

GSM Based Polling System

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Abstract

Traditionally voting system consists of people visiting the voting centres to cast their votes. However there has been instances where people were deceived into casting their votes to candidates they did not want. Also if these centres are not supervised properly a voter might end up with voting multiple times which would defeat the prime purpose of voting itself. To minimize the disadvantages of this type of voting we propose a method in which a candidate who owns a GSM based mobile phone can cast a vote. Using our proposed system the voter can cast a vote using the Short Message Service (SMS). The candidate requires only a registered GSM mobile phone as the basic identification system to cast his vote, thus providing confidentiality as well as eliminating the trouble to actually visit the voting centre. The proposed polling system can also serve as a major boost to increase the percentage voting.

Index terms- GSM mobile phone, confidentiality, polling system, Short Message Service(SMS).

1. Introduction

In a Democratic form of government, voting is an important responsibility of an individual. Traditionally voting was accomplished by installing voting centres in different areas where people could visit and cast their vote in a ballot box. The votes were then counted manually and results would be declared. The major drawback of this system is the manual counting method where human errors can easily take place and manipulations of results is possible. In recent times due to advancement in technology the manual counting method is replaced by an automated system where people could visit the centres and cast their votes using an electronic voting machine. The votes are then counted using a different independent system. Although this drastically reduces the occurrence of human error in counting of votes people still have to travel to their allotted voting booths. These electronic voting machines also require a separate identity check algorithm to make sure that no person votes multiple number of times. For these reasons it is necessary to implement a polling system where voters are not required to be present physically. Such a system should be secure as well as easily implementable even in the most remote areas.

In this paper we suggest a fully automatic polling system by which the voters would be able to vote even when they are at home or during their travels. Mobile phones are extensively used and they have reached even the remote areas. This existing GSM architecture would provide proper authentication and confidentiality for the voters thereby increasing the voting percentage.

When a user gets a SIM (Subscriber Identification Module) card he/she is allocated a unique IMSI (International Mobile Subscriber Identity) number. This number will be used to identify the voter at the time of casting the vote. Our proposed voting system will have the following characteristics:

- A. Authentication: Proper authentication must be provided before the person is allowed to vote.
- B. Secrecy: The votes recorded should be stored at a secure location.
- C. Accuracy: Counting of votes should be accurate.
- D. Simplicity: Simple and easy to use interface should be provided to make to system easier to understand.
- E. Cost-effectiveness: The proposed system should be more cost-efficient than the existing system.
- F. Increased voting percentage: This system will make sure that people who are unable to vote due to unavailability of voting booths will also be able to vote. Also this system injects portability in the voting mechanism which ensures that people can vote even while travelling.

2. Background

GSM is an acronym used for Global System for Mobile. It is standard set developed by the European Telecommunication Standard Institute (ETSI) to describe protocols for 2G digital cellular networks used by mobile phones. Proper services and security features are provided to all GSM mobile users. Some of these features are:

- A. Subscriber Identity Confidentiality: It is a property by which the subscribers real identity remains a secret. Only the

IMSI(International Mobile Subscriber Identity) number is used as the subscribers identity.

- B. Data Confidentiality: This feature of GSM is used to protect data of the user so that it remains hidden from other individuals as well as the authority.

All these features of GSM are used in this polling system to achieve the desired characteristics.

3. Block Diagram

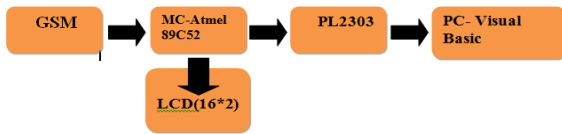


Figure 1: GSM based Polling System

Figure 1 shows the block diagram of the proposed GSM based Polling system. It includes a GSM modem (Eg.:SIM300), a microcontroller (Atmel 89C52), a Prolific PL2303 which is used for serial communication between USB port of computer and serial port of microcontroller and a 16*2 LCD display which is used for displaying messages.

