

Study on Atomization of Agricultural Environment of Indian Agricultural system

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Abstract: Agriculture continues to play a major role in Indian Economy. Agriculture Sector is changing the socio-economic environments of the population due to liberalization and globalization. Irrigation system in India has given a high priority in economic development. In the years since its independence, India has immense progress towards food security. Indian population has tripled, but food grain production more quadrupled, there has been substantial increase in available food grain per capita. The project is designed to provide medium and long term credit to farmers for the purchase of farm machinery and for the development of small private irrigation system. For the precisely monitoring and controlling of the agricultural field, different types of sensors were used. To implement the proposed system ARM LPC2148 Microprocessor is used. The irrigation mechanism is monitored and controlled more efficiently by the proposed system, which is a real time feedback control system. GSM technology is used to inform the end user about the exact field condition. Actually this method of irrigation system has been proposed primarily to save resources, yield of crops and farm profitability.

Keywords: ARM controller, GSM Modem, Temperature sensor, Humidity sensor, Real Time system, LPC2148, 16x2 LCD display.

I. Introduction

Atomizing the agricultural system is very useful for old people and normal person who live far away from the agricultural field. We require monitoring of agriculture these days because in this modern world as the technology has taken tremendous changes in many fields we are going to implement in the field of agricultural. As the time has playing key role we have introduced this system so that farmer can save some time and need not go to farm every time. Now a days resource are getting drained so we should not waste them and use the existing resources carefully. So this will help in protecting resources and saving time. We have a LCD display to see the status of the farm and GSM modem is used to send the messages to farmer regarding the status of the farm. Farmer can know the information of the farm from the remote places also. In this LPC2148 microcontroller has taken because it is a 64-bit RISC architecture. So that it can be easy to write the program with less instruction set and if we want to add any advancement we can add easily to them. We can have many other sensors required for farm to have advancement in the project. As the advancement regarding monitoring of agriculture using ARM7 are increasing we have tried for code optimization technique. So that by doing code optimization we can decrease the time and space complexity

Irrigation may be defined as the science of artificial application of water to the land or soil. It is used to assist in the growing of agricultural crops, maintenance of landscapes, and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall. Additionally, irrigation also has a few other uses in crop production, which include protecting plants against frost, suppressing weed growing in grain fields and helping in preventing soil consolidation. In contrast, agriculture that relies only on direct rainfall is referred to as rain-fed or dry land farming. Irrigation systems are also used for dust suppression, disposal of sewage, and in mining. Irrigation is often studied together with drainage, which is the natural or artificial.

The project is implemented by using advanced processor ARM7TDMI which is a 32 bit microprocessor, GSM serves as an important part as it is responsible for controlling the irrigation on field and sends them to the receiver through coded signals. GSM operates through SMSs and is the link between ARM processor and centralized unit. ARM7TDMI is an advanced version of microprocessors and forms the heart of the system. This project aims to implement the basic application of automizing the irrigation field by programming the components and building the necessary hardware. This project is used to find the exact field condition. GSM is used to inform the user about the exact field condition. The information is given on user request in form of SMS. GSM modem can be controlled by standard set of AT (Attention) commands. These commands can be used to control majority of the functions of GSM modem.

The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique

accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT, PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.

