



WIRELESS MONITORING AND AUTOMATED IRRIGATION CONTROL SYSTEM

C Venkat Swamy¹, B Santosh Kumar²

¹Pursuing M.Tech (ES) from Visvesvaraya College of Engineering and Technology VCET,

M.P.Patelguda, Ibrahimpatnam, RangaReddy, Telangana, (India)

²Working as Assistant Professor & HOD, ECE Department,

Visvesvaraya College of Engineering and Technology (VCET), M.P.Patelguda, Ibrahimpatnam ,
RangaReddy, Telangana, (India)

ABSTRACT

The current Agricultural system, water is supplied a large portion of the area zone of the plants by downpour because of which an expansive amount of water is spared. The Real-time atomization of Agricultural Environment for Social Modernization of Indian Agricultural System concentrates on utilizing an ARM7TDMI Core 32-bit chip, GSM administrations which work through SMS as a connection between ARM processor and incorporated unit. GSM is utilized to educate the client about careful field condition through a SMS on client demand. The GSM model is controlled by a standard arrangement of AT (Attention) orders. The irrigation control system consistently screens the dirt dampness, water level of the land, temperature, moistness, climate conditions and gives the insights about the field to client however SMS. At whatever point the client sends a SMS to the GSMmodem, depends up on the message the operation will be prepared.

Keywords: GSM Module, Mobile, SMS, Temperature Sensor, Humidity Sensor, Water Level and Micro Controller.

I. INTRODUCTION

The worldwide Irrigation system situation, be that as it may, is portrayed by poor execution, expanded interest for higher farming efficiency, diminished accessibility of water for agribusiness, expanding soil saltness and conceivable impacts of an Earth-wide temperature boost and environmental change. This procedure in some cases devours more water or at times the water comes to late because of which the harvests get dried. Water unavailability can be impeding to plants before obvious withering happens. Impeded development rate, lighter weight natural product takes after slight water inadequacy. This issue can be consummately amended on the off chance that we utilize programmed microcontroller based irrigation system framework in which the irrigation system will happen just when there will be exceptional necessity of water.

As we realize that India is a creating nation and the significant piece of our GDP development rate fits in with agribusiness alone. So we can say that horticulture is the foundation of India and watering system is known as the help. Thus, horticulture in India has been the most vital need in the financial improvement of nation since the freedom. Significant piece of our consumption is spent on agribusiness alone and notwithstanding that we

not getting obliged yield. In India, there is uneven natural different qualities cause, some part encounter dry seasons while a few sections surge, so there is dependably unavailability of water accessible for the watering system. Agriculturist in rustic region severally influenced by this condition. New innovations nearing however they are excessively costly for the basic agriculturist.

The system offers a less expensive and more straight forward answer for this issue by creating computerized microclimate irrigation system controllers with remote capacity helped with minimal effort remote sensor hubs. Like temperature sensor, stickiness sensor, water level sensor which faculties the temperature at that territory, dampness of the Soil, and water level in the area. The area or firm is isolated into microclimatic districts furnished with keen indicated sensors and incorporated remotely into mechanized watering system controller with remote systems administration ability.

II. LITERATURE REVIEW

To implement the Solar Energy and GSM for Irrigation control system the study has done on different researches.

In the existing System the power supply for the system will be normal it may be some conditions the power will be unavailable and it is going as a disadvantage. Previously the power supply for the motor is also normal but here we are providing the power supply from the solar energy. Whenever the user send a message the motor on/off operation will be performed.

The most important objective of the paper is to design and develop a remote monitoring and closed loop control system for modern agricultural system. In the proposed system we are implementing the arm7 based irrigation control system using GSM technology and weather conditions monitoring like temperature, moisture, water level etc. Here we are interfacing the controller with the GSM modem, humidity sensor, temperature sensor and water level sensor and motor. Whenever the user need to know the weather conditions of the land he will sent an sms like status then he will get a reply from the controller, depends up on the status the user again sent sms like motor on/off.

