Cost effective atomization of Indian agricultural system using 8051 microcontroller

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Abstract: Automizing the agricultural system is very useful for old people and normal persons who lives far away from the agricultural field. If installed and programmed properly, automatic agricultural systems can even save us money and help in water conservation. Here LCD and GSM receive the information about temperature, humidity and conditions of the soil and motor. The paper "Modernization of Indian agricultural system using micro controller" using 8051 and GSM' is focused on atomizing the irrigation system for social welfare of Indian agricultural system and also to provide perfect irrigation in particular area. Soil moisture sensor sense the condition of the soil whether it is dry or wet and sends the information to microcontroller. Water level sensor senses the water level in the water source and sends the information to the microcontroller. Microcontroller sends the information to the relay then on/off of the motor is done. Temperature and humidity sensor also sense the condition of the weather and sends the information to microcontroller. There is a serial communication between microcontroller and GSM. So the information from the microcontroller is sent as SMS through GSM .LCD displays & GSM receives the information about temperature, humidity and conditions of the soil and motor our project aims to implement the basic application of Modernization the irrigation field by programming the components and building the necessary hardware. This project is used to find the exact field condition and it will give information to farmer by sending sms.

I.INTRODUCTION

8051 micro controller is the contemporary general purpose microcontroller in the embedded market used in industrial level applications yield. In the field of soil environmental monitoring, real-time monitoring the temperature and humidity of soil can correctly guide agricultural production and improve crop. Automatic agricultural systems are convenient, especially for those who travel. If installed and programmed properly, automatic agricultural systems can even save us money and help in water conservation. Dead lawn grass and plants need to be replaced, and that can be expensive. But the savings from automatic agricultural systems can go beyond that.

Watering with a hose or with oscillator wastes water. Neither method targets plant roots with any significant degree of precision. Automatic agricultural systems can be programmed to discharge more precise amounts of water in the field, which promotes water conservation.

At present, labor-saving and water-saving technology is a key issue in agriculture. There have not been any significant technological advancements being made in agricultural sector as compared to other sectors. Agricultural system needs to be monitored on a regular basis. The use of this project is to reduce the wastage by automating the entire agricultural system.

The water or moisture sensor is placed in the field which continuously senses the moisture content in the field. If the field is dry, then the microcontroller unit automatically turns on the motor. If the field is wet, the microcontroller automatically turns off the motor. Temperature and Humidity sensor senses the weather conditions and sends the values to the mobile.

II. WORKING PRINCIPAL

To continuously monitor soil moisture

In case of monitoring the soil moisture, we know that each crop requires different moisture level. we are using a soil moisture sensor which is based of the principle of parallel capacitor. As we know that the voltage across the is inversely proportional to the dielectric medium. This

principle is used to determine the soil moisture by measuring the dielectric constant of soil. This is then informed the centralized unit. The centralized unit will send the message to the device of that particular subscriber. The device waits for a certain amount of default time for which it is programmed. When the user does not respond to the centralized unit in default period the device continues monitoring the field parameters and keep on sending automatically to the centralized unit. Using the database stored in EEPROM of ARM, the corresponding moisture can be known by comparing the stored values and received information from the sensor which ensures faithful irrigation for particular crop.

To continuously monitor the water level of the well

It Is one of the significant operation. It might happen that the water level reaches to critical level and the motor is still running. In order to avoid such situation arrangement should be there to monitor the water level. If the subscriber wants to enquire about the water level status at a particular time, he can send a message to the centralized unit. Centralized unit checks the water level and reply the subscriber with the current status. The receiver uses a standard form of message decoding called NMEA protocol. In our project, we do not display the message on LCD although we have the facility.

Water level sensor

This sensor is implemented with the help of electromagnetic reed switch and a floating magnet. The reed switch is based on the principle that when it will come in contact of any magnetic field it provides conductivity.
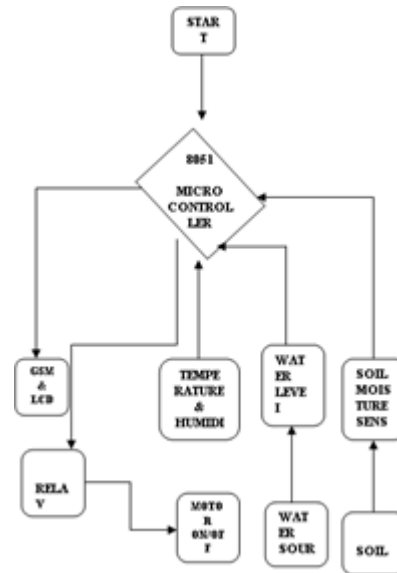*Phase sensor:*

It is based on the principle that whenever it will encounter 3 phases it will trigger a secondary relay circuit which in turn triggers the port pins indicating presence of all the three phases.

