

Electronic Voting Scheme using GSM Technology

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Abstract— Voting is a right of every citizen in a democratic country. Establishment of government is based on citizen's votes. The objective of this project is to overcome the drawbacks of conventional voting systems. Nowadays GSM (Global System For Mobile Communication) is one of the most widely used communication technology. In this paper, voting system based on GSM technology is presented. This voting system is designed by integrating embedded system with mobile infrastructure. This system is able to provide enhanced voter authentication and mobility while maintaining voter privacy.

Keywords— GSM, EVM, Mobile Communication

INTRODUCTION

Traditionally, in centralized or distributed places voting is conducted and the places are called voting booths in India. Traditional voting technologies include hand-counted paper ballots.

Paper based voting system results in various problems that include:

- Loss of votes through unclear or invalid ballot marks
- The Government has to call a day off which can incur huge losses
- Unacceptable percentage of lost, stolen or miscounted ballots
- The Government has to set voting booths at various places in a limited region for people to vote.

Also, for such process, the efficiency, reliability and security of the technologies involved are critical.

The aim of the project is to design an Electronic Voting Machine which maintains the voting record of all candidates through messages received as SMS or GPRS packets and also sends acknowledgement of task.[3]

Benefits of GSM based voting machine:

1. Increase in participation

GSM based voting system offers increased convenience to the voter, encourages more voters to cast their votes remotely, and increases the likelihood of participation for mobile voters.

2. Reduced costs

GSM based voting systems reduces the materials required for printing and distributing ballots.

3. Greater speed and accuracy placing and tallying votes

GSM based systems provide step-by-step processes that helps to minimize the number of miscast votes.

4. Greater accessibility for people with disabilities

GSM based systems allow citizens with disabilities to vote independently and privately.

5. Reduced time consumption[1]

GSM based systems require very less time for citizens to register their votes and the results of the voting will be available immediately after voting process.

II. CHALLENGES WITH THE EXISTING SYSTEM

Conventional voting methods included paper ballots which employs uniform official ballots of various stock weight on which the names of all candidates and issues are printed. Voters record their choices, in private, by marking the boxes next to the candidate or issue choice they select and drop the voted ballot in a sealed ballot box. However it suffered from the disadvantage that counting of ballot papers at an election used to take long hours creating a charged atmosphere for the counting officials. It also created problems for the person who is visually impaired or even illiterate. In order to overcome this drawback an Electronic Voting Machine (EVM) was introduced in Indian general and State Elections to implement electronic voting in a part from 1999 elections and in total since 2004 elections. The EVMs reduce the time in both casting a vote and declaring the results compared to the old paper ballot system. Electronic voting machines are more secure and able to capture the intent of voters. They are capable of preventing residual votes, reliable, easy to use and calculate and report voting results faster. They are accessible to disabled, illiterate, and non-English speaking voters. However, EVMs have been under a cloud of suspicion over alleged tamparability and security problems during elections. Electronic voting can include viruses and hacking as well as physical tampering. EVMs are no different than web sites or software, they can be penetrated and altered by a hacker and facilitates electoral fraud. Since EVM have failed to provide voter authentication in an efficient and transparent way a GSM based voting scheme is implemented. GSM based polling system provides subscriber identity confidentiality, subscriber Identity authentication, data confidentiality and also the voter need not go to any polling center and can cast their votes using their GSM mobile which in turn may increase the voting percentage thereby leading to a more secure democratic society.[4]

III. PROPOSED SYSTEM

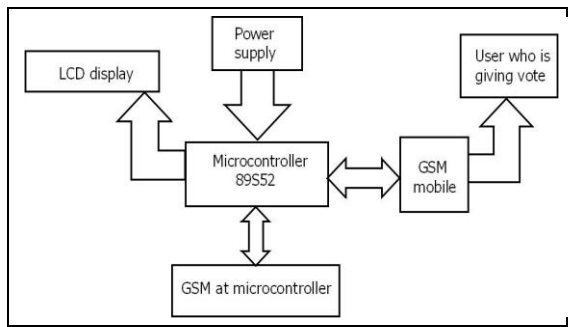


Fig.1 Block Diagram of GSM based Voting Machine

Fig.1 is the block diagram of GSM based voting machine.[5] Microcontroller 89S52 is the heart of this system. It is 8 bit microcontroller with 8k bytes of in-system programmable flash memory. Block diagram also consists of SIM 300 GSM modem which is used to access GSM network. It acts as an interface between microcontroller and voters mobile. GSM modem sends request for voting to all GSM mobile users. In return GSM mobile users cast their votes by sending SMS to GSM modem. GSM modem forwards received SMS to microcontroller which counts votes for all candidates. A 16x2 LCD is interfaced with microcontroller to display vote count of all candidates.

IV. OPERATION OF GSM BASED VOTING MACHINE

A voter who uses mobile can cast vote by sending SMS to GSM modem. This SMS contains voter's ID and candidate's ID which he wants to vote. Voter ID is a unique mobile ID given to each voter by Election Committee. This voter ID recognizes the voter's identity. For this purpose, candidate's information is predefined to the voter modem which has its own number that is known to every user. On Election Day voters cast their vote, by sending a message to GSM, which contains voter mobile id and the candidate's id which he want to vote. Votes coming from the Mobile Equipment will be delivered to the GSM receiver Modem.[2]

GSM modem sends received message to microcontroller. Microcontroller keeps record of all valid voter's ID. AT command is used as protocol for communication between GSM modem and microcontroller. Then, microcontroller decodes message received from GSM modem. It then compares voter's ID of message with IDs in its own database. Microcontroller checks whether received voter ID is valid or not. If it is valid then it further checks whether vote is already received from this voter ID. If microcontroller finds that vote is already received then it sends message to voter's ID that "Vote is already received from this ID".

But if the microcontroller finds that received voter ID is invalid it sends message to voter's mobile that "Voting is unsuccessful".

If the voter ID is valid and voting has not been done from this ID already then microcontroller identifies candidate's ID

and increments counter of respective candidate for whom the voter is voting.

_V. RESULT OF SIMULATION IN KEIL μ VISION 4

The figure below shows the simulation window of the project code

```

037 LCD_CLEAR();
038 P1 = 0x0F;
039 LCD_STRING(" GSM_VOTING ");
040 UART_STRING("ATEO");
041 wait_a_while;
042
043 READ_SMS_COMMAND("TEAM");
044
045
046 //-----STOP ECHO-----
047
048 clear_buff(buff,20);
049 LCD_CLEAR();
050 UART_STRING("ATEO");
051 UART_RSTRING(buff,20);
052 if(CHECK_RESPONSE_OK(buff))
053     LCD_STRING("ECHO STOPPED");
054 else
055     LCD_STRING("ATEO-ERROR");
056 wait_a_while;
  
```

Build Output

```

Build target 'Target 1'
assembling STARTUP.A51...
compiling votingpassword.c...
linking...
*** WARNING L16: UNCALLED SEGMENT, IGNORED FOR OVERLAY PROCESS
SEGMENT: ?PR? SEND_SMS?VOTINGPASSWORD
Program Size: data=81.0 xdata=0 code=2594
creating hex file from "voting password"...
"voting password" - 0 Error(s), 1 Warning(s).
  
```

Fig 2 Simulation Window in Keil μ vision 4

VI. CONCLUSION AND FUTURE WORK

This paper features the requirements, design and enactment of a generic e-voting technique using GSM Mobile System as a most basic application of GSM Based Personal Response System, where voters can cast their votes anytime, anywhere by using a GSM Mobile Equipment (ME).

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