Literature Review on Aadhar Based Secure Biometric Voting Machine

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Abstract: - In Democratic countries like India, Bangladesh the voting system plays a major role during elections. Traditionally, the election commission in India uses electronic voting machines which need more manpower, time-consuming and also they are less trusted. For avoiding misconceptions during elections, there are lot of advanced techniques are being proposed using various methods. The voting system is managed in a easier way as all the users should login by Aadhar card number and password and click on his favorable candidates to cast the vote. In this paper we will review on Aadhar Based Biometric Voting Machine Survey, the research conducted by various researchers related to the discipline of biometric voting machine are taken into consideration and discussed in chronological order. With the help of this literature survey, it has tried to find out the basic of biometric voting system, improvement of various methods for biometric voting system, and classification of various newly developed methods.

Keywords:- Electronic Voting machine, Arduino, Finger print sensor, Matrix keyboard, LCD Display

I. INTRODUCTION

Election is the act of party casting votes to elect on individual for some type of position. Election may involve a public or private vote depending on the position. Most position in the local, state, and federal governments are voting on in some type of election. In paper-based elections, voters cast their votes by depositing their ballots in sealed boxes distributed across the electoral circuits around a given country. When the election period ends, all these boxes are opened and votes are counted manually in presence of the officers. In this process, there can be mistake in counting of votes or in some cases voters find ways to vote more than once. Sometimes votes are even manipulated to distort the results of an election in favor of certain candidates. The user should show his voting card whenever he goes to the booth to poll his vote. Usually it is time consuming method because the person needs to check the voter ID card with the list he has, make sure it as an authorized card and then enable the person to cast his vote. Thus, to avoid this type of issues, designed a finger print based voting machine wherever the individuals no need to carry his ID which contains his entire details.

The person at the booth should show his Finger. This Finger print reader reads the details from the database. This information is passed to the control unit for the verification. The controller reads DATA from the reader and compares this data with the already existing data. If the data matches with the already stored information, the person is allowed to poll his vote otherwise person isn't allow to cast the vote. LCD is employed to display the related messages.

II. RELATED WORK

"VOT-EL: Three Tier Secured State-Of-The-Art EVM Design Using Pragmatic Fingerprint Detection Annexed With NFC Enabled Voter -ID Card" **Anooshmita Das [1]**

Proposes a new state-of-the-art Electronic Voting Machine design in search for election legitimacy, to provide an inexpensive solution which is based on pragmatic biometric system using fingerprint detection along with inclusion of Near- Far Communication technology. NFC cards for the identification purpose of the voters, which is a short range radio communication wireless technology. This technology allows communication between the NFC card and the device equipped with the reader when they are brought together within less than five centimeters apart in a very secured and reliable manner.

"Smart Voting" **Bhuvanapriya. R, Rozil banu. S [2]**

Proposed a secure online voting system by utilizing the concept of biometric and steganographic authentication. Homomorphic technique encrypts the casted vote stored and decrypt s it during the results. It is a finger-print based application and it generates list of all people who are above 18 years from aadhar card database. By using aadhar number he/she can cast his/her vote. This system has high level security. If he/she tries for the second time he/she will not be able to vote since tracking feature is included in this system. When each voter is casting his/her vote the count will be updated at the same time in the admin database through the server.

"Smart Electronic Voting System Based On Biometric Identification-Survey" **J.Deepika, S.Kalaiselvi [3]**

Proposed voting system which uses biometric identification as a major concept some other works have different algorithms being used. In this paper, they proposed about the concept of getting the fingerprint impression of a voter which is entered as input to the system. Then compared with the available data in the database. If the particular pattern matches with anyone on the available record, access to cast a vote is granted. Then the result is instantaneous and counting is done via IOT. They use GSM module in order to increase the speed and security of the voting system. Using GSM module, the message will be sent to voter's mobile that he has successfully casted the vote so that he can verify easily without any confusion. Then another new technology used here is IOT which is the most significant in this concept. Using IOT the counted votes can be easily sent to the total database server so that the overall counted votes and the elected party that is the selected party can be announced easily.

