

Arduino Based Cellular Voting System Using GSM Technology

Mohana rao.CH¹, Lakshmi kanth Acharyulu.A², Sai Gopal.G³, Naveen kumar.M⁴

Assistant professor¹

Department of Electronics Communication and Engineering

Sri Sivani College of engineering, Chilakapalem, Srikakulam-India

Corresponding Authors' Email id: lakshmikanth.656@gmail.com²

Abstract

The main goal of this project is to design and implement a cellular based voting system using GSM technology. In this system, only the authorized persons can access to place their vote and any other person is considered as intruder. Here we provide an Arduino board which is acting as an microcontroller and allows to insert the GSM module by which cellular networking is accessed. Voting can be conducted by using a mobile phone through which a vote can be placed for the respective candidate using a GSM module. This involves an Arduino based digital system that will send the vote and counts at each and every finite increment value. As mentioned in the above manner, the entire functionality of the system basically depends on three main parts which are Arduino, GSM module and a Mobile.

Keywords: *Arduino, GSM module, Cellular Voting System*

INTRODUCTION

Voting has become the primary concern for all the individuals in the new era. To overcome it manually has become a real challenge for everyone. Instead, we found an alternative way which can help us to overcome our needs as well as automatized. In this automated world where technology is transforming very fast one can have access to information, database sitting at

any parts of the world but it also comes with some great advantages. One of the latest technologies is the cellular based system which is now considered as one of the most efficient and trusted security system using the GSM technology. The main reason for its reliability is that a person can have the access through registering with one mobile number. Each and every individual has a unique mobile

number and making it possible for operating in much efficient manner.

II. RELATED WORKS:

Various attempts and research were made to overcome the security issue and still it undergoes.

1. Embedded system:

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as software and hardware. A general purpose definition of embedded systems is that they are the devices used to control, monitor or assist the operation of equipment, machinery or the plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious. All embedded systems are including computers or microprocessors. Some of these computers are however very simple systems as compared with a personal computer.

2. Micro processor:

A silicon chip that contains a CPU. In the world of personal computers, the terms microprocessor and CPU are used

interchangeably. At the heart of all personal computers and most work-stations sits a microprocessor. Microprocessors also control the logic of almost all the digital devices, from clock radios to fuel-injection systems for automobiles. A micro processor has three basic elements. They are ALU, Control unit and registered array. The ALU performs all arithmetic computations, such as addition, subtraction and logic operations (AND, OR,etc). It is controlled by the control unit and receives its data from the register array. The register array is a set of registers used for storing data.

3. Micro controller:

A micro controller is a small computer an a single integrated circuit containing a processor core, memory and programmable input/output peripherals. Program memory in the form of NOR flash or OTP ROM is also often included on chip, as well as a typically small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications.

III. HARDWARE PLATFORM:

The hardware platform mainly consists of an ARDUINO BOARD, gsm module, LcD

DISPLAY, buzzer and the power supply which are being discussed as below.

1. Arduino Microcontroller:

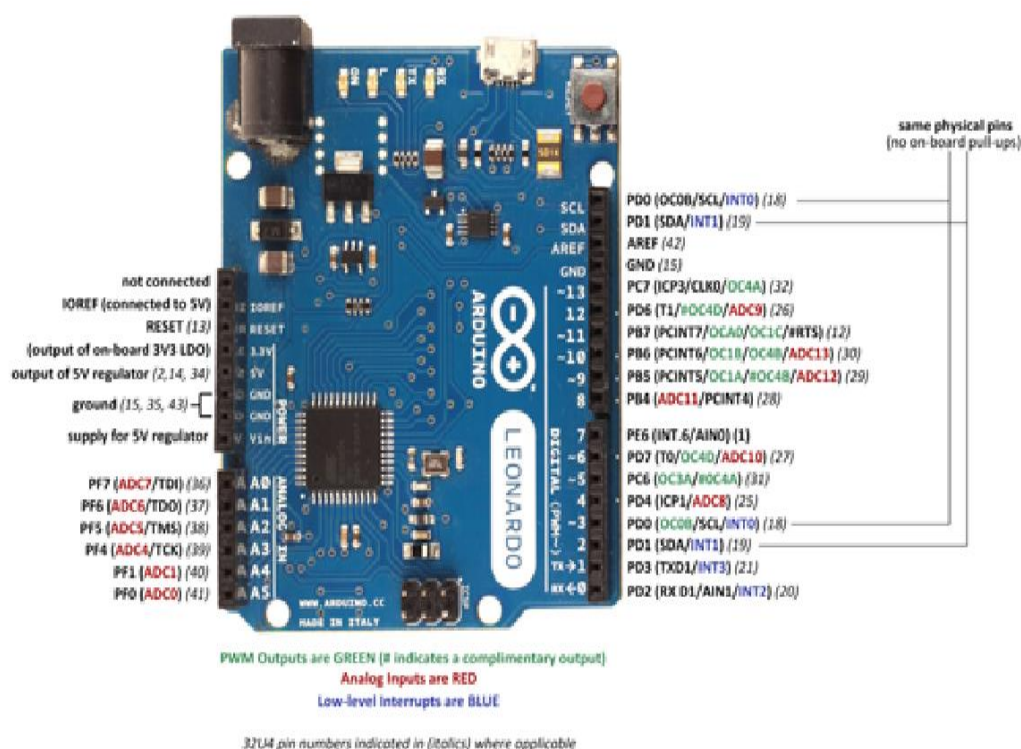
Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs – light on a sensor, a finger on a button, or a twitter message- and turn it into an output – activating a monitor, turning ON a LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. Basically, the processor of the arduino board uses the Harvard architecture where the program code and program data have separate memory. It consists of two memories such as program memory and data memory. Wherein the data is stored in data memory and the code is stored in the flash program memory. The ATmega328P microcontroller has 32kb of flash memory, 2kb of SRAM, 1kb of EPROM and operates with a 16MHZ clock speed.

