

BIOMETRIC BASED ELECTRONIC VOTING SYSTEM

Prof. Pathak Neeru¹, Gite Swapnil², Pawar Amruta³, Sancheti Sumit⁴

¹Assistant Professor, Department of Electronics and Telecommunication Engineering.

^{2,3,4}B.E. Students, Department of Electronics and Telecommunication Engineering.

Thadomal Shahani Engineering College, Bandra (W), Mumbai, Maharashtra, India.

Abstract - This paper aims to present a new voting system employing biometrics in order to avoid rigging and to enhance the accuracy and speed of the process. The system uses a biometric method for voters identification. The major two parts of the system are: enrolling and voting. All the voting machines are connected to a central database network, through which data transfer takes place to the local database. The result is instantaneous and is done finally at the main host itself. The overall cost for conducting elections gets reduced and so does the maintenance cost of the systems.

Keywords: EVM, Fingerprint, Central Database (CBD), Local Database (LDB).

1. INTRODUCTION

In the present day, democracy has become an important part of people's lives, and to achieve democracy one must meet several conditions. The heart of democracy is voting where as the heart of voting is trust that each vote is recorded and tallied with accuracy and impartiality. All earlier elections be it state elections or central elections a voter used to vote his/her favourite candidate by putting the stamp against his/her name and then folding the ballot paper as per a prescribed method before putting it in the Ballot Box. This is a long, time-consuming process and very much prone to errors. This situation continued till the election scene was completely changed by the electronic voting machine. No more ballot paper, ballot boxes, stamping, etc. all this condensed into a simple box called ballot unit of the electronic voting machine. Currently India uses EVM for elections, which is prone to fraud and it is tedious to handle the voting machines. EVMs which are used in India do not provide any mechanism by which the voter can verify their identity before casting votes. EVMs can be tampered during manufacturing, in such cases it can manipulate the actual voting. After elections the

government has to maintain records which is again a tedious process for the government. ^{[1][2][3]}

To overcome these disadvantages of the previous system, our project focuses on Biometric verification and digital record maintenance, because biometrics is becoming an essential component of personal identification solutions. Since biometric identifiers cannot be shared or misplaced, and they represent an individual's identity. In detail it is discussed in further sections.

2. LITERATURE REVIEW

From 1948 onwards, India has conducted the election process at a time interval of 5 years. The following methods are used to elect an appropriate candidate:

- A. Paper ballot system
- B. Electronic voting machine

A. PAPER BALLOT VOTING SYSTEM

Paper Ballots were used in India before 1997 for conducting the public elections. Votes captured in ballots can be stored for a very short period as the ink used in voting may discharge or ballot paper may lose its quality. Proper care has to be taken in maintaining these ballots to protect them from humidity, sunlight and other factors, which affect the ballot papers. Once the ballot is corrupted, we cannot recover the original data. After the election process, it takes more time and effort for counting the votes manually by checking each ballot paper. Paper is an Inflammable material accidentally it may catch fire in case all records will be lost and cannot be recovered and hence the government has to spend extra money for conducting re-elections. Bogus ballots can be made and in-numerous fake votes can be casted. Physically disabled people were facing difficulties in casting their votes, in those cases they needed others' help, but privacy while casting votes was vomited.^[4]



FIG.2.1-BALLOT BOX[5]

B. ELECTRONIC VOTING SYSTEM

Electronic Voting Machines ("EVM"), Idea mooted by the Chief Election Commissioner in 1977. The EVMs were devised and designed by Election Commission of India in collaboration with Bharat Electronics Limited (BEL), Bangalore and Electronics Corporation of India Limited (ECIL), Hyderabad.

The EVMs are now manufactured by the above two undertakings. An EVM consists of two units,

- i) Control Unit
- ii) Balloting Unit

The two units are joined by a five-meter cable. The Control Unit is with the Presiding Officer or a Polling Officer and the Balloting Unit is placed inside the voting compartment.



FIG.2.2-EVM System [6]

There are many types of problems with EVM which is currently in use they are:

1. **Accuracy:** It is not possible for a vote to be altered to eliminate the invalid vote should not be counted in the final tally.
2. **Democracy:** It permits only eligible voters to vote and it ensures that eligible voters vote only once.
3. **Security Problems:** One can change the program installed in the EVM and tamper the results after the polling.
4. **Illegal Voting (Rigging):** The very commonly known problem Rigging which is faced in every electoral procedure. This can be done externally at the time of voting.
5. **Privacy:** Neither authority nor anyone else can link any ballot to the voter
6. **Verifiability:** Independently verification of all votes and tally them correctly.
7. **Resume Ability:** The system allows any voter to interrupt the voting process to resume it or restart it while the poll stands. But the proposed system prevents the election from being accurate. [7]

To overcome drawbacks and reduce the manual work we have proposed a new system which is based on biometric verification of voters and easy to handle for election officers.

