

Face- Based Voting System With Fingerprint Authentication

Prof. Neelamma Shinannavar , Gayatri S. Vharambale, Pratiksha A. Naik, Maithali B. Patil

Department of Computer Science & Engineering.

VSMSRKIT Engineering College.Nipani

shinannavarneelamma1997@gmail.com , vharambalegayatri@gmail.com ,pratikshanaik3981@gmail.com,maithali951@gmail.com

Abstract- Voting and security related to voting has always been a topic of greater research. Different voting methodologies are implemented yet the security related to voting still plays a major role in wide-scale implementation of different voting systems. This project deals with the development of a face-based voting system with fingerprint authentication. The proposed project deals with the development of a Raspberry-based system using IOT which can use facial data as well as fingerprint-based data to implement a voting system online to vote for candidates. This system can implement an additional layer of security in voting since it is based on the biometric data of the user using face recognition and fingerprint authentication. The voting panel is developed for registering votes and display of results which is hosted on the IOT cloud.

Keywords- Voting, face recognition, fingerprint authentication, IOT cloud, Panel, Raspberry Pi, etc..

I. INTRODUCTION

India is the world's largest democratic country. The Fundamental right to vote forms the basis of Indian democracy. In India all earlier elections, be it state elections or central elections a voter used to cast his/her vote for his/her favorite candidate by putting the stamp against his/her name; then folding the ballot paper as per the prescribed method before putting it in the ballot box. This is a long, time-consuming process and prone to errors. Over the years, there was a pronounced increase in the volume of work: millions of ballot papers had to be printed and millions of ballot boxes had to be manufactured, transported, and kept in storage and a great amount of time was taken the conduct of the election.

The implemented Electronic Voting Machine (EVM) is a reliable system for the conduct of elections in which one person has to be elected out of many candidates. EVM consists mainly of two units – (a) Control Unit (CU) and (b) Balloting Unit (BU) with cable for connecting it with the Control Unit. A Balloting Unit caters to up to 16 candidates. Four Balloting Units linked together catering to 64 candidates can be used with one Control Unit. EVM uses a modern microcomputer and other Large-Scale Integration (LSI) chips. It operates on a special Powerpack. It is tamper-proof, error-free, and easy to operate.

It is easily portable. The polling information once recorded is retained in its memory even when the Powerpack is removed. The machine, which is according to the design approved by the Election Commission of India, is manufactured by Bharat Electronics Limited (BEL) and Electronics Corporation of India Limited. It is the end product of considerable experience and extensive trials in

Indian Elections under the guidance of the Election Commission of India. In the implemented voting machine, the user should show his voter ID card whenever he goes to the booth to poll his vote. This is often a time-consuming method because the person needs to check the voter ID card with the list he has, make sure it is an authorized card, and then enable the person to poll his vote. Voter identification is needed during two phases of the electoral process: first for voter registration to determine the right to vote and subsequently, at voting time, to allow a citizen to exercise their right to vote by verifying if the person satisfies all the necessities required to vote(authentication). This process could be a time-consuming method.

After voting if any technical problems or damage occurs with the machine it may lead to reflection. The machine is not able to recognize the eligibility of a candidate, so the corrupted officers misguide the people. The corrupted officers may increase the count of voting. During the transportation of the machines, the in-charge person can change the status of machines and even may destroy them.

In India, the election has supreme weightage. So, to make it secure and efficient in the vision of modern technology we are implementing a "Fingerprint Based E-Voting Machine Using Raspberry Pi", which is made intelligent and can determine the presence of the particular voter by scanning the thumb impression.

The thumb impression of every human being has a unique pattern. During elections, the thumb impression of a voter is compared with the available records in the database and there is no chance of increasing the vote count of a machine, even if in case of damage to the voting machine there will not be loss of voting count. every voter's vote is directly sent on the webpage. With the help of IOT, the voting count of

each contestant will be displayed on the webpage separately.