Each of the 14 digital pins on the UNO can be used as an input or output, using pin

mode(), digital write(), and digital read() functions. They operate at 5volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 k ohms.

2. LCD display:

A liquid crystal display (LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. Each pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the access of polarity of which are perpendicular to each other. Without the liquid crystals between them light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other. Some of the most common LCD's connected to the controller are 16X1, 16X2 and 20X2 displays. This means 16 characters per line by 1 line 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.



Arduino Leonardo Pinout Reference

3. GSM module:



Fig: GSM module

GSM(global system for mobile communication) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM is a digital telephone system that is widely used in Europe and other parts of the world. GSM uses a variation of Time division multiple access (TDMA) and is the most widely used of the three digital wireless telephone technologies (TDMA, GSM and CDMA). GSM RS232 modem from rhydo LABZ is built with SIMCOM make SIM900 Quad-band GSM/GPRS engine, works on frequencies 850Mhz, 900Mhz, 1800Mhz and 1900Mhz. it is very compact in size and easy to use as plug in GSM modem. The modem is designed with RS232 level converter circuitry, which allows you to directly interface PC serial port. The GSM / GPRS modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS.

Voice as well as data transfer application in M2M interface. The onboard regulated power supply allows you to connect wide range unregulated power supply. Using this modem, you can make audio calls, SMS, read SMS, attend the incoming calls etc. through simple AT commands.

IV. METHODOLOGY

In this model our aim is to propose a secured model for providing much feasible electoral process by using the services of cellular networks.

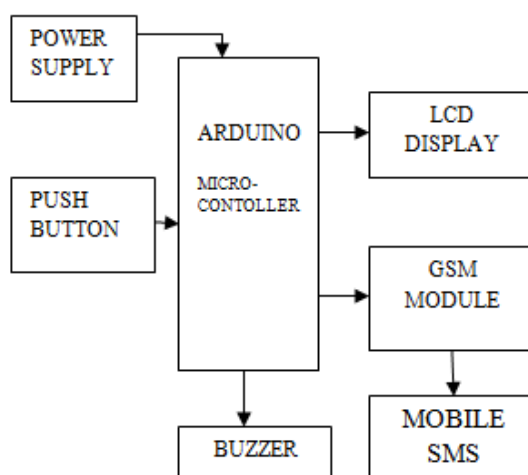


Fig: A block diagram representing the circuit developed

The GSM technology providing the best cellular networks will give access to send message through the SMS services. Each and every mobile consisting of the service which is the basic need of implementing the cellular network.

The steps involved in the proposed model are given below:

Step1: Turn on the power supply such that the arduino reads the modules connected to it.

Step 2: Now we send an SMS to the GSM module and thus it registers the number and stores in it. Then it sends messages to provide the confirmation of successful registration and also displays the process in the LCD display.

Step3: Now we send an SMS to place our respective vote such that it confirms as successful voting and counts it through the registered mobile number.

Step 4: And the buzzer will alert for the successful delivery of the messages passed through the GSM modem.

Step5: If one places their vote more than once then it rejects and sends an SMS that displays as “one person one vote”.

V. EXPERIMENTAL EVALUATION

In order to implement and demonstrate the system developed theoretically, we created a prototype that represents a system. Thus the whole system being developed is shown below:

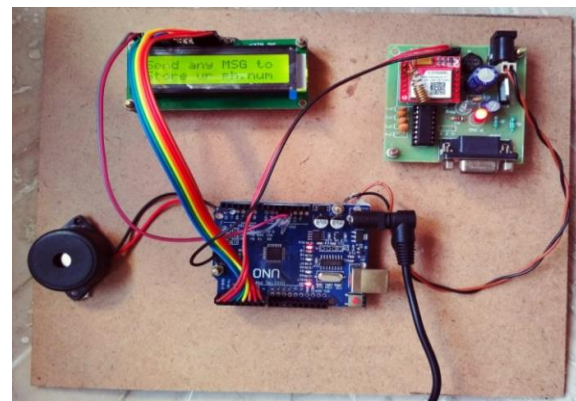


Fig: Prototype circuit

The cellular based voting system provides good solution for the electoral procedure. A novel architecture of mobile based voting system has been designed and implemented in this paper. It gives the basic idea of how an SMS service is used for providing access in electoral process. It provides accurate result and avoids the errors where occurs. For future work, some recommendations can be made like, providing an app that can be accessed through internet facility. the whole system

can be fabricated as an economic commercial package.