4. Working

Figure 2 shows a GSM modem (SIM300) which receives the votes from a remote GSM user. Each voter has a predefined voter ID (IMSI number). This voter ID is stored in the central database to uniquely identify each voter. Also each candidate is issued a unique candidate ID for identification to the voter. The voter just has to send the candidate ID in his SMS. When the voter casts his vote in the form of a SMS, the system reads the voters ID. The system then verifies the status of the voter, whether he has previously voted or not. If the voter has already voted then a return SMS of ‘Voting already completed’ is sent. If the ID is verified, the system reads the candidates ID which the voter wants to vote. The corresponding vote is registered by incrementing the total votes of that candidate. A SMS regarding ‘Voting Successful’ is sent to the voter. This process is repeated for all the voters. Finally after a predetermined time interval the final results are declared. The complete process is given in the form of a flowchart in figure 3.

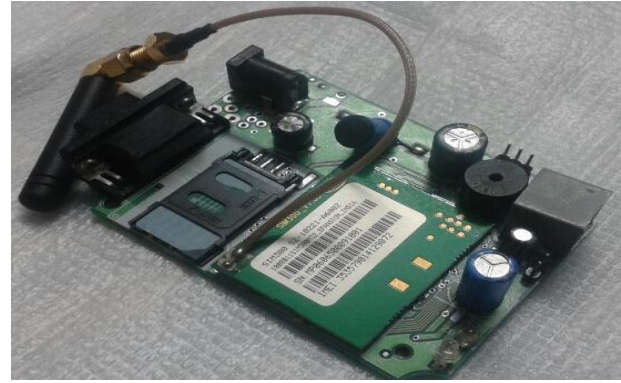


Figure 2: SIM300 GSM modem

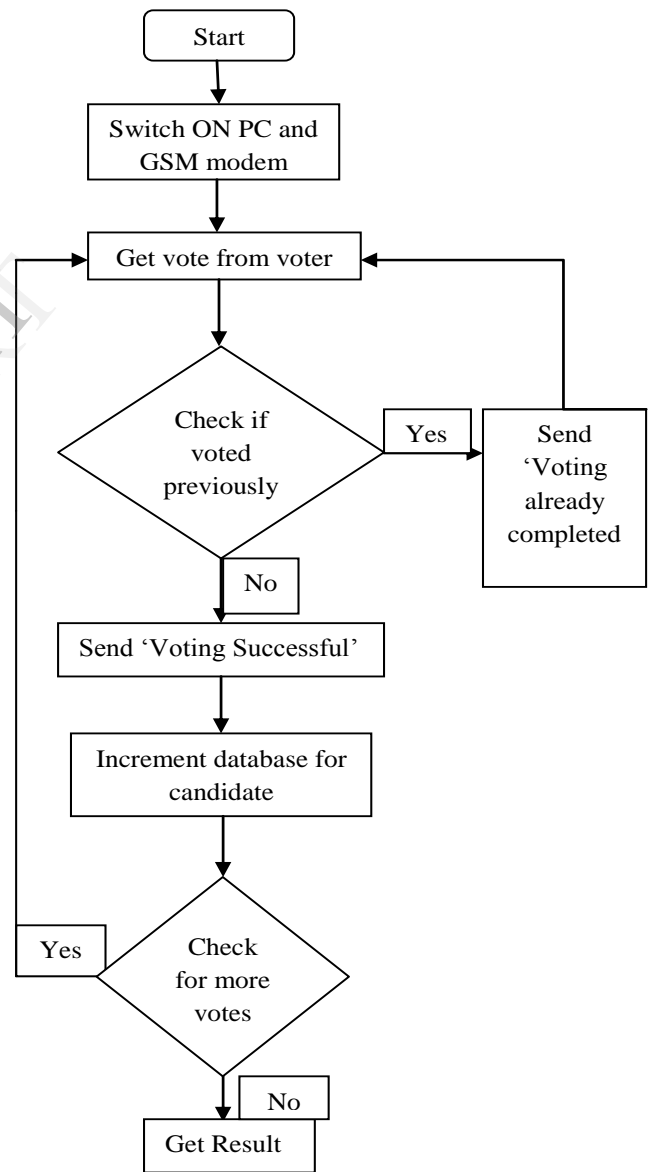


Figure 3: Flow chart of GSM based polling system

5. Results

The below figure 4 shows the total number of votes received by each candidate. The four candidates are named P1, P2, P3 and P4. Voting is carried out as per the process mentioned in figure 3. After four messages from different voters the total number of votes per candidate is displayed.