II. LITERATURE REVIEW

The implementation of any system cannot be started directly without studying previous related work carried out by various authors. The researchers have developed the framework for the implementation of an Electronics Voting Machine. This literature survey is focused on many issues such as the basics of Voting systems, the Drawbacks of current voting systems, and the Advantages of Electronics Voting Systems. Voting is one of the fundamental rights of every citizen of a democratic country. By utilizing the rights of the voting people elect the most suitable leader who will lead them. In this modern era where technology is being used in every aspect of life election is a place to apply the best technology. In this project, we have developed a system that will suitable for elections in countries like India. In this proposed system we have used Raspberry pi-3B and a fingerprint scanner that can identify each voter count votes and can prevent fake votes. The proposed system is a more digital technology-based and secure system.[1]

Already stored in the government databases. Hence this project provides the best solutions In democratic societies, voting is an important tool to collect and re-act people thinking's. Traditionally, voting is conducted in centralized or distributed places called polling booths. Voters go to polling booths and cast their votes under the supervision of authorized parties. Then the votes are counted manually once the election has been completed. With the rapidly growing development of computer technology and cryptographic methods. The electronic voting systems can be employed that replace the incident and most importantly error-prone human Component. Our project proposes and implements a simple and secure method of polling votes by using biometrics. Due to the changes that occurred in technology, so many advancements were introduced in the field of voting. The improvisations aim at increasing the flexibility security, reliability, and Scalability of the model and provide less time consumption to announce the result. Nowadays, the voting procedure was held by manually operating machines and even through SMS also. But this electronic voting machine is a unique and new concept that saves a lot of time and avoids false voting by a false person.

In this system, the user has to use his fingerprint to poll the authenticated vote. The fingerprint module was to avoid false voting. The electronic voting machine was connected to the computer. The computer is having the full database list of the people who are having the eligibility to vote. For each poll, the corresponding person's identity was deleted. So, it avoids false voting. A touch screen is used, so it is user-friendly. A printer is also used to provide a confirmation sheet for the voter who polls the authenticated vote. The GSM module is used for sending results to the corresponding authority.[2] Every citizen or voter of India

is allowed to exercise their right to express their choices regarding specific issues, pieces of legislation, citizen initiatives, constitutional amendments, and recalls and to choose their government and political representative through casting their votes. To allow the exercise of this right, almost all voting systems include the following steps: voter identification and authentication, voting, and recording of votes cast, vote counting, and publication of election results. Voter identification is required during the electoral process. Security is the heart of the e-voting process. Therefore, the necessity of designing a secure e-voting process is very important. A secured electronic voting machine using a unique identification number i.e., AADHAR number has been developed. To provide additional security along with the AADHAR number biometric identification is used. At the time of voting in the elections, voter authentication can be done through a biometric pattern. If the biometric information of the voter matches the database of the AADHAR then the person is allowed to cast their vote. Transparency is an additional advantage of the above system.[3]

India is a Democratic country which means people have the power to select their leaders. For selection, we have an election process that is prone to fraud and has many disadvantages. India is losing the actual meaning of Democracy as the percentage of voting is decreasing drastically day by day. to order to overcome this problem there is a need to provide an easy and secure process by developing Mobile Application. Nowadays mobile has replaced everything and has made every process simple and secure. The main perspective of this paper is to provide a simple and secure voting system in India. Since it is app-based it is more secure than an online voting system. This system uses fingerprint for unique identification and Aadhar details are fetched based on fingerprint data. This paper provides significance for senior citizens, the disabled, patients, soldiers, and migrants. People can participate in voting where ever they are located. Results will be announced immediately after the completion of the election process. This help to move a step ahead towards Digital India and Make in India.[4]

The Paper ballot voting system is commonly used as a traditional voting system. Some disadvantages are occurred in this system such as time consumption, and low tally speed. Advancement in the electronic voting system eliminates the drawbacks of the paper ballot voting system. Every system tries to overcome the loopholes of the existing system. the Online voting system eliminates the drawbacks of the electronic voting system. In the online voting system, the voted ballot is transmitted over the internet through the web browser. It is a very much portable system as the system works on the internet only an internet-supporting device is required. the Online voting system is very fast compared to the paper ballot voting system. This paper can help find in finding the drawbacks of current voting systems and also help in developing a new system that combines all

the advantages and overcomes the drawbacks of existing systems.[5]

Aadhar-based electronic voting machine using Arduino describes the user should show his voter ID card whenever he goes to the booth to poll his vote. This is often a time-consuming method because the person needs to check the voter ID card with the list he has, make sure it is an authorized card, and then enable the person to poll his vote. Thus, to avoid this type of issue designed a fingerprint-based voting machine wherever the individual no ought to carry his ID which contains his entire details. The person at the booth should show his finger. This fingerprint reader reads the details from the tag. This information is passed to the controlling unit for verification. The controller needs DATA from the reader and compares this data with already existing data. If the data matches with already stored information, the person is allowed to poll his vote. If not, a message is displayed on LCD and therefore they are not allowed to poll his vote. The polling mechanism carries out manually using the switches. LCD is employed to display the related messages. To permit the exercise of his right, the majority voting system around the world includes the following step: citizen identification and authentication, voting and recording of the vote cast, vote counting, and publication of election results.[6]