III. HARDWARE DESIGN

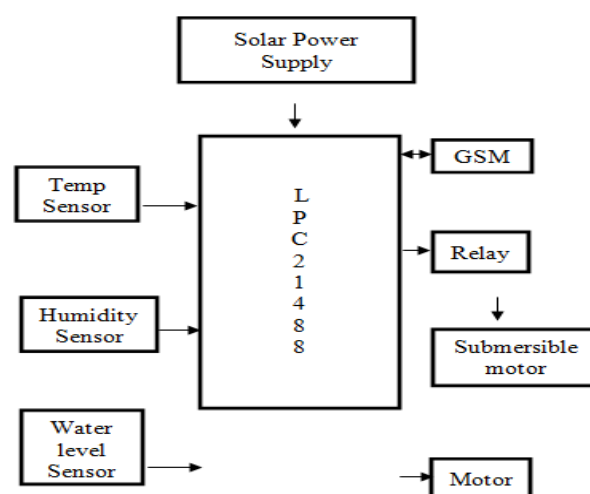


Fig 1: Block Diagram



The Irrigation Control system using Solar panel and GSM technology consists of different hardware and software modules. The following block diagram shows the overview of hardware components included in the system.

3.1 LPC2148 Microcontroller

The LPC2148 microcontroller board based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation, 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package, 8 kB to 40 kB of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory; 128-bit wide interface/accelerator enables high-speed 60 MHz operation, In-System Programming/In-Application(ISP), Single 10-bit DAC provides variable analog output, Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog, Low power Real-Time Clock (RTC), Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus (400 kbit/s), SPI and SSP with buffering and variable data length capabilities.

3.2 GSM Modem

A GSM modem is a gadget which can perform all the modile operations like calling, and GPRS network with it. However, the main contrast is the GSM modem is the crude type of a cell telephone which is planned to use in modern and test applications. The GSM modem utilizes 900MHz data transfer capacity as a part of India according to the telecom administrative tenets. As we say prior it is a crude type of a cell telephone, the GSM modem contains a SIM card space, Antenna and a Max 232 driver in it.

3.3 Motor

The 12V DC Geared Motor can be utilized as a part of assortment of mechanical technology applications and is accessible with extensive variety of RPM and Torque. In this paper we are utilizing a 12v DC engine with the 60 rpm speed.

3.4 Temperature Sensor

The DS1621 measures temperature by tallying the quantity of clock cycles that an oscillator with a low temperature coefficient experiences amid a door period controlled by a high temperature coefficient oscillator.

3.5 Humidity Sensor

Moisture ness is the vicinity of water in air. The measure of water vapor in air can influence human solace and also numerous assembling procedures in commercial enterprises. The vicinity of water vapor likewise impacts different physical, concoction, and natural procedures.

3.6 Water Level Sensor

To put it plainly, level sensors are one of the important sensors and assume critical part in assortment of purchaser/ modern applications. Similarly as with other sort of sensors, level sensors are accessible or can be composed utilizing mixture of detecting standards.



3.7 Relay

Relay is a device which provides connection between two or more points or device in response to the input given to the relay. The other using of relay provide isolation between the controller and the device as we know devices may work on AC as well as on DC.

3.8 Submersible Motor

A submersible pump is a device which has a hermetically sealed motor close-coupled to the pump body. The whole assembly is submerged in the fluid to be pumped. The main advantage of this type of pump is that it prevents pump cavitation, a problem associated with a high elevation difference between pump and the fluid surface. Submersible pumps push fluid to the surface as opposed to jet pumps having to pull fluids. Submersibles are more efficient than jet pumps.

IV. SOFTWARE DESIGN

In this proposed system, as we used LPC2148 we need to use following software tools to program for it.

1. Keil uVision
2. Flash Magic

The Keil uVision is an IDE for Embedded C language. In this IDE, we need to import the utilities and libraries according to the controller we are using. This IDE is very simpler and in user friendly manner to use. It includes all the C/C++ compilers, assemblers, and debuggers in it. It simplifies the process of embedded simulation and testing along with Hex file generation.

The flash magic is a programming utility. The C/C++ program written in IDE will be processed into Hex file i.e. in .hex format. It is necessary to dump the hex file on to the microcontroller.

V. WORKING DESCRIPTION

The Irrigation Control system working starts from user messaging depends up on the sms content the operation will be performed by the Microcontroller, If the message is status then the controller will capture the all the sensors and it will send details to the user and motor on/off then the motor will be on/off. The main advantage of the system is solar power supply and knowing the weather conditions in the area. When the system gets powered up then the system will be wait for the user SMS, and captures the all the sensors details and compares with the normal weather conditions if the any one of the sensor will exceeds its limit then automatically the message sent to the authorized person. and the operation of the motor will be depends up on the user command.