3. PROPOSED METHOD

In this proposed method, we get the details of voters from AADHAR CARD database. This information will be provided by the government of India. Our proposed method has two databases:

- i) Local database (LDB).
- ii) Central database (CDB).

This information will be segregated according to the locality of the voter. Once it is segregated it will be stored in the local database. All the local databases are consolidated with the central database. At the time of election fingerprint access by using a fingerprint sensing module is used for casting a vote. Fingerprint module is an automated method of verifying a matching fingerprint and it can provide security, therefore fingerprint verification may be a good choice for electronic voting systems. The voter at the polling booth has to scan his/her finger on the fingerprint module. Fingerprint module scans his/her fingerprint and sends it to the controller for matching

scanned fingerprint with stored AADHAR CARD details in the local database. If the fingerprint matches an already stored voter AADHAR CARD database then he/she will be verified depending on different terminologies (age, voting flag), after which the voter is allowed to pull his/her vote. If not, the controller will send the message to the central database to verify the voter. If the voter is not verified in the central database a message will be displayed by the LCD indicating 'UNREGISTERED VOTER'. On the other side if the fingerprint is matched with the CDB the voter will be verified in a similar process as done in the local database then the voter will be allowed to cast the vote according to its respective locality. Once all the conditions are satisfied the voter is allowed to caste the vote and voting is done successfully. After completion of voting process means polling of vote, the message will be displayed on LCD screen "Your Vote Is Successful". The votes will be stored separately in a database and will be uploaded to the server simultaneously.

4. EXPERIMENTAL SETUP

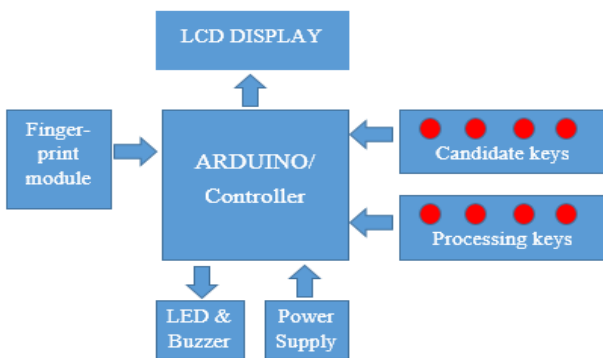


FIG. 4.1 - BLOCK DIAGRAM [8]

The above figure consists of a power supply, fingerprint module, Arduino, push buttons, LCD display, LED and buzzer. Power supply is of 5V which is connected to all components. The information regarding the voter is stored in a database. Fingerprint module is used to scan the fingers of voters. If the fingerprint is matched with data stored in the database then the voter is allowed to vote and if the fingerprint is not matched then a message will be

displayed indicating unregistered voter. Selection of the candidate is carried out by the push buttons. The result being success or failure is displayed on the LCD display.

5. WORKING

Our system has three phases:

- To enroll
- To caste vote
- To show result

PHASE-I: TO ENROLL

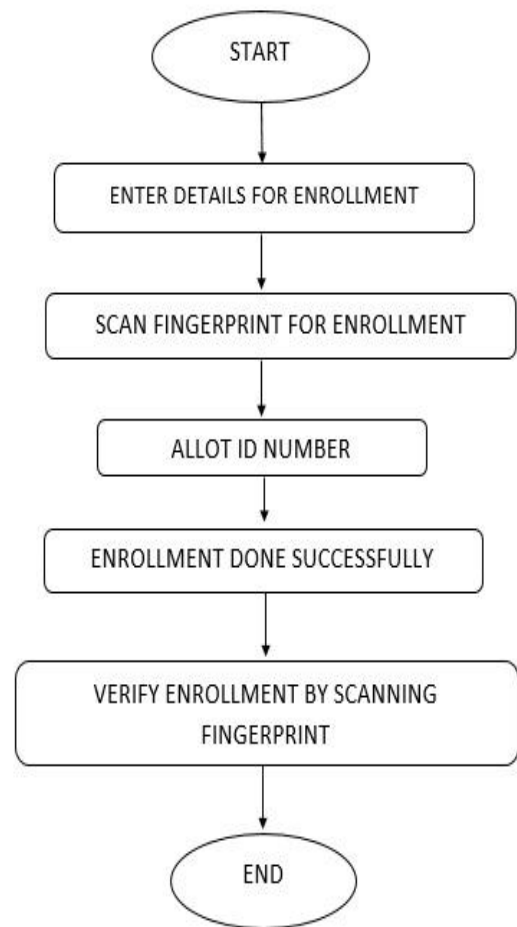


FIG.5.1-Flow chart(to enroll)

