



# Raspberry Pi Based Advance Electronic Voting Machine

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**ABSTRACT:** Electronic voting machine has developed and used in many countries all over world, India is one of them who has world's largest democracy. This project is designed for integrating Electronic Voting Machine with the Server data of the voter as in the Aadhar using Cloud. Using the Aadhar Number and its unique bio-metric identification system to prevent and alert the authorities against fake voting and voting on behalf of absent voters during election and prevent rigging during election. Protecting the voting rights of the citizen using fingerprint to ensure the identity of the person who is voting and also to ensure that no single person can vote more than once and aborting and alerting the authorities if otherwise. In this manner the citizen's trust in democracy is protected by ensuring a fair method for collection and counting of votes. Illegal voting by impersonation and multiple voting by the same person can be avoided.

**KEYWORDS:** Voting Machine, Aadhar, Cloud, Fingerprints, Elections.

## I. INTRODUCTION

In India there are two types of voting procedure which are used to be followed during an election. The first one is Ballot Paper System and the second one is Electronic Voting System (EVM). But both the systems cannot achieve and attain proper security and authenticity. Antisocial activists can easily cast false votes of dead people's.

Voting is a method by which the voters chooses their representatives. In current voting system whenever a person goes to the polling booth to poll his vote the voter has to show his voter ID card. In the process is a time consuming process as the polling officer has to check the voter ID card with the list he has, confirm it as an authorized voter and then allow the voter to poll his vote. Thus, to avoid this kind of problems, we have designed Raspberry Pi Based Advance Electronic Voting Machin. This advanced Electronic Voting Machin overcome all the above issues by using advanced IOT technologies and cloud. In this project using cloud we can make election procedure more easy and less complicated. Here we are authenticating voter using two methods that is fingerprint and QR code of Aadhar card which means this can avoid fake voting. System is directly attched to Governments server for accessing Aadhar card data.

The main purpose of Raspberry Pi Based Advance Electronic Voting Machin is to use latest technologies like cloud, kubernetes to make election more sucure and less complicated. It should furnish more services in order to make the process more trusted and secure.

## II. RELATED WORK

In this project the author has proposes a secure online IoT Based Electronic voting system that uses Aadhar card info which is stored in governments servers as a backend database. The system guarantee authentication by matching fingerprint and QR code is checked by Fingerprint sensors and QR code scanner so the result is compared with the authenticated data of Aadhar which is stored in government servers for verification of voter.

A user interface accepts voters Aadhaar QR code, voter's fingerprints and provides associate interface to vote and show confirmation, process and error messages. This technique needs smart information measure and high-speed web affiliation for in operation. This is nothing but a frontend where as the backed will be the authrized governments servers which strore data of voters.

As the modern communication and intenet, today people's are digitlized by so many things. Usages of new technology in the voting process improve the elections in natural. Raspberry Pi Based Advance Electronic Voting Machin is used where the election data is recorded, stored and processed primarily as digital information.