"A Proposed Framework for Biometric Electronic Voting System" **Md. Mahboob Karim, Nabila Shahnaz Khan [4]**

In this paper, they have focused on designing an biometric electronic voting machine (BEVM) along with fingerprint authentication and centralized database. Based on total number of voters, several BEVM will be installed in each polling station for different elections in Bangladesh which will help to deploy the fingerprint matching task accurately within less time. The proposed system is a biometric e-voting system which has two main sections- 1) voter registration & 2) voting control and result calculation. Each user needs to register first as a voter through the system with biometric (fingerprint) verification. The information of the voter will be saved in a central database.

"Arduino based Smart Electronic Voting Machine" **V. Kiruthika Priya, V. Vimaladevi [5]**

Proposes a system with the addition of biometric fingerprint sensor, each voter is entered into the system only after being recognized and checked with the given database of enlisted voters. Once the corresponding fingerprint is matched with the information provided, the voter will be allowed to proceed for choosing their preferred candidate from the panel of buttons. The final vote is then displayed onto a LCD for the satisfaction of voters. The proposed project displays transparentness and also carries the feature of being autonomous during the course of operation. They propose an idea to avoid fraudulence in mechanism to make e-voting in India a reality. It improves the security performance and avoid fake vote because naturally one human finger print is different from other human.

"Biometrically Secured Electronic Voting Machine" **Rahil Rezwan, Huzaifa Ahmed [6]**

The proposed system is based on electronic voting machine. The system is able to identify each voter by getting their fingerprint. Whenever the system will receive a fingerprint, it will match the fingerprint from the database. According to the information given by the database, the system will decide if the person is registered or not. System is also able to distinguish second vote. If a particular voter is not registered voter or tries to cast more than one vote, system will identify him and will restrict from voting. However, if neither case is applicable for a voter, it will allow the voter to cast the vote. The system is designed in such a way, if vote is given to a candidate mistakenly, the voter has the ability to change their decision but only once. Furthermore, just like any other electronic voting machines, the device will count votes for each candidate. It is also able to show the result, after a certain period of time when the voting is over.

"Secure and Transparent Voting System Using Biometrics" **Ch.Jaya Lakshmi, S.Kalpana [7]**

System is a secured e-voting system that uses aadhar database as its back-end. The system assure authentication of an individual by matching fingerprints and eligibility is checked by calculating the age of the voter thus making the existing voting cards redundant. The proposed system contains two databases. One is Central database and another is Local database of the polling booth. Central database forms the backbone of the system. It contains all the

demographic and biometric data of every citizen of India. All the local databases retrieve data from central database of only those people who come under its scope. The local databases will retrieve only the data that is pertaining to the voting process and exclude all other irrelevant information. These databases will be used for generating statistics and results of the electoral process.
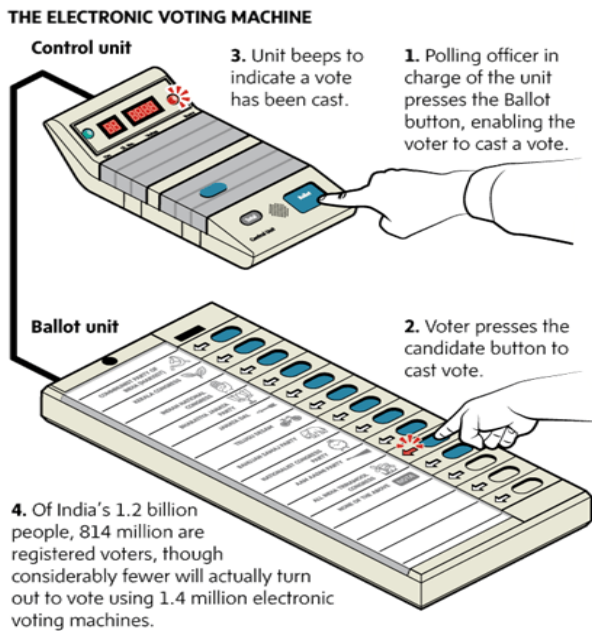
III. METHODOLOGY
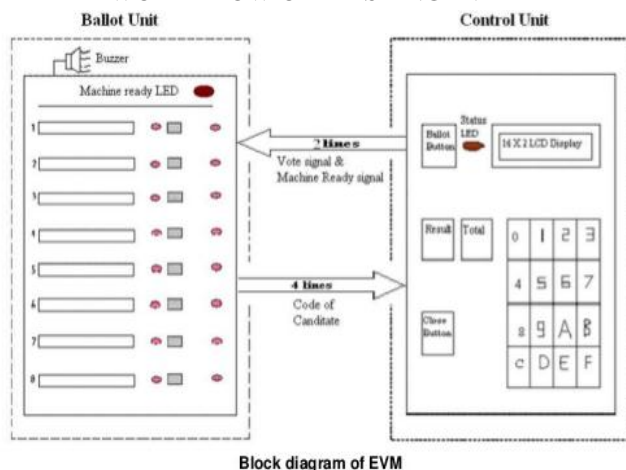
EXISTING EVM MACHINE