II. Literature Review

Prabha1 , Tanujabai J.M2 , S. Krupesh3, Real time atomization of agricultural environment for social modernization of Indian agricultural system uses ARM7 and GSM' and is focused on automizing the irrigation system for social welfare of Indian agricultural system. Using this system the condition of the field can be sensed with help of sensors; the related information is displayed on LCD and transmitted to former/user. The project is implemented by using advanced processor ARM7TDMI which is a 32 bit microcontroller, GSM serves as an important part as it is responsible for controlling the irrigation on field and sends information to the receiver through coded signals. GSM operates through SMSs and is the link between ARM processor and centralized unit system with microcontroller. The 16X2 LCD display is used to read the condition of the field at workstation itself [1]. Mahesh M. Galgalikar , Gayatri S Deshmukh, "Real time atomization of agricultural environment for social modernization of Indian agricultural system" using ARM7 and GSM' is focused on automizing the irrigation system for social welfare of Indian agricultural system and also to provide adequate irrigation in particular area. This project aims to implement the basic application of automizing the irrigation field by programming the components and building the necessary hardware. This project is used to find the exact field condition. GSM is used to inform the user about the exact field condition. The information is given on user request in form of SMS. GSM modem can be controlled by standard set of AT (Attention) commands. These commands can be used to control majority of the functions of GSM modem [2]. K. Karthickpriya, Dr.S.Vijayarajan, Mr.K.kannan, the recent trends in developing low cost techniques to support cost effective agriculture in developing countries with huge population has motivated the development of low cost sensing system to provide for low cost irrigation facilities and also to provide for saving of water at the same time. A smart irrigation system is developed to optimize water use for agricultural crops. The system has distributed in situ wireless network of soil-moisture and temperature sensor placed in the root zone of the plants. In addition, humidity sensor, ultrasonic sensor and PH sensor is used for automation [3]. S.Lakshmana Pandian, Y Charishma, V Parameswary, describe about the monitoring of Indian agriculture using LPC2148. Monitoring of Indian agriculture is done using information of the temperature and humidity content. This is mainly used for saving water and monitoring agriculture without human presence. Temperature sensor and humidity sensor will continuously sense the information regarding the field. When the values are less than or greater than the threshold values it will do certain operations. It included two modes for monitoring manual and automatic mode. In manual mode farmer will be sending message and to monitor and control water pump. In automatic mode farmer will not be involved to control the operations of motor. It will be operating the water pump motor automatically. So he can monitor from remote place also [4]. Polkampally Akhila, Sandip Moparthi, Agriculture continues to play a major role in Indian Economy. Agriculture Sector is changing the socio-economic environments of the population due to liberalization and globalization. Irrigation system in India has given a high priority in economic development. Many new concepts are being developed to allow agricultural automation to flourish and deliver its full potential. To take full advantage of these technologies, we should not just consider the implication of developing a new single technology but should look at the wider issues for complete development of a system [5]. Deepti Bansal, S.R.N Reddy, in last few years, remotely monitored embedded system for irrigation purposes have become a new necessity for farmer to save his energy, time and money. This paper is proposing a complete agricultural solution for the farmer based on wireless sensor networks and GSM technology. The data acquired about environmental factor of the field is transmitted to the farmer enabling him to control the actuators in the field. Zigbee based low power devices employed to enable cost saving and the valves and sprinklers are employed to save the water usage for irrigation. The technology used is simple and easy to implement and the parameters recorded helps a great way to farmer to enable the "Smart farms" theory work for him [6].

III. Detailed Study

The survey includes studying of different approaches of incorporating GSM technology with mobile devices into a wireless adaption of the farm status.

A] The real time automization of agricultural environment for social modernization of Indian agricultural system focuses on using an ARM7TDMI core 32-bit microprocessor, GSM services which operates through SMS as he link between ARM processor and centralized unit. GSM is used to inform the user about the

exact field condition through a SMS on user request. The GSM model is controlled by a standard set of AT commands. The system continuously monitors the soil moisture, water level of well, temperature, humidity, dew point, weather condition and provides details about the field to user through SMS. The system consists of centralized unit having a subscriber number which forms a link between user and device and acts as a primary node for sending and receiving the data through SMSs by the user. The centralized unit communicates with the system through SMSs which will be received by GS with the help of SIM card; the GSM sends this data to ARM7, after processing it displays it on the LCD. The activation command is given to start the motor and indirectly activate the transistorized relay circuit to constantly monitor the environmental factors and once the required level is reached the motor is turned off and the message is sent to the farmer [7].

- B) Real time automation of Indian agricultural system deals with ARM7 and GSM combined together for programming and developing the automated system. It is very much similar to the system presented in Real-time automatization of agricultural environment for social modernization of Indian agricultural system [7]. In the system, soil moisture is measured using dielectric constant of soil and is informed to the centralized unit which sends a message to the device which waits for a certain amount of default time for user response if no response is received it continuously monitors the field and keeps on sending the parameters to the centralized unit where it is stored in the EEPROM of ARM. Additionally, to monitor the plant or leaf's health, a leaf wetness sensor has been used allowing us to forecast disease and protect plan canopy. In-system programming with timers and serial interfaces and modems for creating the real time applications [8].
- C) Innovative GSM Bluetooth Based Remote Controlled Embedded System for Irrigation proposes a system where GSM/Bluetooth based remote controlled embedded system is used for irrigation. The system sets the irrigation time depending on the environmental factors and can automatically irrigate the field. Information, regarding the status of power supply, is exchanged between the system using SMSs on GSM network. In addition to the GSM a Bluetooth facility has also been interfaced to the microcontroller for eliminating the SMS charges and range limitation. The system checks for the water flow from the pump if no water supply is available system sends data in the form of SMSs in the GSM network to start of stop irrigation according to the received information. The system consists of an 8-bit PIC microcontroller having inbuilt ADCs and interface to various sensors, pump [9].
- D) Integration of Wireless Technologies Wireless technologies for Sustainable Agriculture proposes the system that eliminates the use of wired technology and improves the old method of collecting data and allows the farmer to control their sprinklers remotely. It utilizes wireless sensor networks to collect real time status of agricultural field and uses mobile phone to control the watering of the field using sprinkler.

