



# Integration of Biometric Sensor with Aadhar for Voting Process

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## ABSTRACT

With the concurrence and the consent of the Election Commission of India, Biometric sensor can be integrated with Aadhar system, along with the EVM (Electronic Voting Machine), to ensure the authenticity of the voters and to avoid challenged (Fake) votes. In our existing election system, the main challenge we face is the problem of challenged votes. This issue can be addressed by implementing Biometric sensor along with the EVM. As the majority of the citizens are provided with Aadhar card, which consists of the finger print pattern, along with the other necessary details, it is easy for the sensor to be synchronized with the Aadhar database. The proposed system is implemented with the Biometric sensor, which identifies the finger print pattern, once the voter places his left hand index finger. The sensor is integrated with the data of that polling booth alone. Thereby, the search and retrieval time process can be minimized. The polling officer who monitors the green signal and the beep sound from the sensor allow the voter to proceed to vote. Once the sensor establishes the authenticity of the voter to cast his vote. Otherwise, the red light on the EVM indicates that he/she is not valid voter.

**Keywords:** Aadhar; Biometric sensor; Electronic voting; Finger print pattern.

## 1. INTRODUCTION

In India Electronic Voting System is being used during the election. EVM (Electronic Voting Machine) is used to only to cast the votes and to count the votes of individual candidates. Election commission of India provides the Voter Id Card used to identify the voter. Booth slip is also issued by the Election commission of India. But this system cannot achieve and attain proper security and authenticity. Antisocial activists can easily cast challenged votes. This problem is addressed by our proposed system.

### 1.1 Aadhar Database

Aadhar system was issued by UIDAI (Unique Identification Authority of India). Every Indian citizen have unique Aadhar id. That contain all details of the person like finger print pattern, Iris pattern, and photo, name, age, address, etc.,

### 1.2 Biometric Method

The main objective of the proposed system is the use of fingerprint image of the voter to authenticate him and to enable him cast the vote genuinely (Davinder kaur and Sangram Bana, 2011; Anil K. Jain and David Maltoni, 2003). Fingerprint matching technique can be classified into three types:

- Correlation-based matching
- Minutiae-based matching
- Pattern-based matching

#### 1.2.1 Correlation-based Matching

Two fingerprint images are superimposed and the correlation between corresponding pixels is computed for different alignments (e.g. various displacements and rotations).

#### 1.2.2 Minutiae-based Matching

This is the most popular and widely used technique. Minutiae are extracted from the two fingerprint and stores as sets of points in the two-dimensional plane. Minutiae-based matching essentially consists of finding the alignments between the template and the input minutiae sets that result in the maximum number of minutiae pairings.

#### 1.2.3 Pattern-based Matching

Pattern-based algorithms compare the basic fingerprint patterns (arch, whorl, and loop) between a previously stored template and a candidate fingerprint. This requires that the images be aligned in the same orientation. To do this, the algorithm finds a central point in the fingerprint image and centers on that. In a pattern-based algorithm, the template contains the type, size, and orientation of patterns within the aligned fingerprint image. The candidate fingerprint image is graphically compared with the template to determine the degree to which they match. In the proposed Biometric Authenticating system (BAS) we have used the Minutiae-based matching procedure to identify person

from his/her fingerprint. Finger print matching techniques are used to identify the voter with Aadhar Database (Soumyajit Chakraborty *et al.* 2016; Gbolagade and Yineyeh, 2013).

**2. LITERATURE SURVEY**

Gowri, Guruprasanth, Krishnan.s, Jayasurya.d, Dhanasekaran in their paper presented Biometric Voting Machine using Aadhar card and they concluded Implementation of Biometric Voting Machine using Aadhar card has been successfully designed and tested.

Sankhadip sen, samadip sen in their paper presented Automatic Voting Machine-An advanced Model for Biometric based Voting system and they concluded it was a first step of creating Automatic Voting Machine.

Sonal Mangoankar, Snehal Chagare, Sanket Naik, Kiran Patti in their paper presented Virtual Voting System and they concluded Desktop Application for Online Voting connected with Aadhar database was enhanced Security of Online Voting System.

Murali Prasad .R, Pollaiah Bojja, Madhu Nakirekanti in their paper presented Aadhar Based Electronic Voting Machine using Arduino and they concluded developing innovated electronic Voting Machine with Aadhar database will increase voter confidence and Hope.

Prof.R.L.Gaike, Vishnu.P, Shubum, T.Jadhav Prasad N.Paulbudle in their paper presented Aadhar Based Electronic Voting System and they concluded developing the Electronic Voting Machine with Finger print Provides more security in the Election Process.

Rakesh S Raj, Raghavendra A, Madhushree KR, Bhargavi D, in their paper presented An Online Voting System using Biometric Finger Print and Aadhar card and they concluded their proposal enables voter cast his/her vote online.

