



# **Fingerprint and RFID Based Electronic Voting System Linked With AADHAAR for Rigging Free Elections**

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**ABSTRACT:** This paper proposes a method for safe and secure aadhaar based biometric voting system to avoid misconceptions which are going to take place in elections. From last few years in India, aadhaar enrollment process is going on in Andhra Pradesh. At that time, Indian government collects details of finger prints and IRIS of every person. This entire data of each and every person persists in the database of Indian government. If Indian Government links this database to authors proposed method, Indian Government no need to collect details of finger print of every person. So, if Indian Government adopts biometric voting system for voting purpose, we can easily avoid rigging in elections. One more advantage of this project is, if an alcoholic person enters into polling booth, buzzer will alert authorized persons or constables who are in election duty. Because of Alcoholic sensor, we can provide peaceful environment at polling booth. If an unauthorized person enters into polling booth to cast his vote, buzzer will alert booth level officer. If already vote casted person enters into booth with his RFID tag for 2<sup>nd</sup> time voting, then also buzzer will alert booth level officer.

**KEYWORDS:** AADHAAR, EPIC, Finger Print Identification Module, RFID, GAS SENSOR, ALCOHOL SENSOR, METAL DETECTOR

## **I. INTRODUCTION**

After getting freedom, Indian Government provide a right to Indian people to elect their interested leader. For conducting and controlling voting in India, a separate commission was introduced which was named as Election Commission of India (ECI). This commission is not favorable or support to any political party. As per rules which have been in law, this commission works. For the persons, who have age of 18 and above are eligible to enroll their vote. To cast their vote, Election commission provides voter id cards. From last few decades paper voting procedure is going on. After polling votes in polling booths, Those paper format votes have been placed in ballot boxes. That entire box placed in the rooms of schools or colleges. If those rooms are perfect with interior walls, then there is no problem. If those inner walls are older one, then ants will damage that valuable ballot box. At this instant, Election commission needs to conduct elections at that particular place once again.

Electronic voting (also known as E-voting) is voting using electronic systems to aid casting and counting votes. Voting machines use a two-piece system with a balloting unit presenting the voter with a button for each choice connected by a cable to an electronic ballot box.

An EVM consists of two units:

1. Control Unit
2. 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. Instead of issuing a ballot paper, the Polling Officer in-charge of the Control Unit will press the Ballot Button. This will enable the voter to cast his vote by pressing the blue button on the Balloting Unit against the candidate and symbol of his choice. The controller used in EVMs has its operating program etched permanently in silicon at the time of manufacturing by the

manufacturer. No one can change the program once the controller is manufactured.

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The main drawback of this system is that, voter's id checking process is manual hence possibilities of illegal voting by a wrong candidate. And also, possibility of multiple votes by same person. To avoid this problem, Author going to use E- voting system.

In this project, two step verification goes on. In 1<sup>st</sup> step, RFID tag is verified with data base of AT89S52 to check whether the person belongs to that particular polling booth or not. In 2<sup>nd</sup> step, Finger print scanner is used to check whether the voter is original or not. If these two steps are successful then microcontroller enables switches to cast vote to particular political party. RFID tag contains it's own ID. When we place this RFID tag near RFID reader, it reads the Tag ID. It will be checked with the database of micro controller. If that Tag ID persists in the database of microcontroller, then the information related person(name of the person, AADHAAR Number, Voter Number)will be revealed on LCD screen. In our project, for enrolling purpose, Enroll button is provided. If voter is not enroll his Vote on the database of microcontroller, Vote will not be casted. After casting votes, results will be announced through LCD display. LCD display is an instructor for citizens of India to follow step by step procedure. Our proposed system will detect alcoholic person who tries to enter into polling booth. Alcoholic person doesn't have patience. He don't know what is going on around him while he was in drunk state. He can create nuisance at polling booth. To avoid this kind of nuisance alcoholic sensor is used.