III. BLOCK DIAGRAM
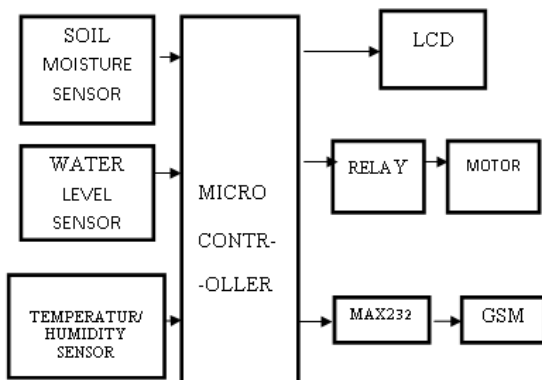
IV. FLOW CHART

V. SOFTWARE REQURIEMENTS

Keil an ARM Company makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, evaluation boards, and emulators for ARM7/ARM9/Cortex-M3, XC16x/C16x/ST10, 251, and 8051 MCU families.

Keil development tools for the 8051 Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. When starting a new project, simply select the microcontroller you use from the Device Database and the µVision IDE sets all compiler, assembler, linker, and memory options for you.

Keil is a cross compiler. So first we have to understand the concept of compilers and cross compilers. After then we shall learn how to work with keil.

EMBEDDED C:

Use of embedded processors in passenger cars, mobile phones, medical equipment, aerospace systems and defense systems is widespread, and even everyday domestic appliances such as dish washers, televisions, washing machines and video recorders now include at least one such device. Because most embedded projects have severe cost constraints, they tend to use low-cost processors like the 8051 family of devices considered in this book. These popular chips have very limited resources available most such devices have around 256 bytes (not megabytes!) of RAM, and the available processor power is around 1000 times less than that of a desktop processor. As a result, developing embedded software presents significant new challenges, even for experienced desktop programmers. If you have some programming experience

- in C, C++ or Java - then this book and its accompanying CD will help make your move to the embedded world as quick and painless as possible.

CONTINUITY TEST

In electronics, a continuity test is the checking of an electric circuit to see if current flows (that it is in fact a complete circuit). A continuity test is performed by placing a small voltage (wired in series with an LED or noise-producing component such as a piezoelectric speaker) across the chosen path. If electron flow is inhibited by broken conductors, damaged components, or excessive resistance, the circuit is "open".
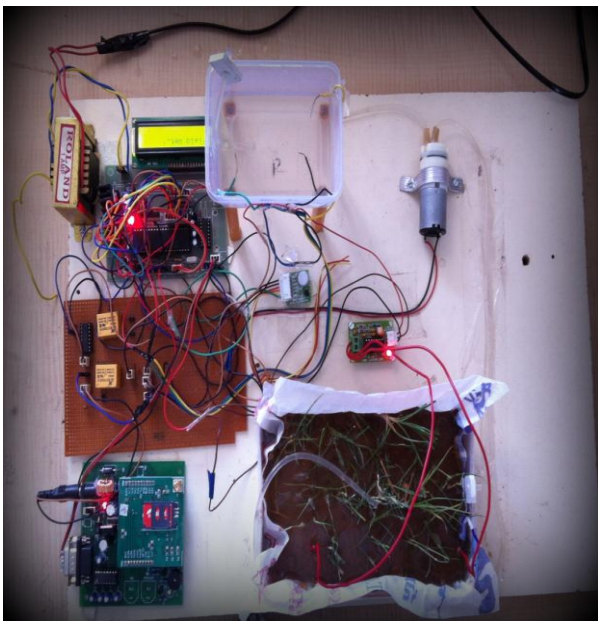
Devices that can be used to perform continuity tests include multi meters which measure current and specialized continuity testers which are cheaper, more basic devices, generally with a simple light bulb that lights up when current flows.

An important application is the continuity test of a bundle of wires so as to find the two ends belonging to a particular one of these wires; there will be a negligible resistance between the "right" ends, and only between the "right" ends.

This test is the performed just after the hardware soldering and configuration has been completed. This test aims at finding any electrical open paths in the circuit after the soldering. Many a times, the electrical continuity in the circuit is lost due to improper soldering, wrong and rough handling of the PCB, improper usage of the soldering iron, component failures and presence of bugs in the circuit diagram. We use a multi meter to perform this test. We keep the multi meter in buzzer mode and connect the ground terminal of the multi meter to the ground. We connect both the terminals across the path that needs to be checked. If there is continuation then you will hear the beep sound.