PHASE - II: TO CAST VOTE

PHASE - III: TO SHOW RESULT

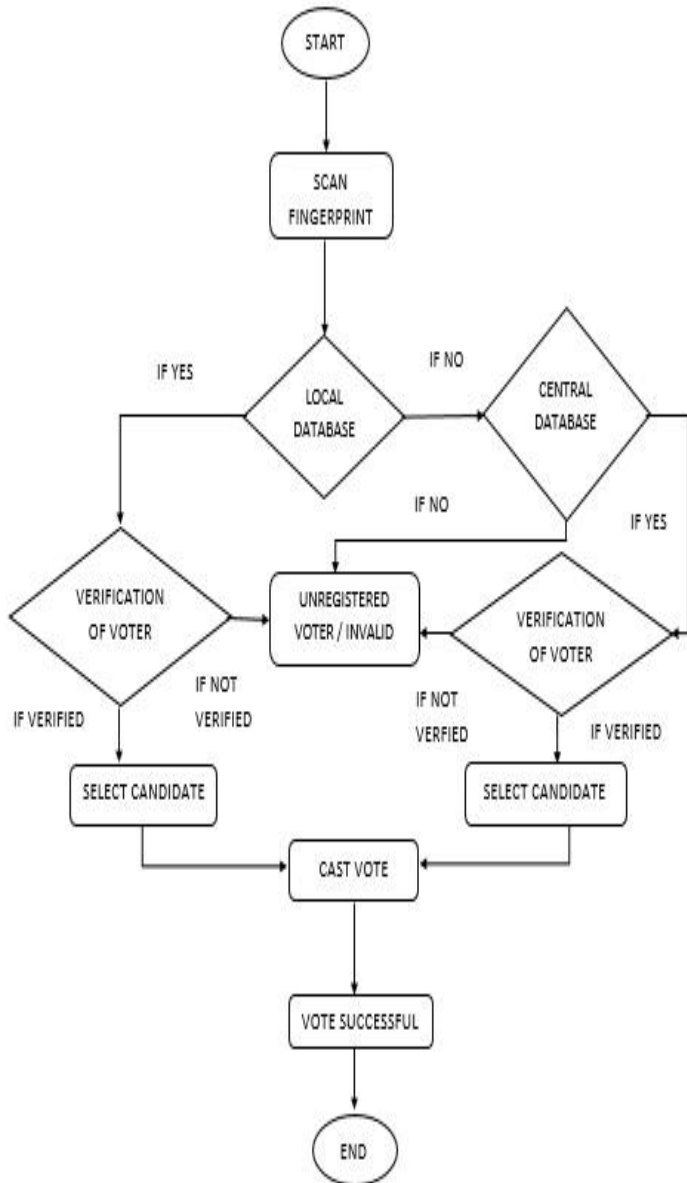


FIG.5.2-Flow chart(to cast vote)