## II. SYSTEM ANALYSIS AND RELATED WORK

### 1) RFID:

In this project, four RFID tags have been used. Each and every tag contains the information related to individual voters. Our micro controller AT89S52 contains the following details such as Name of the voter, voter ID, AADHAAR ID, Date of Birth of the voter. When RFID tag placed near to RFID reader, RFID reader activate the details of particular information of RFID tag which is preloaded into micro controller memory. If that RFID tag exists in the database of micro controller, then biometric authentication process. Else, our system goes to check next RFID Tag. In this way, entire voting process goes on. RFID tag transmits its information to the RFID reader by taking advantage of the fact that each time the tag draws energy from the RFID reader's magnetic field, the RFID reader itself can detect a corresponding voltage drop across its antenna leads. Capitalizing on this phenomenon, the tag can communicate binary information to the reader by switching ON and OFF a load resistor to perform load modulation.

### 2) Fingerprint Identification Module:

Fingerprint processing includes two parts: fingerprint enrollment and fingerprint matching (the matching can be 1:1 or 1:N).When enrolling, user needs to enter the finger two times. The system will process the two time finger images, generate a template of the finger based on processing results and store the template. When matching, user enters the finger through optical sensor and system will generate a template of the finger and compare it with templates of the finger library. For 1:1 matching, system will compare the live finger with specific template designated in the Module; for 1:N matching, or searching, system will search the whole finger library for the matching finger. In both circumstances, system will return the matching result, success or failure.



Fig 1. R305 Module

In this proposed paper, Finger print Optical scanner is used for authentication purpose. When RFID tag



## International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 3, March 2016

authentication occurs, user need to go for second stage authentication. There is a scope to misuse of votes if we won't adopt biometric voting system. There is scope to use of RFID Tag by somebody to cast some one's vote illegally. To avoid this, we are using biometric voting system. Finger prints of each and every person may get varied. None of a man in the earth have same kind of finger prints. Finger print optical scanner is an input module for AT89S52. After 1<sup>st</sup> stage verification, user need to put his proper thumb upon fingerprint scanner. If that particular fingerprint matches with the database of AT89S52 then only switches will be enabled by AT89S52 to cast vote.

Fingerprint is very safe and convenient device for security instead of password that is vulnerable to fraud and is hard to remember biometric process for authentication, identification and verification functions that let your fingerprints act like digital passwords that cannot be lost, forgotten or stolen.

### 3) *Liquid Crystal Display:*

LCD stands for **Liquid Crystal Display**. LCD components are “specialized” for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.

In author's proposed paper, LCD display is an output module which have been controlled by AT89S52. When user places RFID tag near RFID reader, user details will be displayed on LCD screen. If those details belongs to you, then it asks for place your finger upon module for authentication (Please verify your Thumb Impression....).if your thumb impression matches with data base, one message will be displayed like this, “Authentication SUCCESSFUL PLEASE CAST YOUR VOTE”. To cast your vote, you need to switch a button which is present in the ballot. If LED blinks once, then one message will be shown like this in the LCD screen, “YOUR VOTE IS CASTED SUCCESSFULLY”. If a person enters 2<sup>nd</sup> time to cast his vote, then an error message will be likes this... “ALERT!! YOUR VOTE IS ALREADY CASTED”. If an alcoholic person enters into booth, then an error message on the LCD screen will be like this... “ALCOHOLIC person Entered. BE ALERT”. If an unauthorized RFID tag enters into the field of RFID reader, a proper error message will be shown like this..... “YOUR CARD is UNAUTHORISED”. Like this LCD module useful in our project.

### 4) *Switches:*

In this project, instead of EVM(Electronic Voting Machine), switches are used to cast vote by voters. Here four switches have been provided named as SW1,SW2,SW3 and result button. Each and every switch belongs to their respective political party except result button. Moreover in author's project for enrolling voters, Enroll Button is provided. While casting vote, user need to press a button named as Authentication Button. If the person is Already enrolled one, then only vote casting takes place. When voter press a button named as SW1, vote is polled for respective political party. Like this, entire voting process completes. After voting process completes, when election commission opens the result by using particular confidential password, then only list of polled votes to particular political party will be shown on LCD screen. Based on that information, user has to decide who is the winner.

### 5) *RS232 (Serial Communication Interface):*

In this project, RS232 serial data transmission cable is used to connect finger print module with AT89S52. In general images will be store in chip memory in the form of binary digits like ON(1) and OFF(0). Like this, voters finger print also stored in the memory of ARM7 in the form of Binary digits. When we place our finger for biometric authentication, the data will be transfer to AT89S52 in the form of stream of bits serially through RS232 cable. This entire stream of bits will be collected and compared by AT89S52. If perfect match found, voting process initiated.

