Mobile E-Voting System (MEVS) Using Raspberry Pi

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Abstract—Electronic voting refers to voting using electronic means of casting and counting votes depending on the particular implementation, e-voting may use standalone electronic machine (also called EVM) or computer to the internet .This paper describes an electoral system for election. Using the GSM module to provide high performance with high security to the voting counter to make the voting system more practical. This system is used to display the data-base of the user (voter).

This paper examines policy regarding the electronic approaches and developments towards electronic data storage and transmission. The voter should send his voter ID number along with his Aadhar number and the party name in a particular format through SMS. Then the system checks information, if the ID`s are matched and if yes, then the voter is allowed to poll his vote. Here a person needs to check the registration mobile number with the list he has, making sure that the voter is authorized and then enable the person to poll his vote. The controller reads DATA from the reader and compares this data with the already existing data. If the data matches with the stored information, then the person's vote will be polled. If not, an acknowledgement will be send that the person isn't allowed to poll his vote. The polling mechanism carries out manually using the switches. LCD is employed to display the related messages. The entire voting counter result is updated in the server to protect from hacker's and also avoiding fake votes.

Keywords—*Raspberry Pi; GSM module; Poll switch.*

I. INTRODUCTION

The Government of India depends upon federalism which means the officials are elected by people through voting system. As India is a democratic country, the citizens of India have the right to elect the leaders of their own choice. Some of the traditional voting systems in India are:

1. *PAPER BASED VOTING SYSTEM*: Paper based voting system is the initial method of the voting system where a person has to go to the voting place and should write the leader or the party name on a paper and have to put it in the ballot box. The major disadvantage with this method is time taking and ballot boxes transportation is cost consuming and people have to wait in queues for hours to poll their vote.

2. *ELECTRONIC VOTING MACHINE*: Electronic voting machines consist of labelled buttons and store the count and display the result on LED. The major disadvantage with this system is once if the machine is manufactured, the program cannot be changed again.

3. *ONLINE VOTING*: In this system, the voting is done through internet. So it can be also known as the internet voting. This method has a great security as the voter has to confirm his security password before the acceptance of his or

her vote.The major disadvantage with this system is it can be corrupted internally and externally or can be hacked and may have software issues.

The above problems can be overcome by using Mobile E-Voting through which the voters can cast their votes from anywhere during a particular time. It uses Raspberry Pi processor which is interfaced with GSM module. The Voter is assigned with a particular voter ID for which their respective Aadhar and mobile number are linked. If both the ID`s and the mobile number are matched then the voter is allowed to poll his vote. Thus it saves the time in helps in incrementing the voting percentage.

II. LITERATURE SURVEY

Voting through SMS is an advanced area of research. These are the papers we have taken for the review.

1. *Smart voting system using Aadhar card:*

This paper includes bio-metric and reference data to save time for voters and avoids illegal votes. This system hardware consists of 1) Arduino mega 2560 2) Fingerprint identification module   3) PC
The Arduino mega 2560 microcontroller board based on Atmega 2560 and has 4 UART ports and 250 KB to store the reference data.The fingerprint identification module is used for bio-metric. The user has to enroll his fingerprint along with his Aadhar card number. This data is stored for further reference. At the time of voting, the user has to verify his fingerprint; if it is previously enrolled then he is allowed to vote.

2. *E-Voting system using SMS:*

This paper introduces a system which reduces the problems of traditional voting system with the key feature by including SMS . It consists of   1) ARM cortex M3   2) GSM.
The user has to register his mobile number and then the data is stored and when he sends the SMS ,system checks if voter is registered or not. If yes then he is allowed to vote.

III. PROPOSED MODEL

Our proposed model describes the mobile electoral system for election. The users can cast their vote by using mobile through an SMS from anywhere during the particular time. This uses Raspberry Pi processor which is interfaced with GSM module.

Every voter is assigned with a particular voter ID for which their respective Aadhar and the mobile number are linked. If both the ID's and mobile number are matched with the existing data then he is allowed to poll his vote, if not his vote will not be casted.
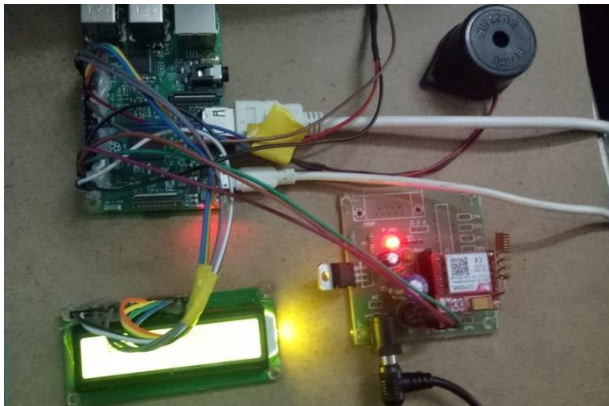