VI. POWER ON TEST

This test is performed to check whether the voltage at different terminals is according to the requirement or not. We take a multi meter and put it in voltage mode. First of all check the voltage across the battery terminal whether it is fully charged or not, the battery used in this project is 12V, so touch the 'red terminal' of battery with 'red probe' of multi meter and touch 'black terminal' of battery with 'black probe' of multi meter, if 12V is being displayed on multi meter screen then we can proceed for next steps.

Now that the power supply is available, no IC should be inserted in the base, first apply power and check whether proper voltage is reaching at 'vcc' and 'gnd' pins of each IC base or not. If proper voltages appear at the supply pins of IC bases then insert IC and check the required output.

Now we have to check whether the LEDs are in working condition or not, Red LED or IR LED or Photo diode has got one 'longer leg' and one 'shorter leg'. Longer leg is positive terminal of LED and shorter leg is negative terminal.

Now keep the multi meter in 'buzzer mode or continuity mode' and touch 'red probe' of multi meter to the 'longer leg' of LED and 'black probe' of multi meter to the 'shorter leg' of LED.

Now solder Red LED into PCB, remember 'longer leg' of LED should be inserted into positive marking on PCB and 'shorter leg' should be inserted into other hole of LED marking on PCB. Now after soldering LED with a series resistor apply battery voltage to the board and see whether the

LED is glowing or not. The black LED is photodiode and white LED is IR diode even these components have got longer leg and shorter leg,

VII. FUTURE SCOPE

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.

By using ARM processor, the video of the agriculture is captured and that video is sent through an multi-media message service (MMS).Every operation

regarding to the agriculture is done through mobile controlling such as motor ON/OFF.

VIII.CONCLUSION

The project is thus carried out using 8051microcontroller with the help of GSM technologies

Traditional or old-type farming involved much more manual labour and for longer hours than the more modern methods of today. Farmers were highly dependent on climate and weather. In traditional agricultural system the farmer is used to stay at nights in order to ON the motor when power comes. Instantly the farmer comes to the field to monitor its condition

This project finds application in domestic agricultural field. Incivilian 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.

REFERENCES

1. Zhang xihai, Zhang changli Fang junlong. Smart Sensors Nodes for Wireless Soil Temperature Monitoring
2. Systems in Precision Agriculture2009. 237-241
3. Bogena H R, Huisman J A, OberdÊrster C, et al. Evaluation of a low cost soil water content sensor for wireless network applications [J].Journal of Hydrology, 2007, 32-42
4. Li wenzhong Duan chaoyu. ZigBee2007/PRO experiment And practice of stack. Press of Beihang University, Beijing, 2007
5. George W. Irwin, Jeremy Colandairaj and William G. Scanlon, An Overview of Wireless Networks in Control and Monitoring, International Conference on Intelligent Computing, Kunming , CHINE (2006), Vol. 4114, 2006, pp. 1061-1072.
6. Tseng Chwan-Lu, Jiang Joe-Air, Lee Ren- Guey, Lu Fu-Ming, Ouyang Cheng-Shiou, Chen Yih-Shaing and Chang Chih-
7. Hsiang, Feasibility study on application of GSM–SM technology to field data acquisition,
8. Computers and Electronics in Agriculture, Vol. 53, Issue 1, 2006, pp. 45-59.
9. S. Correia, V. Realinho, R. Braga, J. Turégano, A. Miranda, J.
10. Gañan, Development of a Monitoring System for Efficient
11. Management of Agriculture Resources, Proceeding of the VIII
12. International Congress on Project Engineering, 2004.
13. Ning Wang, Naiqian Zhang and Maohua Wang, Wireless
14. Sensors in Agriculture and Food Industry - Recent
15. Development and Future Perspective, Computers and
16. Electronics in Agriculture, Vol. 50, Issue 1, 2006, pp. 1–14.
17. Jing Li, Yong Xu. Remote Monitoring Systems Based on
18. Embedded Database [C]. Third International Conference on
19. Genetic and Evolutionary Computing.2009:381-384.
20. Tseng Chwan-Lu, Jiang Joe-Air, Lee Ren- Guey, Lu Fu-Ming,
21. Ouyang Cheng-Shiou, Chen Yih-Shaing and Chang Chih-
22. Hsiang, Feasibility Study on application of GSM–SMS technology to field data acquisition,
23. Computers and Electronics in Agriculture, Vol. 53, Issue 1,
24. 2006, pp. 45-59.
25. S. Correia, V. Realinho, R. Braga, J. Turégano, A. Miranda, J.
26. Gañan, Development of a Monitoring System for Efficient
27. Management of Agriculture Resources, Proceeding of the VIII International Congress on Project Engineering, 2004.