Figure 1. *Existing EVM machine*

WORK FLOW OF EXISTING EVM

As our election commission introduced EVM machine firstly in 1982 in the by-election to Parur Assembly Constituency of Kerala for 50 polling stations. They are being used from 1999 elections and in total since 2004 elections. EVM machines are easy to use than ballot papers and reduce the time in both casting the votes and declaration of the result and also EVM's are easy to transport as compare to ballot boxes. So everyone positively react towards EVM machines and this change is easily adapted by our government.

UNIQUE FEATURES

1. Simple machine, can be operated easily by both polling personals and the voters.
2. Sturdy and able to withstand rough handling and variable climatic conditions.
3. Standalone machine without network connectivity. Due to this, nobody can interfere with its programming and manipulate the results.
4. Does not run on electricity but on alkaline batteries. So can work with erratic/absent power supply.

CAPACITY

Usually less than 1400 votes are assigned to a polling station. An EVM can record a maximum of 3840 votes which exceeds this number. Elections can be conducted through EVM's when the maximum number of candidate does not exceeds the capacity of 64. If number of candidates exceeds the capacity of 64, then there is no option to use conventional method of ballot papers.

As all the above Unique Features and capacity are added in the EVM machine, still there are some incidents are happened in our elections that arises many doubts about EVM machine in peoples mind that, "Is EVM machines are actually secure enough?"

IV. RESULTS AND DISCUSSION

INCEDENTS HAPPENED REGARDING EVM

Very recently the elections are held to Buldhana Zilla Parishad from Lonar, Sultanpur in that, every time the voter pressed symbol of Coconut allotted to the candidate, the LED of Bharatiya Janata Party's Lotus used to flash.
In the elections of BMC, Shrikant Ganpat Shirsat is the candidate who enrolled as a voter from two booths. He got total 44 votes out of them, he got 11 votes from booth number 29 and 2 votes from booth number 15. But as the results displayed, he claimed that he got zero votes.

In Delhi elections, 13,58,179 votes are illegal. Fake voter cards are generated for changing the results of election. This figure is very much big that can make large impact on the elections.

In Bihar, there also illegal voting is happened as 30% of votes from all over the Bihar are illegal votes.

POSSIBLE WAYS OF TEMPERING THE RESULTS OF EVM MACHINES

1. Changing display of the machine

As the display of the control unit is like plug and play, we can change that display by other fraud one and place one bluetooth device in the system and after that ballot unit accepts all the input from voters but at the time of results, it gives the result which can be set by fraud person.
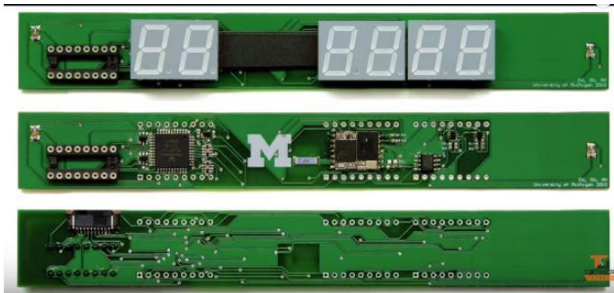

Figure 2. *Control unit plugged with Bluetooth*

Figure 3. *Display of control unit*

2. By rewriting the memory of control unit

The software of this machine is completely embedded so it cannot be possible to insert or remove some or all part of the machine, also there are no external ports in the control unit so everything is completely inside the control unit. But one way is by externally forcefully rewriting the memory of control unit it can be possible to temper the results of election.