Fig. 1 Proposed model

IV.   BLOCK DIAGRAM

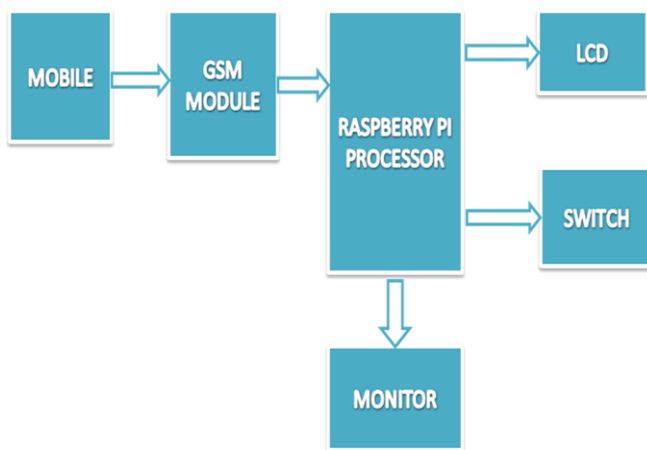The block diagram consists of 1) Raspberry Pi 3   2) GSM module 3) LCD 4) Poll switch

Fig. 2 Block diagram of MEVS

1. *RASPBERRY PI 3:* It is a single board computer with 1.2 GHz 64 bit ARMv8 and Broadcom BCM2837. It consists of 4 USB 2.0 ports, 40 GPIO, 1 GB memory. Pi 3 model B used in the system is the latest version that supports heavier operating systems.The code is written in python 2.7 version. The user database is created and stored here.

2. *GSM MODULE*: Global system for mobile communication is a digital cellular technology which supports voice and data services. GSM operates at the frequency 900MHz with data transfer speed of up to 9.6 kbits/s. It requires SIM (subscriber interface module) and the functioning of GSM depends on instruction set which uses AT(Attention) commands. By using this SIM we can connect to wireless network under the Globe.

3. *LCD*: Liquid crystal display is used to display the acknowledgments and results at the final stage.

4. *PC*: Personal computer is used to install the Raspbian Linux OS Which allows to run the code written in python. Attention commands are also viewed here.

5. *POLL SWITCH*: It is of a simple switch mechanism, "push to break" switch is used to break the circuit and calculates the final count of the votes.

V.   WORKING

After the completion of data storage, the primary step is initialization of hardware. The connections are checked and if the GSM is properly connected then it displays "OK". And the second step is waiting for SMS. The user has to send his voter ID number along with their respective Aadhar number and party name in a particular format from registered mobile number to the mentioned ID in SMS format. If the message is received, then the system checks for the details and compares it with the stored data. If all the IDs are matched, then the vote is counted.It increments the count and sends acknowledgement to the voter as "SUCCESSFULLY VOTED". If the ID is mismatched then the vote is rejected by sending an SMS as "your mobile number is not registered". When a person casted his vote successfully and if he tries to vote again then an SMS will be send as "you have already voted thank you". After the completion of voting, poll switch is pressed so that the final result is calculated. It compares the number of votes and displays the party with the majority on the LCD. Thus easy and earlier calculation of votes can be done by avoiding illegal voting and thereby removing the hassles of traditional voting system.

VI.   RESULT

The above message is observed when the installation process is completed and waiting for the SMS of casting vote. After casting the vote, following are the result obtained.
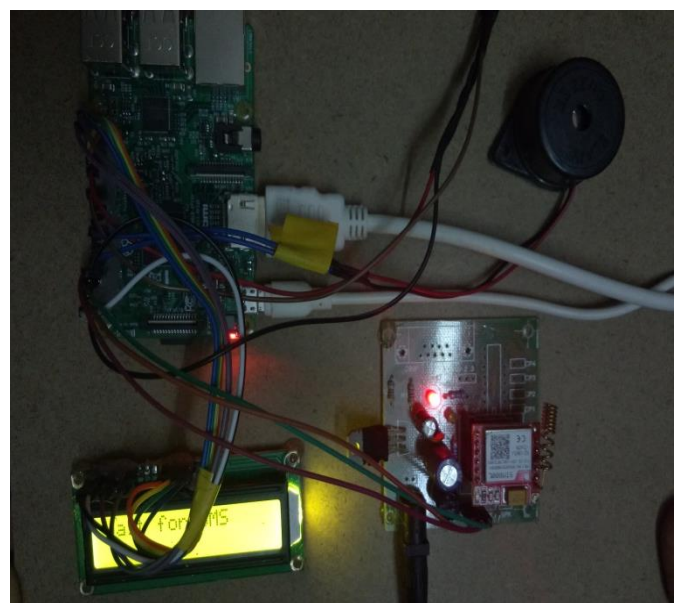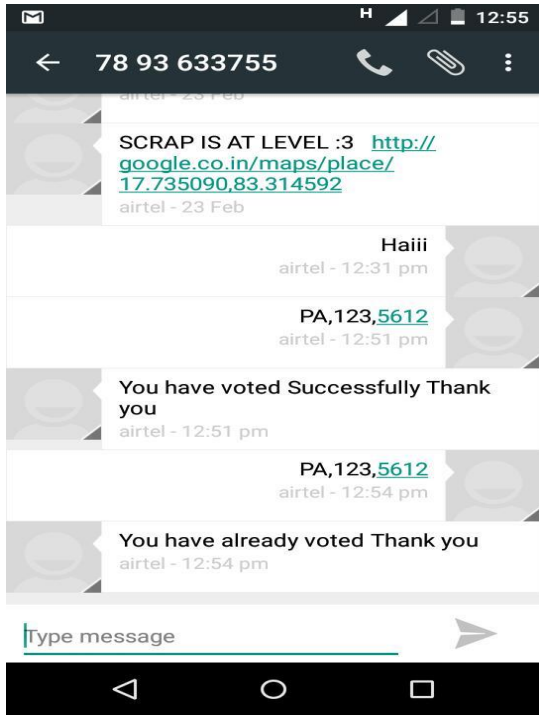