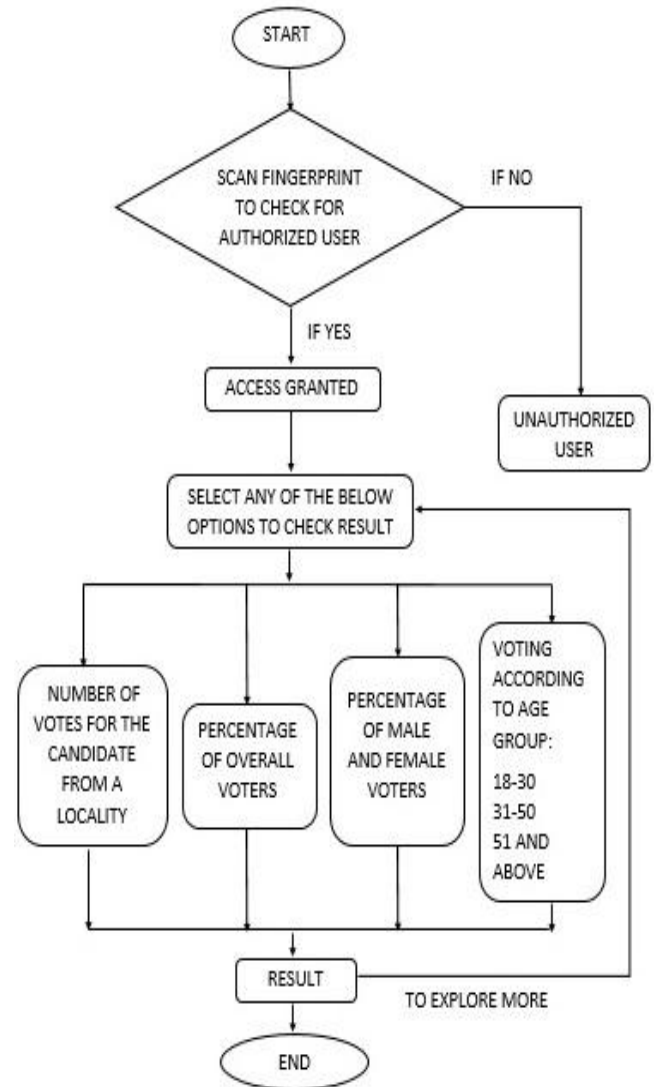


FIG.5.3-Flow chart(to show result)

6. CONCLUSION

Fingerprints are considered as one of the most popular biometric methods used for human recognition. Every person in the globe is born with a unique fingerprint even twins are born with totally different fingerprints and fingerprints are naturally unchangeable throughout life. For that reason a fingerprint voting system has been made and the person ID has been replaced with his fingerprint. This fingerprint voting system is implemented and evaluated successfully. The final result of the fingerprint

voting system was amazingly significant and compatible with other voting systems. The system's accuracy came from the image enhancement by removing or reducing the noise. Once the polling machine is programmed even the manufacturer cannot reprogram because it is one time programmable. In conventional methods the polling and result announcement may take a long period but in this type of polling system takes a short period of time for result announcement. This method increases the approximation of results, the belief of people among the voting system increases and the election commission of India makes a step ahead to use this type of polling machine for people welfare. The main advantage of this method is we can vote in India at any location using our UIDAI.

This system avoids fraudulent voting and illegal practices during the elections which is the key issue in the traditional voting system. This system provides transparency in the counting process. The advantages of this system are economic, faster tabulation of results, improved accessibility, greater accuracy, and lower risk of human and mechanical errors. Database consisting of the details like age, gender, place of voter, biometric data of the voter is present so we can easily find out the percentage of voters by age group as well as by gender in elections, so that it will help the government to keep record and spread awareness about election which is not possible in the present system.

7. FUTURE SCOPE

1. Protect all the system by providing secure channels, encrypt data, and protect servers.
2. Increase security levels of the admin login process by adding a second level of security.
3. Using a twain driver for the fingerprint scanner will allow the web application to read fingerprint data through the finger scanner directly, and send it to the web service for verification.
4. Using the GSM module in the circuit we can send a message to the voters before and after voting.
5. System can be further improved by adding face detection technology.
6. Retina scanning can also be implemented.

8. REFERENCES

- [1] Firas I. Hazzaa, Seifedine Kadry, Oussama Kassem Zein "Web-Based Voting System Using Fingerprint: Design and Implementation"
- [2] "<http://homepage.divms.uiowa.edu/~jones/voting/congress.html>"
- [3] Manual on "Electronic Voting Machine and VVPAT" Document 2-Edition4 Feb,2019 by Election Commission of India.
- [4] R. Murali Prasad, Polaiiah Bojja, Madhu Nakirekanti, "AADHAR based Electronic Voting Machine using Arduino", IEEE paper.
- [5] "<https://www.ndtv.com/india-news/presidential-election-2017-different-coloured-ballot-papers-for-mps-and-mlas-1713808>"
- [6] "<https://thewire.in/tech/vvpats-can-be-hacked-says-former-ias-officer-in-series-of-tweets>"
- [7] Naveenraj M, Arun AC, Gowtham A, Laleth TR, Naveen Kumar G "Biometric based Electronic Voting System using Aadhar", IEEE paper.
- [8] R.Balaji, Muhammed Afnas.M.P, B.Praveen Kumar, V.Varun, C.Tamizhvanan "Embedded based E-Voting System through Fingerprint and Aadhaar Card Verification", IEEE paper.