The wireless sensor nodes collect information regarding water level conditions and send the data to the central sink node which processes the information and sends it to the user's node which processes the information and sends it to the user's mobile phone and he accordingly controls the watering of the field using sprinkler controller. The nodes contain a sensor, radio transceivers, battery and interfacing circuit. The system proposes the use of sprinklers having two major features, pulsing (water application depth can be controlled by a series of on-off cycles) and nozzle orifice control (mechanically activated pin to alter the area which adjusts the sprinkler flow rate) controlled by the sprinkler controller which in turn has a GSM modem and a microcontroller. It uses a missed call instruction format wherein each number of missed calls is associated with a certain number of instructions to be performed, which is calculated by the microcontroller [10].

- E) Design of Ultra Low Cost Cell Phone Based Embedded System for Irrigation uses AVR ATmega32 microcontroller and includes protection against single phasing, over current, over voltage, dry running and probable bearing faults; and alerts the user through missed calls/buzzers on completion of tasks. RTC DS1307 and DS18S20 are used for time and temperature measurement. The system offers attractive features like automated control based on parameters specified through serial cable and based on the motor through starter using relay. Interfacing is done using RS232, AT commands is used. The SMS is a store and forward way of transmitting messages [11].

IV. Proposed System

This paper deals with Real time automatization of agricultural environment for social modernization of Indian agricultural system using ARM7 and GSM is focused on automatizing the irrigation system for social welfare of Indian agricultural system. The project is implemented by using advanced processor ARM7TDMI which is a 32-bit microprocessor, GSM serves as an important part as it is responsible for controlling the irrigation on field and sends them to the receiver through coded signals. GSM operates through SMSs and is the link between ARM processor and centralized unit. This project aims o basic application of automatizing the irrigation on field by programming the component and building the necessary hardware .GSM is used to inform the user about the exact field condition. The information is given on user request in form of SMS. GSM modem

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This project uses two power supplies, one is regulated 5V for modules and other one is 3.3V for LPC2148. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

The project basically concentrating on following application such as To continuously monitor the soil moisture To check the temperature, humidity and dew point so as to forecast the weather condition To monitor and control the whole system through GSM mobile

Provide the detail information about the field condition to the user through SMS

V. Conclusion

Development of Real-Time automatization of agricultural environment for social modernization of Indian agricultural system with various parameters being controlled by a microcontroller and maintained further to an optimum value required for adequate growth of plant, using the low power by adaption of both wired and wireless technology. The status of the farm is monitored with the help of different sensors. The proposed system is very use full for regular monitoring of farm status without visiting manually, and saves time and also use full to monitor hilly areas, which were hard to visit manually.

The system not only saves the energy consumption significantly, but also reduces a large number of inputting on the human and material resources in the management. Applying embedded technology and ZigBee wireless transceiver technology to the rapid development system of the incident detection of emergency food storage environment without complicated connection, it enhances the system's flexibility, small size, low cost and good effective, so it is easy to install and manage.