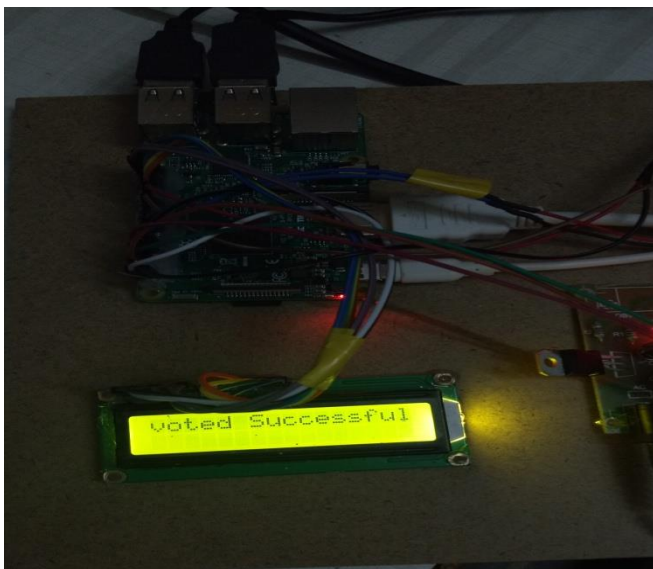Fig. 3 Result obtained after installation process

Fig. 6 Result obtained for repeated voting

Fig. 4 Result obtained after voting through SMS
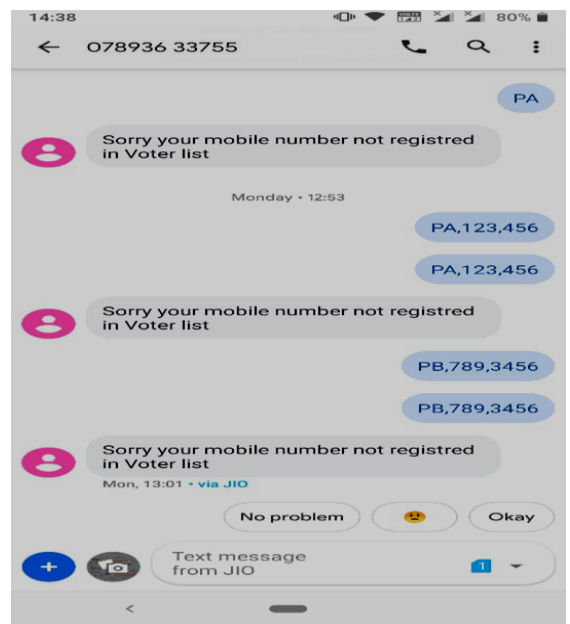
Fig. 7 Result obtained for unregistered mobile number
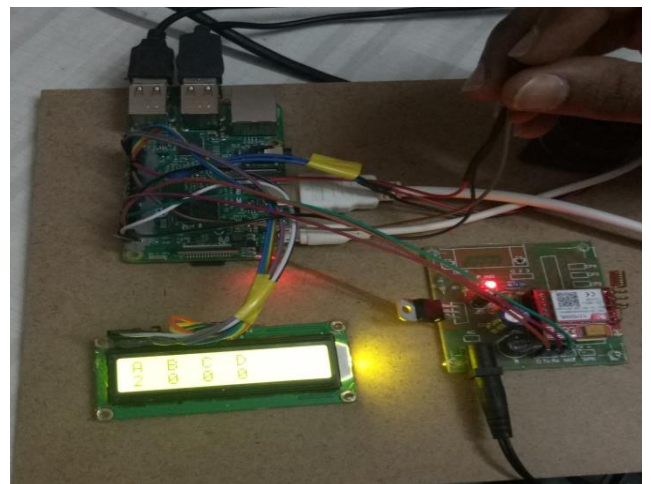

Fig. 5 Result after successfully voting

Fig. 8 Polling result

VII. ADVANTAGES

- The major advantage of this system is it saves time as voter need not have to go to the polling booth and wait in queues to cast their vote.
- This system also reduces the work load.
- The motto of this system is to avoid duplicate votes and no vote can be eliminated.
- Configurable immediate SMS response to voters whether he has successfully voted or not and automatic vote evaluation.

VIII. CONCLUSION

The proposed system is secure as the voter can only cast his vote after the verification process that avoids duplicate votes. And this system is fast when compared to other traditional voting systems as it reduces the burden of counting of votes and the final result gets calculated and displays the party with its majority.

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