Fingerprint recognition-based electronic voting machine describes the objective of voting as to allow voters to exercise their right to express their choices regarding specific issues, pieces of legislation, citizen initiatives, constitutional amendments, recall, and/or to choose their government and political representatives. This project will be implemented with a biometric system i.e., fingerprint scanning. Biometrics is the science and technology of measuring and analyzing biological data.

In information technology, biometrics refers to technologies that measure and analyze human body characteristics, such as DNA, fingerprints, eye retinas and irises, voice patterns, facial patterns, and hand measurements, for authentication purposes. This is used to ensure security to avoid fake, repeated voting, etc. It also enhances the accuracy and speed of the process. The system uses a thumb impression for voter identification as we know that the thumb impression of every human being has a unique pattern. During elections, the thumb impression of a voter is entered as input to the system. This is then compared with the available records in the database.

If the particular pattern matches with anyone in the available record, access to cast a vote is granted. But in case the pattern doesn't match with the records of the database or in case of repetition, access to cast a vote is denied or the vote gets rejected. The result is instantaneous and counting is done. A database is created containing the thumb impressions of all the voters in the constituency. Illegal votes and repetition of votes are checked for in this system.

Hence if this system is employed the elections would be fair and free from rigging.[7]

Raspberry Pi and image-processing-based electronic voting machine describes electronic voting machine has already been developed and widely used in many developed countries. But most of them use Radio Frequency ID. In developing countries, RFID is still a costly solution. Some developing countries use image processing techniques to detect citizens. But only image processing is not enough. Keeping these problems in mind this paper a raspberry pi will be used as the host. If the citizen is valid and also didn't vote then the person will be allowed to submit his/her vote. Each voting machine is locked by a fingerprint access module. As the user is identified his/her fingerprint will be sent to a specific machine for voting. Each voting machine is networked with the central raspberry pi voting identification system.

The finger vein and face recognition get MATLAB which is compared with existing Images. If the image is matched, the computer sends the command the person is valid to the microcontroller and displays. If anyone tries to poll their vote beyond the time limit the GSM modem sends the message alert to the authorized person. This processor is implemented on Raspberry Pi Board. So, this board is connected to a monitor, camera, and SD card. all components are connected by USB adaptors. Once the base station confirms the voter as a valid member it transmits the fingerprint of the voter to a specific voting machine. the Fingerprint sensor takes the fingerprint of the voter. When the fingerprint matches the voting machine gets unlocked and ready to accept the vote otherwise it will remain locked.[8]

III. OBJECTIVES

The main objective of the project is to propose a model for the dual voting system which can use either face data or fingerprint data to check for the candidate's identity and then cast the vote. The objectives of the project are:

- To develop and facial recognition system using deep metric learning that can differentiate users based on their face data
- To implement a facial recognition system for voting as a biometric identity
- To Implement a fingerprint-based voting system
- To design a voting management system that can be used for different voting-related activities such as the Addition of candidates, casting votes, the Addition of users, and the display of results.
- To develop IOT-based protocols for secure interaction between the voting hardware and the software developed.

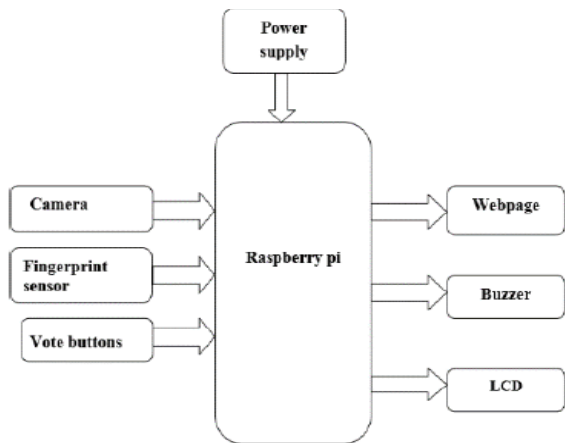


Fig.1 Block diagram.