UART (Universal Asynchronous Receiver Transmitter) or USART (Universal Synchronous Asynchronous Receiver Transmitter) are one of the basic interface which you will find in almost all the controllers available in the market till date. This interface provide a cost effective simple and reliable communication between one controller to another controller or between a controller and PC.

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 3, March 2016

## 6) Smoke or Alcohol Sensor and Metal Detector:

MQ5 is basically a smoke sensor. We can also use it for detecting alcoholic person. If we adjust sensitivity of MQ5 using potentiometer, we can get better results in spite of weather conditions are bad. Most of Alcoholic persons will create nuisance everywhere in the public. Due to this, decent voters suffers from lots of problems. Because of this, election in that particular polling booth is going to cancel. To avoid these kind of serious problems author had adopted alcohol sensor. In this project, to detect alcoholic person MQ5 sensor is used.

In this project, Metal detector is used to detect a person who have been entering into polling booth with gun or knives. Here, Metal detector will alert us to faraway Maoists from polling booth. Authors project is especially for safe and secure voting.

Resistance value of MQ-5 is different for different gases. We need to adjust sensitivity by varying resistance value for various concentration of gases. For example, the concentration of gases for LPG, Natural Gas, Cigarette and Town Gas are not unique. Based on requirement, we have to adjust resistance to get better sensitivity.

### III. BLOCK DIAGRAM

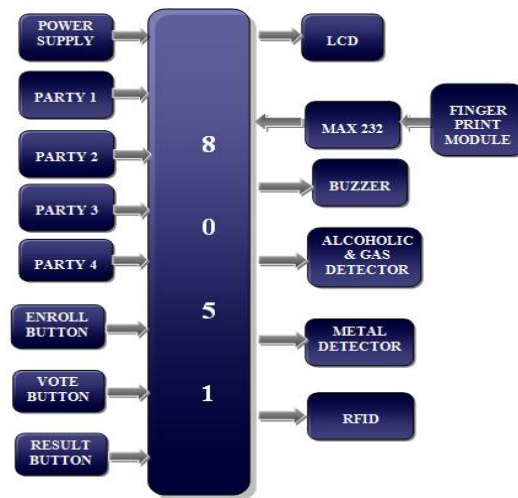


Fig 2. Block Diagram of our Project

### IV. APPLICATIONS OF OUR PROJECT

1. Especially for safe and Secure Voting using Biometric System.
2. To Detect Alcoholic person who tries to enter into polling booth.
3. To detect moist who are trying to enter into polling booth with guns and bombs.
4. To Detect Gas Leakage near polling booth.
5. AADHAAR, VOTER ID(EPIC) Linked with RFID Tag to avoid dummy votes.

