Design and Implementation of MCU and the Internet Communication System Based on GPRS

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ABSTRACT:

For such an environment, such as radiation, pollution, dangerous situations, distributed environment where the staff is not easy to reach, it is difficult to complete data collection and real-time monitoring through the traditional manual method.

The purpose of system is to implement the remote wireless communication between MCU and GPRS. The proposed project aims in designing an automatic operated system which is capable of controlling the electrical devices based on the sensors unit. This system creates a new era in the automation system. This system integrates human-machine interface.

Keywords:
GPRS, Agricultural Applications, Sensors, Micro controlling unit.

I. INTRODUCTION:

As the population is increasing that increased the food demand and due to which day to day the natural resources are getting endangered such as water bodies e.t.c., there are many other ways for saving water in irrigation needs and to maintain sustained growth in the field of agriculture.

The enormous growth in Science and technology has once again proved that the strategies designed to rescue the situation in agricultural applications. For this needs we have proposed a system called "Design and Implementation of MCU and the Internet Communication System Based on GPRS."

Here in this proposed project we consider wireless sensor units and GPRS technology interfaced to a micro controlling unit based on ARM-7 controller. Vast growth in the wireless communication technology has provided the reliability to control or monitor devices remotely with just one click, these systems's integrates human-machine interface, gives effective results in less time.

In the past many papers have proposed the monitoring measures of the system design for various applications. In this paper I have included the monitoring and controlling measures in the design and implementation of MCU and the Internet communication system based on GPRS.

This paper is designed in the following pattern. System's overview and general architecture, the hardware implementations, the software implementations finally, we conclude design evaluation and result.

II. System overview:

In this project work the controlling device of the whole system is done using ARM-7 Microcontroller. Whenever the sensors unit gets the input from respective sensors like temperature LM35 sensor, level indicator sensor LM324 and Gas leakage detector are fed to the ARM 7 microcontroller(4). ARM-7 Microcontroller performs appropriate task related to the data received like motor ON/OFF control, fan as coolant control system and buzzer as the indication for gas leakage.

The ARM-7 microcontroller is also interfaced with GPRS module which is used to display the devices monitoring status directly to the predefined webpage (http://ksp.comoj.com/LPC2148gprs.html). The ARM-7 Microcontroller used in the project is programmed using (Embedded C language) Keil µVision3 IDE and program code is dumped on to the board by using Flash Magic Software.

III. Hardware implementation:

The project provides us exposure on:

1.ARM7 controller.

2.Interfacing GPRS modem with microcontroller.

3.Different sensors like LM35, LM324 and Gas leakage detector.

4.LCD interfacing.

The major hardware components used in the design of MCU and wireless units interface on ARM-7 microcontroller board are, GPRS modem, Temperature sensor, Water level indicator sensor, Gas leakage detector and reset button are fed as input to MCU.

For controlling purpose the temperature can be lowered by fan as coolant control system, to switch on the fan automatically relay is used as a switch, Triac is a driver circuit for driving AC motor ON/OFF control so as to control a water level sensor (LM324) is used for water level indication, buzzer as the indication for gas leakage detection.

The whole system measures are displayed on a 16x2 char LCD display. The controller is loaded with a program written using Embedded 'C' language.

Figure 1 shows the block diagram of the overall system's architecture.

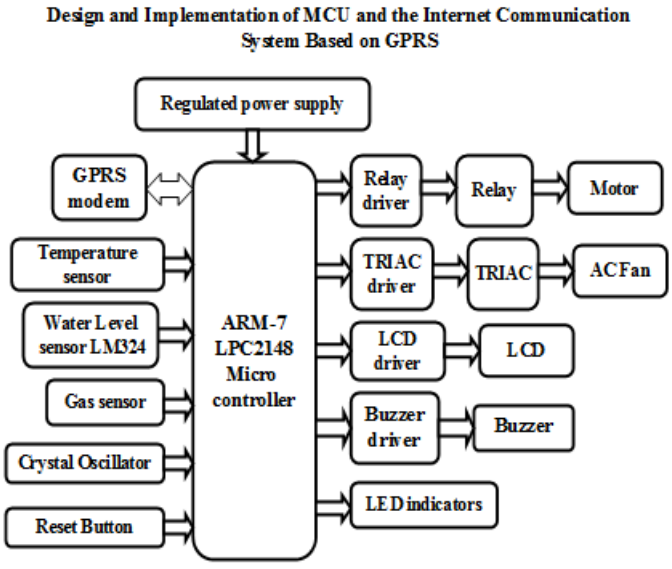

Fig.1: Block diagram of MCU and I/O Units.