IV. BLOCK DIAGRAM

Fig1. Block Diagram of Voting System Raspberry Pi is the heart of our system. Raspberry Pi is capable of accepting different kinds of data and process on it. In this system, Raspberry Pi acts as the controller of the whole system. All the input-output processing is done in this module. he module provides the main interface for all devices such as RPI Camera. The Raspberry Pi camera is Connected to an onboard camera port, which detects the face of voters and calls API to vote.

V.ARCHITECTURE DIAGRAM

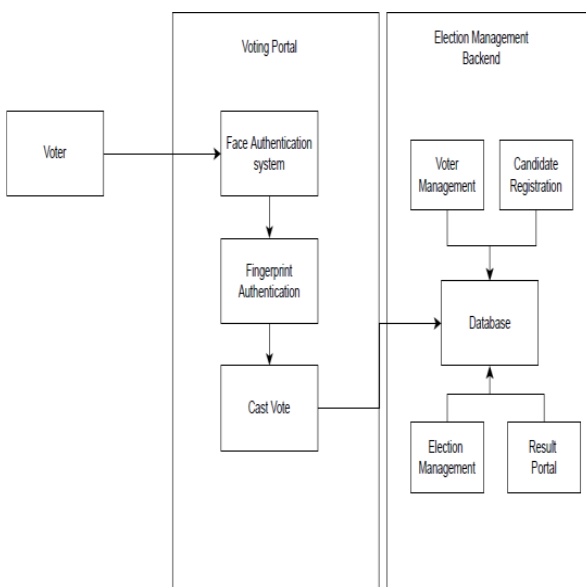


Fig2. Software Part.

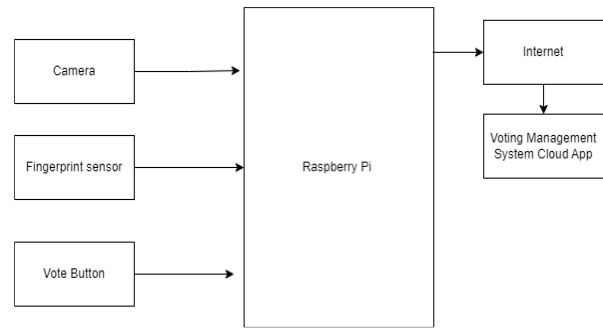


Fig3. Hardware Part.

VI.METHODOLOGY

The entire approach towards the project is divided into several steps so that the errors can be minimized at the end. The brief methodology to carry out the project is given below.

1. Literature Review and problem definition
2. Collection of facial Data of the user's
3. Development of a Python program for the extraction of facial data
4. Training a Face Detection and recognition model .
5. Interfacing fingerprint sensor to Raspberry Pi and development of fingerprint-based authentication system
6. Implementation of the candidate registration system
7. I have a voter registration system
8. Development of a voting schedule and automated result declaration system
9. Development of web services for remote voting system
10. Programming
11. Assembly
12. Testing
13. Conclusion

VII. HARDWARE USED

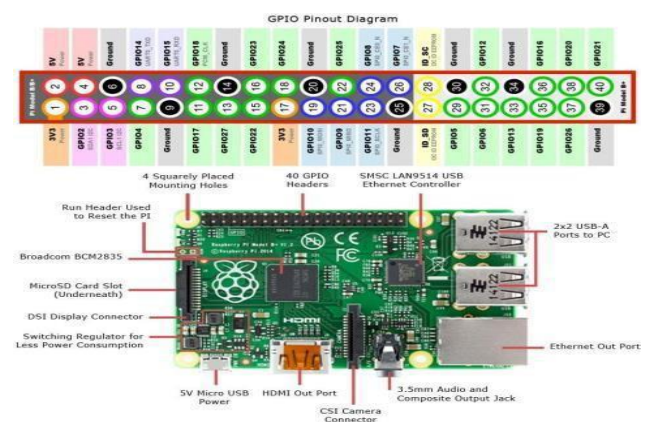


Fig4. Raspberry pi.