REFERENCES

- I. Douglas W. Jones, "Early Requirements for Mechanical Voting Systems", International Workshop on Requirements Engineering for E-voting Systems, Aug. 31, 2009.
- II. Vaibhav Bhatia, Pawan Whig, "Performance Analysis of Multi Functional Bot System Design using Microcontroller", International Journal of Intelligent Systems and Applications, Vol. 6, no. 2, pp. 69-75, January 2014.
- III. How does a GSM Technology Work?
<http://en.wikipedia.org/wiki/GSM>
- IV. P. Pradeep, M. Prabhakaran, B. Prakash, P. ArunKumar, and G. Gopu, "Advanced Design for Robot in Mars Exploration," presented at 2010 International Conference on Industrial Engineering and Operations Management Dhaka, Bangladesh, January 9 – 10, 2010
- V. J. Bethencourt, D. Boneh, and B. Waters, "Cryptographic Methods for Storing Ballots on a Voting Machine," in Proc. of Network and Distributed System Security Symp, 2007.
- VI. S. Garera and A. Rubin, "An Independent Audit Framework for Software Dependent Voting Systems," in Proc. of ACM conf. Computer and Comm. Security, pp. 256-265, 2007.
- VII. J. Hall, "Improving the Security, Transparency and Efficiency of California's 1 Percent Manual Tally Procedures," in Proc. of Usenix/ Accurate Electronic Voting Technology Workshop, 2008
- VIII. Chang-Jiu Chen, Wei-Min Cheng, Hung-Yue Tsai and Jen- Cheieh Wu,|| A Quasi-Delay-Insensitive Microprocessor Core Implementation for Microcontrollers|| , Journal Of

-
- Information Science And Engineering 25, 543-557 (2009)
- IX.** J. H. Lee, W. C. Lee, and K. R. Cho, —A novel asynchronous pipeline architecture for CISC type embedded controller - A8051, in Proceedings of the 45th Midwest Symposium on Circuits and Systems, Vol. 2, 2002, pp. 675-678.
- XI.** T. Nguyen and L. G. Bushnell, “Feasibility Study of DTMF Communications for Robots,” Dept of EE, University of Principles and Practice, Kluwer Academic Publishers, 1997.
- XII.** Washington Seattle WA, 98195-2500, April 6, 2004.
- XIII.** Chang-Jiu Chen, Wei-Min Cheng, Hung-Yue Tsai and Jen- Cheieh Wu, A Quasi-Delay-Insensitive Microprocessor Core Implementation for Microcontrollers, Journal Of Information Science And Engineering 25, 543-557 (2009)
- XIV.** J. H. Lee, W. C. Lee, and K. R. Cho, —A novel asynchronous pipeline architecture for CISC type embedded controller – A8051, in Proceedings of the 45th Midwest Symposium on Circuits and Systems, Vol. 2, 2002, pp. 675-678.
- XV.** J. Staunstrup and W. Wolf, editors, Hardware/Software Co-design. Principles and Practice, Kluwer Academic Publishers, 1997.
- XVI.** F. Vahid and T. Givargis, Embedded System Design: A Unified Hardware/Software Introduction, John Wiley & Sons, 2002. P. Pradeep, M. Prabhakaran, B. Prakash, P. ArunKumar, and G. Gopu, “Advanced Design for Robot in Mars Exploration,” presented at 2010 International Conference on Industrial Engineering and Operations Management Dhaka, Bangladesh, January 9 – 10, 2010.
- XVII.** T. Nguyen and L. G. Bushnell, “Feasibility Study of DTMF Communications for Robots,” Dept of EE, University of Washington Seattle WA, 98195-2500, April 6, 2004.
-

XVIII. Douglas W. Jones, "Early Requirements for Mechanical Voting Systems", International Workshop on Requirements Engineering for E-voting Systems, Aug. 31, 2009.

XIX. Vaibhav Bhatia, Pawan Whig, "Performance Analysis of Multi Functional Bot System Design using Microcontroller", International Journal of Intelligent Systems and Applications, Vol. 6, no. 2, pp. 69-75, January 2014.

A. Drumea, P. Svasta,
"Universal electronic

module for industrial control based on system on chip device," 30th International Spring Seminar on Electronics Technology, ISSE 2007, Cluj-Napoca, Romania, pp. 232-235, May 2007.

XX. Vaibhav Bhatia, Gavish Bhatia, "Room Temperature Based Fan Speed Control System using Pulse Width Modulation Technology", International Journal of Computer Applications, Vol. 81, no. 5, pp.35-40, November 2013.