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III. Software implementation:

1.Express SCH for Circuit design.
2.Proteus for hardware simulation.
3.Keil µ vision software for Embedded C programming.
4.Flash magic software for dumping code into Micro controller.

Initially a CAD circuit was designed using Express SCH, using Proteus hardware simulator all the hardware modules are tested with their working conditions, after hardware simulation was performed they are connected according to the circuit design again a trial and error run test was made to check whether all the connections are correctly placed.

A source code was developed using Keil µ vision software in Embedded C language, then it was debugged and built error free. The code written in embedded C language was dumped into Micro controller using Flash magic software. Finally both hardware and software are embedded so as to perform the defined project operations. Hence required result was obtained.

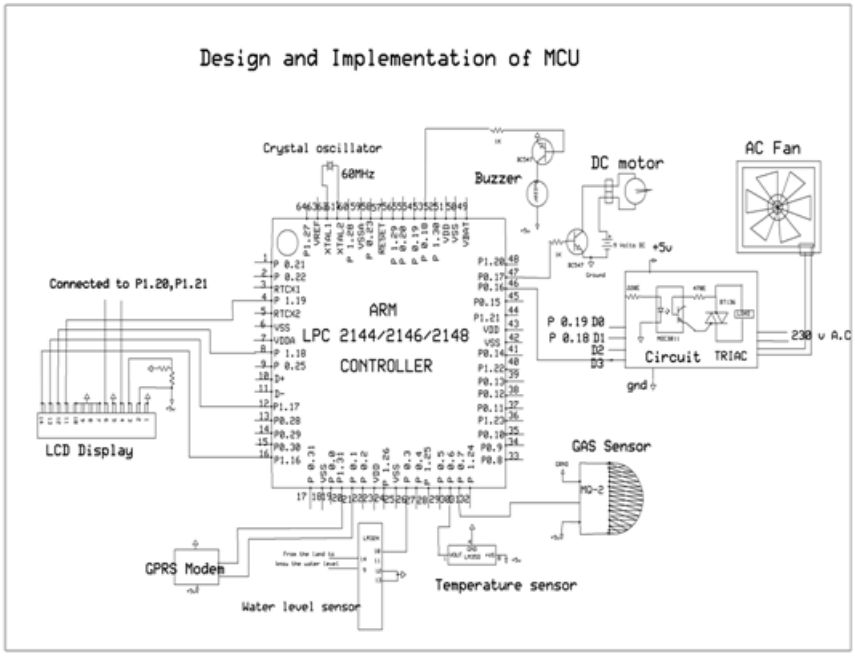

Fig.2: Circuit diagram of design and implementation of MCU.

Parameters	Value
Water Level	HIGH
Motor Status	OFF
Live Temperature	30 °C
GAS Status	LOW
FAN Status	OFF

Fig.3: Web page monitoring

IV. Html link:

http://ksp.comoj.com/LPC2148gprs.html

GSM and GPRS based multiple parameters monitoring and control system.(using ARM LPC2148).

V. CONCLUSION:

The automated irrigation system implemented was found to be feasible and cost effective for optimizing water resources for agricultural production. This irrigation system allows cultivation in places with water scarcity thereby improving sustainability.

The automated irrigation system developed proves that the use of water can be diminished for a given amount of fresh biomass production.

The use of solar power in this irrigation system is pertinent and significantly important for organic crops and other agricultural products that are geographically isolated, where the investment in electric power supply would be expensive.

The irrigation system can be adjusted to a variety of specific crop needs and requires minimum maintenance. The modular configuration of the automated irrigation system allows it to be scaled up for larger greenhouses or open fields. In addition, other applications such as temperature monitoring in compost production can be easily implemented. The Internet controlled duplex communication system provides a powerful decision-making device concept for adaptation to several cultivation scenarios. Furthermore, the Internet link allows the supervision through mobile telecommunication devices, such as a smart phone.

Besides the monetary savings in water use, the importance of the preservation of this natural resource justify the use of this kind of irrigation systems.

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