. Such Sensors can be incorporated in the design. It can also be designed to detect the particular disease on the plant and suggest the proper curative measures on it.
- In the same manner one can exactly predict the weather if the system is made to communicate with the nearer weather station through satellite communication.



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