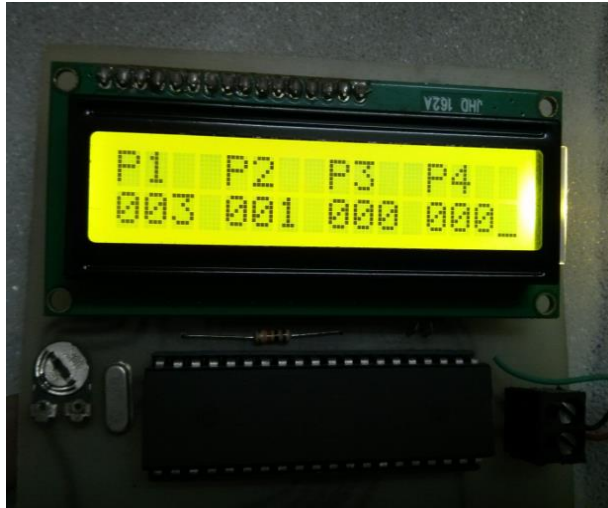


Figure 4: Total number of votes obtained for each candidate.

The microcontroller 89C52 is coded so as to display the name of the candidate which is the winner in the elections. After displaying the total votes for a specified time interval the name of the winning candidate is displayed. Figure 5 below shows the message which is displayed at the time of declaring the results.



Figure 5: Final Results

6. Conclusion

This paper provides a prototype model of a GSM Based Polling Machine. Also it explains the authentication services used as the properties of a GSM modem that are required while making this prototype. Our prototype enables a voter to cast a vote while travelling without compromising the identity of that voter. It also made sure that no voter is able to vote twice. As the voting is done using SMS service the interface is familiar to voters which provides simplicity along with enhanced security to the polling system. During voting period a phone number to which votes are sent is made toll-free. Thus additional costs to vote is avoided. All these advantages of our proposed GSM Based Polling System makes it highly favourable to work along with the existing polling system. Additional security can be installed at the main centre where the database of all votes is stored to enhance security features of our proposed model.

7. References

- [1] Er. Nitin Agarwal, Ankit Kumar Omar and Barkha Sharma, "SMS Based Secure(ID Based) Voting System", *International Journal of Research in Computer Engineering and Electronics*, Vol 2 Issue-1, Feb 2013.
- [2] Monali R.Dave, Jai Karan Singh , Mukesh Tiwari , Dr. Anubhuti Khare, *International Journal of Computer Technology and Electronics Engineering (IJCTEE)*, Volume 1 , Issue 2
- [3] Hemlata Sahu, Anupam Choudhry, "Polling System Using GSM Facility", *International Journal of Scientific & Engineering Research*, Volume 2, Issue 10, Oct-2011.
- [4] Pawan Kumar, Vikas Bhrdwaj, Kiran Pal, Narayan Singh Rathor, Amit Mishra, "GSM based e-Notice Board: Wireless Communication", *International Journal of Soft Computing and Engineering (IJSCE)* , Volume-2, Issue-3, July 2012.
- [5] X. Y. Cerone and P. Y. Zhang, "Secure Electronic Voting for Mobile Communications," Vehicular Technology Conference, 2006. VTC 2006-Spring. *IEEE* 63rd, Vol. 2, 2006, page(s):836 – 840.
- [6] Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, *The 8051 Microcontroller and Embedded Systems*.