## III. BLOCK DIAGRAM

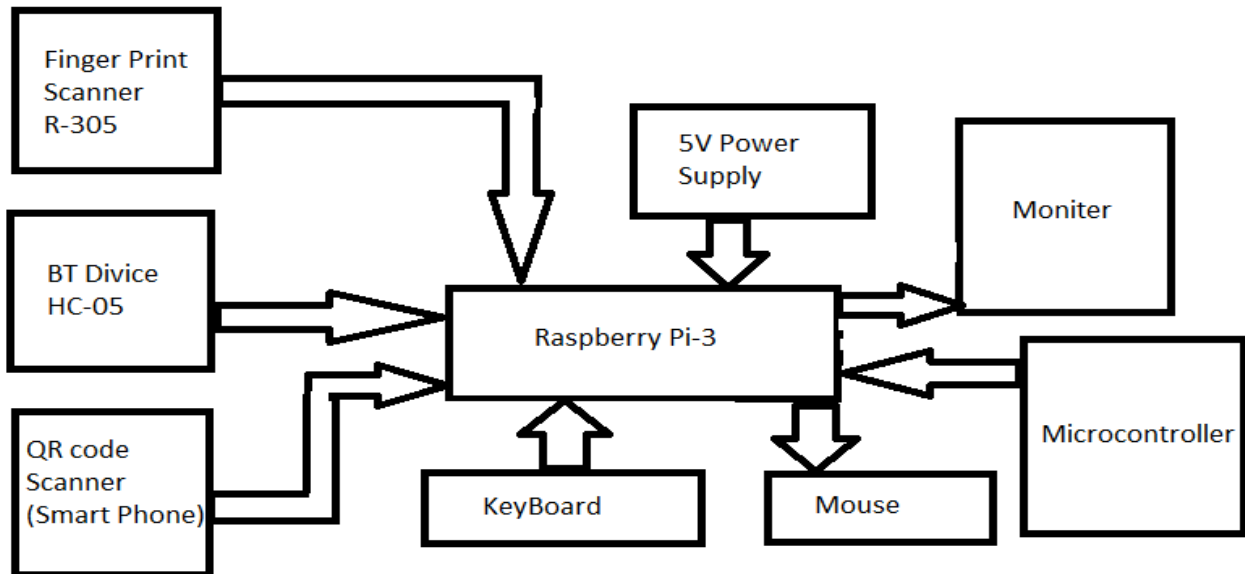


Fig.1. Block Diagram of Raspberry Pi Based Advance Electronic Voting Machine

As shown in block diagram the central processing Unit (CPU) is Raspberry Pi. Raspberry Pi is a small single board computer. By connecting peripherals like Keyboard, mouse, display to the Raspberry Pi, it will act as a mini personal computer. Raspberry Pi is popularly used for real time Image/Video Processing, IoT based applications and Robotics applications. Raspberry Pi is slower than laptop or desktop but is still a computer which can provide all the expected features or abilities, at a low power consumption. Raspberry Pi Foundation officially provides Debian based Raspbian OS. Also, they provide NOOBS OS for Raspberry Pi. We can install several Third-Party versions of OS like Ubuntu, Arch Linux, RISC OS, Windows 10 IOT Core, etc. Raspbian OS is official Operating System available for free to use. This OS is efficiently optimized to use with Raspberry Pi. Raspbian have GUI which includes tools for Browsing, Python programming, office, games, etc. We should use SD card (minimum 8 GB recommended) to store the OS (operating System).Raspberry Pi is more than computer as it provides access to the on-chip hardware i.e. GPIOs for developing an application. By accessing GPIO, we can connect devices like LED, motors, sensors, etc. and can control them too.

It has ARM based Broadcom Processor SoC along with on-chip GPU (Graphics Processing Unit).The CPU speed of Raspberry Pi varies from 700 MHz to 1.2 GHz. Also, it has on-board SDRAM that ranges from 256 MB to 1 GB. Raspberry Pi also provides on-chip SPI, I2C, I2S and UART modules.

Finger Print Sensor R305 is connected to UART of the Raspberry Pi. Fingerprint Sensor capture, process voters as well as Polling Agent (Operator). For scanning Aadhar card camera is used with Raspberry Pi .Raspberry Pi handles Optical Character Recognition (OCR) Algorithm and give Aadhar Card which is unique for every voter. *OCR (optical character recognition)* is the recognition of printed or written text characters by a computer. This involves photo scanning of the text character-by-character, analysis of the scanned-in image, and then translation of the character image into character codes, such as ASCII, commonly used in data processing. 16X2 LCD is used to give system messages. Buzzer used to give audio warning of system abnormal condition.

Our proposed system mainly works in offline mode and has three modes. They are

1. Admin Mode
2. User Mode

Here is the brief description of these three modes.

**A.Admin mode:-**

In this proposed system the officials of Election Commission of India play the role of Admin of the system. To use the system first they need to register themselves with the system. Those persons who have not registered themselves with the system, they need to register them as an Admin by scanning their own Aadhar The



system will then search the Aadhar card details from the “Aadhar” Database. Next to verify the authenticity of the Admin, the system will seek the fingerprint image from the user. After getting the fingerprint image, the system will compare the fingerprint with the stored one in the “Aadhar” database and if it is matched then it will allow the user to work as Administrator.