Rathna prabha.S, Trini Xavier.X, Deepika.V, Iswarya.C in their paper presented A Survey on E-Voting System Using Arduino Software and they concluded Aurduino software used to find the repeated Voter to prevent the Election from challenged votes.

Alaguvel.R, Gnanavel.G, Jagadhambal.K in their paper presented Biometrics using Electronic Voting System with Embedded Security and they concluded developing the online and offline Voting System was successful.

Talib.A, Divan, Veena.A, Gulhare in their paper presented Development of Online Voting System Using Minutiae-based Algorithms and they concluded developing a System with Online Voting using Minutiae-based Algorithms with low errors.

M.Sudhakar, B.Divya Soundarya Sai, Biometric System Based Electronic Voting Machine using Arm 9 Microcontroller they concluded this system will Enhanced Security by eliminating bogus Voting and repetition by using Arm9 Microcontroller System.

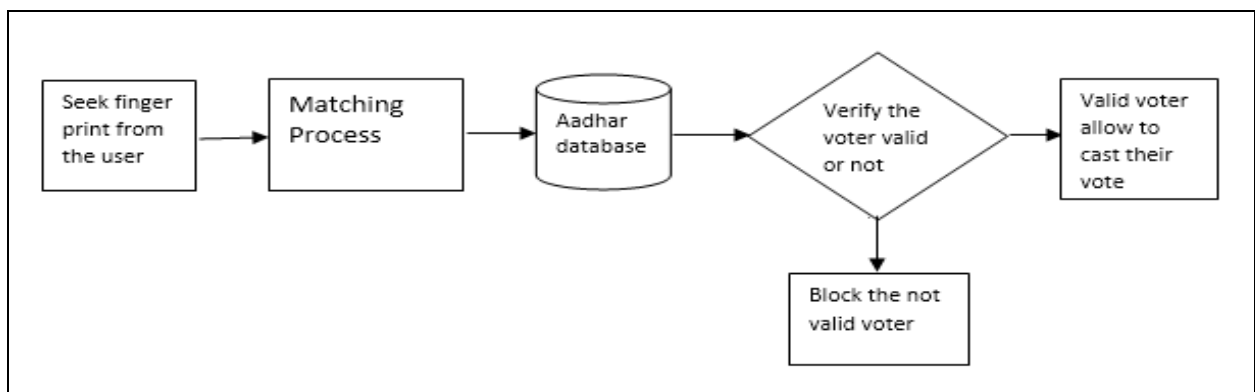
**3. PROPOSED FRAMEWORK**

Our proposed system works in both online and offline modes.

- Configure Server System
- Creating Probe Application
- Authentication

**3.1 Configure Server System**

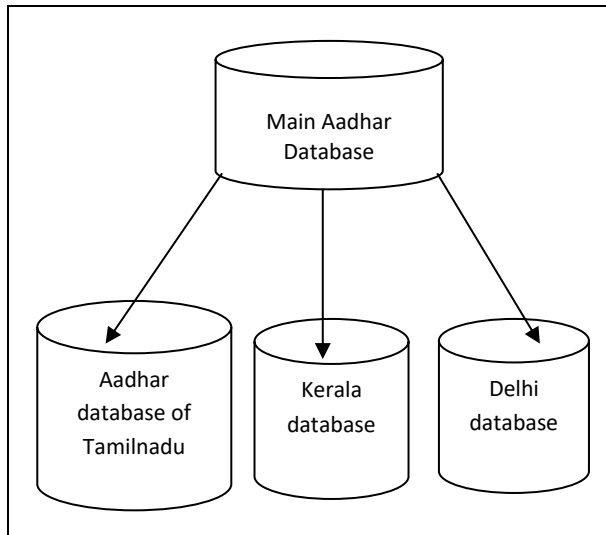
Main Aadhar database is very big that contains lots of data so that was divided into several parts based on the locality of the voters. This separation process made by using some data mining algorithms (Steinbach and Tan pang-Ning, 2009; Larose, 2005).



**Fig. 1: Voting process.**

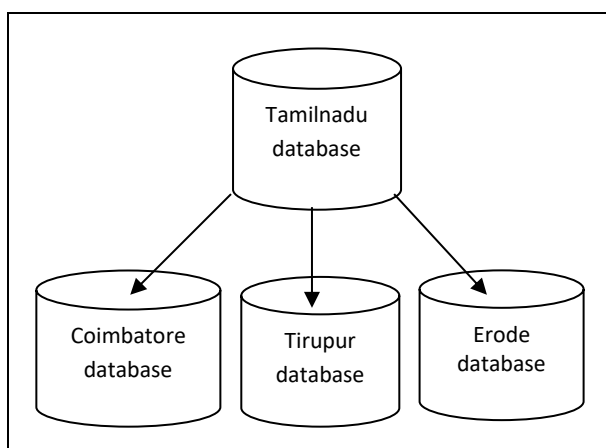
Particular area database used as the server of that area. That server contain the details of that area voters only. So that server works efficiently.