## V. FLOW CHART OF OUR PROJECT

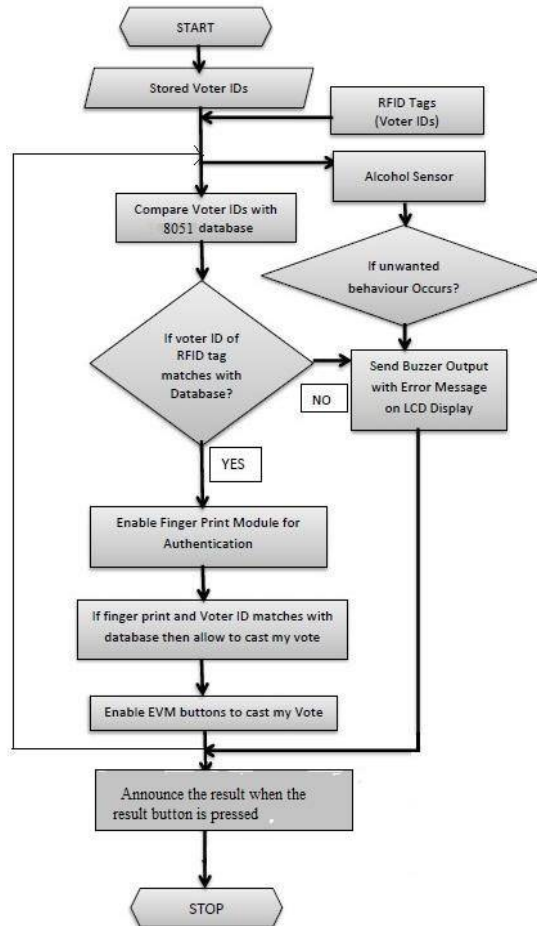


Fig 3. Flow Chart of our Proposed System

## VI. STATE TRANSITION DIAGRAM

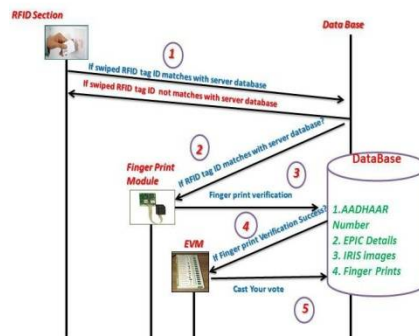


Figure: State Diagram for our Proposed Method

Fig 4. State Diagram of our Proposed System

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 3, March 2016

## VII. OVERVIEW OF OUR SYSTEM

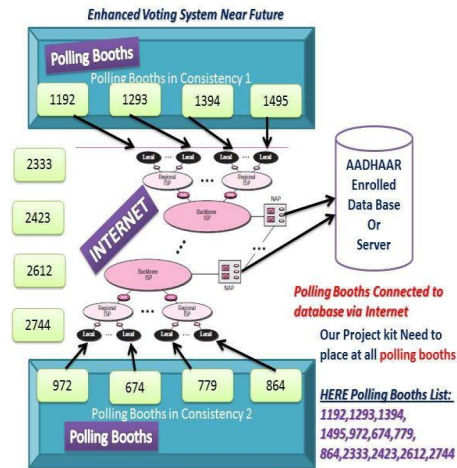


Fig 5. Overview of our system

## VIII. FUTURESCOPE

If we adopt, IRIS Technology for authentication purpose, we can get better results compared to Biometric System. If we provide networking among polling booths with AADHAAR data collected Server with the help of internet, we can easily get better security. If we use very sensitive alcohol sensor and metal detector, we can provide better safety and peaceful environment near polling booth.

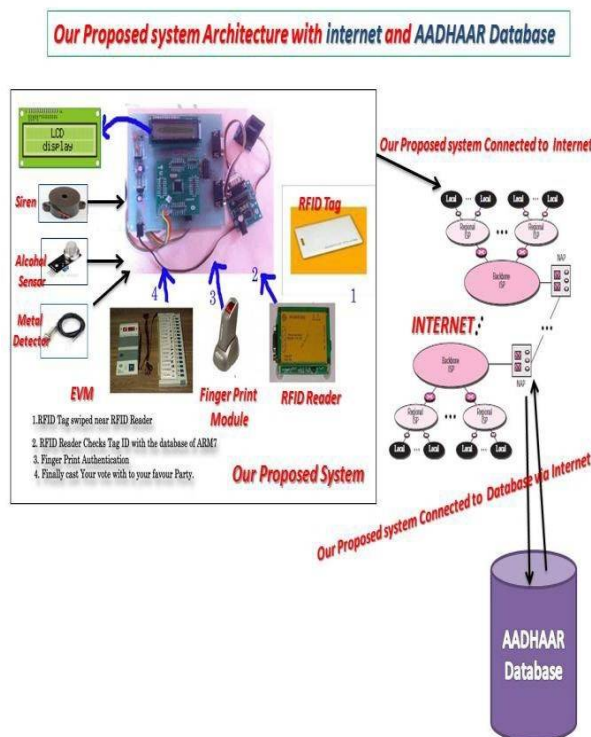


Fig 6. Our proposed system architecture with internet and AADHAAR database

## IX. RESULTS AND DISCUSSION



Fig 8. Results of our project



# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 3, March 2016

## X. CONCLUSION

Our project provides safety and security in voting process. Our system provides security with RFID based Biometric Voting Method. And provides safety from alcoholic persons and Maoists who comes to polling booth to blast polling booth. This system perfectly suited for 99% of voters. The remaining 1% is who are physically handicapped. If we adopt face recognition based retinal scan method, we can solve this authentication problem up to 100%. Our system is linked to AADHAAR to avoid votes duplication. This system inter linked with three primary specifications such as voter id, AADHAAR ID, Biometric Authentication. There is no scope to take place rigging in elections.

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