Figure 4. *External device to rewrite the memory*
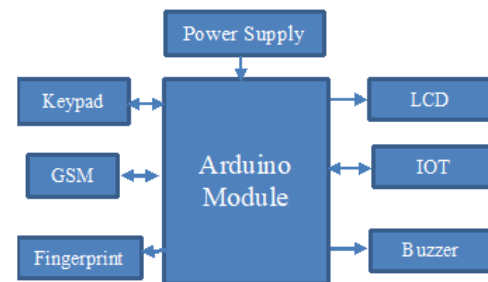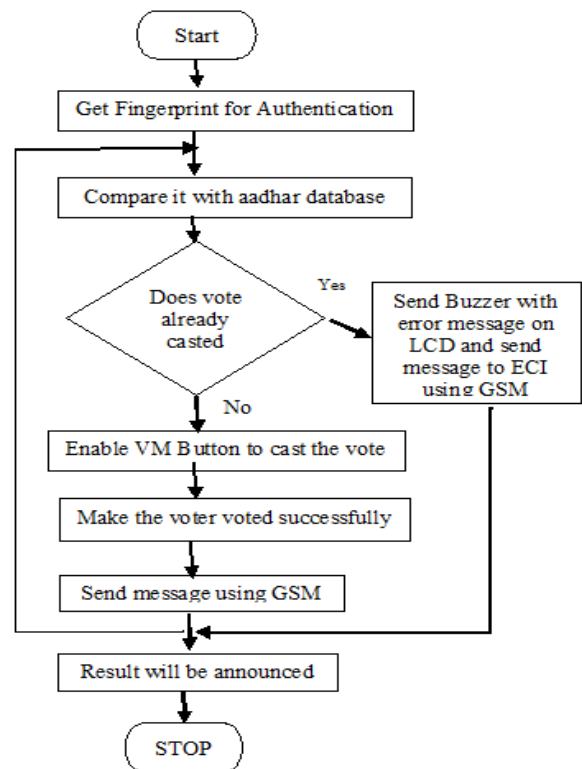
PROPOSED SYSTEM

Figure 5. *Proposed System*

DATA FLOW DIAGRAM

V.   CONCLUSION AND FUTURE SCOPE

Throughout this literature survey researchers proposed a good and efficient biometric voting machine had more extra features and better over traditional voting system. The advantage of this system are faster result, better accuracy, improved accessibility, low risk of mechanical, human errors. It was also more feasible, economical, ease of use, less power consumption, time saving, and not extra hardware requirement. The process flow is very simple and unique.

Some important points are raised during this survey that is has some limitations and we want to future work on it. Some additional feature added with hardware like large display, webcams and sensors can be integrated with voting machine for more security and fast work.

1.   It has less memory so increased memory capacity.

2.   Peoples with no hands won't be able to cast vote so in future we should use multi-biometric systems by iris scan or facial recognition in model

3.   Better interface

4.   Huge volume of database which take more time to check and verify.

ACKNOWLEDGMENT

REFERENCES

[1]   A. Das, M. P. Dutta, "VOT-EL:Three Tier Secured State-Of-The-Art EVM Design Using Pragmatic Fingerprint Detection Annexed With NFC Enabled Voter -ID Card", International Conference on Emerging Trends in Engineering, Technology and science, 2016.

[2]   R. Bhuvanapriya, S. R. banu, P. Sivapriya, V. K Kalaiselvi, "Smart Voting", International Conference on Computing and Communication Technology, Chennai, India, 2017

[3]   J. Deepika, S. Kalaiselvi, S.Mahalakshmi, S.Agnes Shifani, "Smart Electronic Voting System Based On Biometric Identification-Survey", Third International Conference on Science Technology Engineering & Management (ICONSTEM), , Chennai, India, 2017.

[4]   M. M. Karim, N. S. Khan, "Smart Electronic Voting System Based On Biometric Identification-Survey", IEEE International Conference on Telecommunications and Photonics (ICTP) 26-28 December, 2017, Dhaka, Bangladesh, 2017

[5]   V. K. Priya, V. Vimaladevi, T. D. Pandimeenal, "Arduino based Smart Electronic Voting Machine", International Conference on Trends in Electronics and Informatics (ICEI), Tirunelveli, India, 2017

[6]   R. Rezwan, Huzaifa Ahmed, M. R. N. Biplob, S. M. Shuvo, Md. A. Rahman, "Biometrically Secured Electronic Voting Machine", IEEE Region 10 Humanitarian Technology Conference (R10-HTC), Dhaka, Bangladesh, 2017

[7]   Ch.Jaya Lakshmi, S.Kalpana, "Secured and Transparent Voting System Using Biometrics", Second International Conference on Inventive Systems and Control (ICISC 2018), Coimbatore, India, 2018