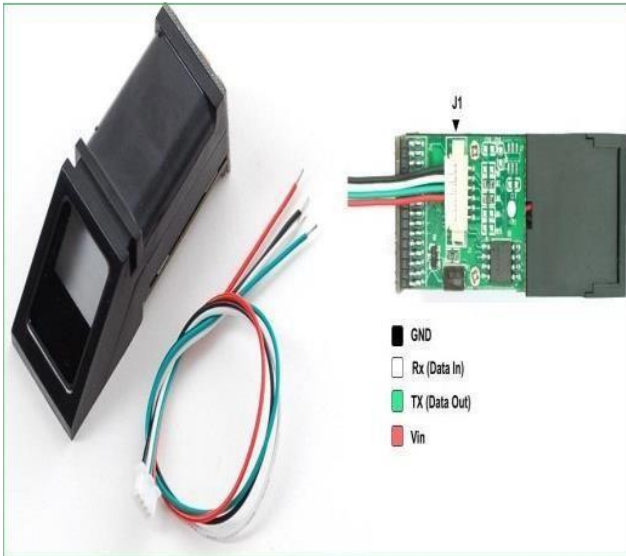


Fig5. Fingerprint Sensor.



Fig6. Camera Module



Fig7. Buzzer .

VIII. ADVATAGE AND APPLICATION

1. It requires only a device that supports the Internet as the system works on the Internet.
2. The voting takes place on a single click. There are no queues like that of a traditional voting system and hence much faster than a traditional voting system.
3. For voters who are regularly out of the station, this system is very beneficial as it gives the freedom of casting the vote from anywhere in the country.
4. This system can be reused several times without any technical difficulties.
5. Eliminate the need to configure elections from scratch. Just do it once, then save that ballot configuration, and in subsequent years, specify only the names of the candidates
6. Secure with dual authentication hence can avoid duplicate votes.

IX. CONCLUSION

The system is expected to overcome all the drawbacks of ordinary voting systems such as rigging, fraudulent votes, and voter authentication mistakes. The Fingerprints of every person are unique and hence this system completely reduces the chance of invalidating votes. Illiterate people can also use this system more friendlyly. Using this enhanced voting system one can get results within a minute after the completion of voting. Minimum manpower utilization, hence mechanism is error-free. The system is expected to provide an additional layer of security as it implemented fingerprint as well as face recognition-based.

REFERENCES

- [1] Hari k. Prasad, Security analysis of India Electronic voting machine 17th ACM conference on computer and communication security 2010. Chicago, IL, USA.
- [2] Khasawne M Malkawi M & Al-Jarrah O (2008) A Biometric-Secure e-Voting System for the election process. proceeding of the 5th International Symposium

- on Mechatronics and its Application (ISMA08) Amman, Jordan.
- [3] N.Ansari, P. sakarindr, EHaghani, C.Zhang, AK.Jain and Y.Q.Shi, Evaluating electronic voting system equipped with voter-verified paper Records IEEE Security and Privacy, vol.6, no.3, May 2008.
- [4] Mayur Patil, Vijay Pimplodkar, Anuja Zade, Vinit Vibhute, Ratnakar Ghadge "A survey on voting system techniques" International Journal of Research in Computer Science and Software Engineering, Volume - 3, Issue-1, PP-114-117, January- 2013.
- R. Murali Prasad, Polaiah Bojja and Madhu Nakirekanti "Aadhar-based electronic voting system using Arduino" International Journal of Computer Applications, Volume -145- No.12, PP-39-42, July- 2016.
- [7] Navnath Baban Belote, Sneha Revankar "Next Generation Electronic Voting Machine" International Journal of Advanced Research in Computer and Communication Engineering, volume-5, Issue-6, PP-622-624, June-2016.
- [8] Shanu Agrawal, Pradeep Majhi and Vipin Yadav "Fingerprint recognition based electronic voting machine" International journal and Technical Research, ISSN-2321-0869, Special Issue, PP 255- 259, STET-2014
- [9] Praveen Kumar and K. R. Ganesh "Raspberry Pi and Image Processing Based Electronic Voting Machine" International journal for research in emerging science and Technology, Volume -4, Issue-V, PP-586- 574, May- 2016.
- [10] Sanjay Kumar, Manpreet Singh "Design a secure electronic voting system using fingerprint techniques" Computer Science Issues, Volume-10, Issue-4, PP-192-199, July-2013.
- [12] Chaum, "Secret ballot: True voter-verifiable elections" IEEE Security and privacy, 2(1), pp-38-47, 2004.
- [13] Rohan Patel, Vaibhav Ghorpade, Vinay Jain and Mansi Kambli "Fingerprint-based e-voting system using Aadhar Databases" International Journal for Research in Emerging Science and Technology, Volume -2, Issue-3, PP-100-120, March- 2015