References

- [1] Prabhal , Tanujabai J.M2 , S. Krupesh3 Assistant professor, Dept. of ECE,BITM, Bellary, Karnataka, India1 PG Student [VLSI & Embedded System] , Dept. of ECE,BITM, Bellary, Karnataka, India2 UG Student [ECE] , Dept. of IT,PDIT College, Karnataka, India3.
- [2] Mahesh M. Galgalikar Dept of Electronics and Telecommunication Jawaharlal Darda Institute Of Engineering & technology, Yavatmal , India Gayatri S Deshmukh Dept of Electronics and Telecommunication Jawaharlal Darda Institute Of Engineering & technology, Yavatmal , India.
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- [5] Polkampally Akhila 1, M. Tech(ES), Dept of ECE, Sandeep Moparthi, M. Tech 2, Asst prof, Dept of ECE,1,2 Anurag Engineering college, Kodad.
- [6] Deepti Bansal, S.R.N Reddy, Department of Electronic and communication IGIT, IP University, Delhi, India.
- [7] Purnima, S.R.N Reddy, "Design of Remote Monitoring and Control System with Automatic Irrigation System using GSM-Bluetooth", on IJCA,2012
- [8] M. Nagendra Babu, Indian Priyadarshini S. "Real Time Automation of Indian Agricultural System".
- [9] Indu Gautam, S.R.N Reddy, "Innovative GSM Bluetooth Based Remote Controlled Embedded System for Irrigation" on IJCA, June 2012.
- [10] Kalyan Mohan Goli, Karthik Madidipatla , Thentu Sravani, "Integration of Wireless Technologies for sustainable Agriculture" on IJCST,2011.
- [11] vasif Ahmed, Siddarth A.Ladhake, "Design Ultra Low Cost Cell Phone Based Embedded System For Irrigation", on International Conference on Machine Vision and Human Machine Interface,2010.
- [12] MADHU G.C, V.K.. KARTHIK, K.M.N. CHAITANYA KUMAR, REDDY,P. BHANU CHANDAR, "REAL TIME AUTOMIZATION OF IRRIGATION SYSTEM USING FPGA AND GSM", on Journal of International Academic Research Fir Multidiplinary,2014.
- [13] Chandrika Chanda, Surbhi Agarwal, Er. B. Persis, "A Survey Of Automated GSM Based Irrigation System", on IJETAE,2012.
- [14] Ms.Shewta S. Patil,Prof.Mrs.A.V.Malviya, "Review for ARM Based Agricultural Field Moinitoring System",on International Journal of scientific and Research Publication,2014.
- [15] G.Meena Kumari,Dr.V.Vidya Devi, "Real Time Automatiom and Monitoring System for Modernized Agriculture", on IJRASE,

- 2013.
- [16]. Prathyusha K., Sowmya Bala, Dr. K. Sreenivasa Ravi, “A REAL-TIME IRRIGATION CONTROL SYSTEM FOR PRECISION AGRICULTURE USING WSN IN INDIAN AGRICULTURAL SECTORS”, on IJCSA, 2013.
 - [17]. Prateek Chauhan, Numbodiri Akhil. R. Nagendra Babu, “DEVELOPMENT OF NOVEL ALGORITHM FOR AGRICULTURAL PRACTICES”, on IJRAE, 2014.
 - [18]. N. Suresh, M. Nagalakshmi, G. Yaswanth, G. Sujatha, “Real-Time Automization of Agricultural Environment For Social Moderization of Indian Agricultural System” on IJSEAT, March 2015.
 - [19]. M. Ramu and CH. Rajendra Prasad, “Cost effective automization of Indian agricultural system using 8051 microcontroller” on International Journal of Advanced Research in Computer and Communication Engineering, July 2013.
 - [20]. Gaytri Londhe, Prof. S. G. Galande, “Automated Irrigation System By Using ARM Processor ” on IJSRET, May 2014.
 - [21]. K. Chenna Kesava Reddy and P. Venketrao, “Real Time Field Monitoring and Controlling System” IJRTE, Sept.2013.
 - [22]. Kalyan Mohan Goli, Karthik Madidipatla, Thenta Sravani, “Integration of Wireless Technology for Sustainable agriculture”, on IJCST, 2011.
 - [23]. Mr. Srinubala Aravapathi, Mrs. Ch. Sridevi, Dr. N. S. Murthi Sharma, Mr. K. Raju Sekhar, “Design and Implementation of GSM based Irrigation System using ARM7”, IJRCCCT, December 2012.
 - [24]. H. I. Ingale, N. N. Kasat, “Automated Irrigation System”, on International Journal of Engineering Research and Development, November 2012.
 - [25]. Mr. Sachin Prabhakar Bandewar, Ms. Aditi V. Vedalankar, “Design of GSM Based Embedded System for Irrigation”, on IJERT, June 2013.