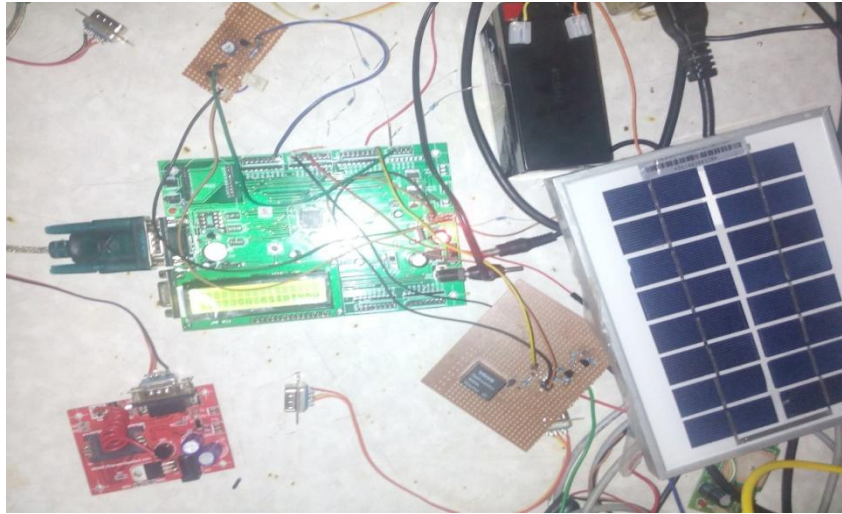


Fig 2: Overview of System Design Model

VII. CONCLUSION

Irrigation system has been the foundation of human progress since man has begun Agriculture. As the era developed, man created numerous strategies for irrigation system to control the supply of water in to the area. In the present situation on preservation of water is of high significance. By knowing the status of water level and temperature and moisture level in the land sent through the authorized person and also if the limit of the any one sensors exceeds then the motor will be automatically switched off. By using these system power saving and in emergency conditions. The Irrigation control system is low cost, easy in operation and uninterrupted power supply.

After the code is Programmed in to the controller and powered up then the GSM waits for the message and execute the code by operating Motor and capturing the the status of the sensors details and here we are developing a conventional system for the Efficient usage of the agricultural and for the emergency conditions.



REFERENCES

- [1]. Kay, M., "Small holder irrigation technology: Prospects for sub-Saharan Africa" International Program for Technology and Research in Irrigation and Drainage, FAO, Rome, 2001.
- [2]. N. Shah and I. Das, "Precision Irrigation Sensor Network Based Irrigation", a book on Problems, Perspectives and Challenges of Agricultural Water Management, IIT Bombay, India, April 2008 .
- [3]. Fangmeier, D. D., Garrot, D. J., Mancino, C.F and Husman, S. H., "Automated irrigation systems using plant and soil sensors", American Society of Agricultural Engineers, ASAE Publication, 1990.
- [4]. Benzekri, A., Meghriche, K., and Refoufi, L., PC-based automation of a multi-mode control for an irrigation system Proceedings of International symposium on industrial embedded systems, Lisbon, July 2007.
- [5]. Shinghal, K., Noor, A., Srivastava, N., and Singh, R., Wireless sensor networks in agriculture for potato farming International Journal of Engineering, Science and Technology, Vol. 2, No. 8, 2010.



- [6]. Gautam, I., and Reddy, S. R. N., Innovative GSM-Bluetooth based remote controlled embedded system for irrigation, International Journal of Computer Applications, Vol. 47, No. 8, 2012.
- [7]. Zhang, F., Yang, M., and Ying, H., The application of GSM communication in agricultural automation, Journal of Technology for Agriculture, Vol. 1, No. 1, 2004, pp. Control System (HACS) for Automating Appliances and Security”, *Issues in Informing Science and Information Technology*, 2009.
- [8]. Webin Huang, Guanglong Wang, Research of Wireless Sensor Networks for an Intelligent Measurement System Based on ARM, 2011.
- [9]. Sezen SM, Yazar A, Irrigation Management on Yield And Quality Of Tomatoes Grown in different Soilless Media in Glasshouse, 2010.
- [10]. Daniel K. Fisher and Hirut Kebede, a Low Cost Microcontroller-Based System to Monitor Crop Temperature and Water Status, 2010.

AUTHOR DETAILS

	C. VENKAT SWAMY , Pursuing Mtech (ES) from Visvesvaraya College of Engineering and Technology (VCET), M.P. Patalguda, Ibrahimpatnam, Ranga Reddy, Telangana, INDIA. His area of interest includes embedded systems interrelated with different types of microcontrollers.
	B. SANTHOSHKUMAR , working as Assistant Professor & HOD (ECE Department) from Visvesvaraya College of Engineering and Technology (VCET), M.P. Patalguda, Ibrahimpatnam, Ranga Reddy. He is pursuing Ph.D in Wireless Communications. He has more than nine years of Experience in Teaching Field