Following figures 2 and 3 explain separation of databases.



**Fig. 2: Aadhar database.**

After this separation process every single database contains all details of the particular area/booth voters. That provides so many details of that area like total number of voters in that area, gender wise, first time voters of that area.



**Fig. 3: Separation of database region wise.**

### 3.2 Creating Probe Application

One Probe windows application for admin (Election Commission of India) connects with Aadhar database server. The main use of this application is display the details of the voter, and notify the Election Officer that voter is eligible to vote or not. Other features

of this application is display the status of the election. Help to get the list of who have not casted their votes.

### 3.3 Authentication

In the election time election officer could authenticate the voter using this application the voter place the thumb impression on the Biometric sensor that application find the matches fingerprint data in the Aadhar database using minutiae-based matching algorithm (Sergey Tulyakov *et al.* 2013; Alex C. Kot and Sheng Li, 2011). Once it find that all details will be fetched and displayed in the application. Then the officer will identify the voter easily after identification process the officer will enter the ok button that application will allow the voter to cast his vote in the EVM as normally. If the same voter tries to vote again, the system ensure vote one time only.

This system will also monitored in online every minute status of the every single booth are send by the application to the main server system was monitoring by the controller of the Election Commission (Ayman Mohammed Bahaa-Eldin, 2013; Rohan Patel *et al.* 2015). Election commission of India was used voter id and booth slip to identify the voter, this process was time consuming and expensive and many users unable to get it easily. Our system will reduce that difficulties.

### 4. CONCLUSION

Throughout this paper an overview of a Biometric identification for voting is presented which can be implemented in the election of India to prevent antisocial activities in the booth. This system is too much fast to do the tasks and most of the tasks are done automatically by the system so that, there will be no problem of manual discrepancies. The cost of the system will be not so high. Biometric devices are highly used in most of the organization now-a-days. So it is not too much strenuous task for any organization like Election Commission of India to bear the expensive of this system.

### FUTUR WORKS

- Iris scan also be included to make the security of the system much higher. Iris image is already there in the Aadhar card database of every citizen of India. So it can be implemented without much difficulties
- We have used the minutiae-based fingerprint matching technique in our system. To improve the performance and get much reliable fingerprint recognition and authentication system Data mining algorithms can be used.

- There is much scope to change the total voting process into the digital online/offline voting system.

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## CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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## REFERENCES

- Alex C. Kot and Sheng Li, A Novel System for Finger Print Privacy Protection, *Int. Conf. Info. Ass. Sec.*, 2011.  
<https://doi.org/10.1109/isias.2011.6122830>
- Anil K. Jain and David Maltoni, *Hand book of Finger Print recognition*, New York, Springer-Verlag(2003).

Ayman Mohammed Bahaa-Eldin, A Medium resolution finger print matching system, *Ain Shams Engineering Journals*, 4(3), 393-408(2013).

<https://doi.org/10.1016/j.asej.2012.10.001>

Davinder Kaur and Sangram Bana, Finger Print Recognition using Image Segmentation, *Int. J. Adv. Engg. Sci. Technol.*, 5(1), 12-23(2011).

Gbolagade, K. A. and Yineyeh, M. O., Over view of Biometric Electronic Voting System in Ghana, *Int. J. Adv. Res. Comp. Sci. Soft. Engg.*, 3(7), 624-627(2013).

Larose D.T, *Discovering knowledge in Data: An introduction to data mining*, ISBN: 0-471-66657-2, John Wiley & Sons, Inc, 2005.

Rohan Patel, Vaibhav Ghorpade, Vinay Jain and Mansi Kambli, Fingerprint based e-voting system using adhar database, *Int. J. Res. Eme. Sci. Technol.*, 2(3), 87-90(2015).

Sergey Tulyakov, Venu Govindaraju and Xi cheng, Minutiae-based matching state model for combinations in finger print matching system, *IEEE conference on computer vision and pattern recognition workshops*, 92-97(2013).

<https://doi.org/10.1109/CVPRW.2013.21>

Soumyajit Chakraborty, Siddartha Mukherjee, Bhaswati Sadhukhan and Kazi Tanvi Yasmin, Biometric Voting system using Aadhar card in India, *Int. J. Inn. Res. Comp. Comm. Engg.*, 4(4), 5284-5291(2016).

<https://doi.org/10.15680/IJIRCCCE.2016.0404222>

Steinbach, Tan pang-Ning, *Introduction to Data mining*, Pearson Education, New Delhi, ISBN: 978-81-317-1472-0 (2009).