The Admin of this system can :

- Register a Voter
- View the election Result
- Delete vote data to configure BVM ready for next Election

**B.User Mode:-**

This mode is for the general voters. At first they need to scan the Aadhar card in front of Digital Camera attached to the BVS. The BVS will read Aadhar card Number and search that Aadhar Card number in the “Vote” database. If Aadhar number is matched with stored in database while register. BVM prompts user to scan finger. Next it will seek the fingerprint image from the voter with which it will compare the stored image in the “Vote” database. If the matching is successful then the BVS will prompt voter to do vote once. After votes system turn on buzzer for short time to indicate that voting process is completed. If the fingerprint is not matched perfectly then buzzer sounds continuously to indicate fraud

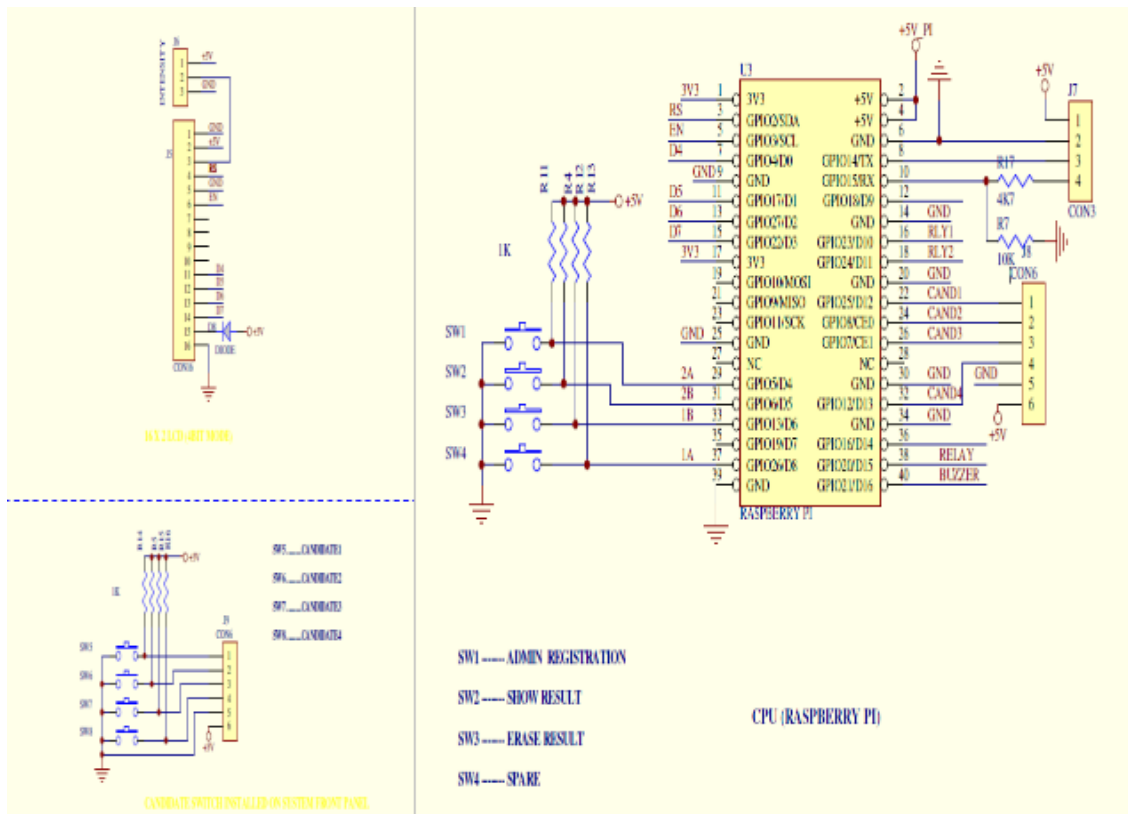


Fig.2. Circuit Diagram of Raspberry Pi Based Advance Electronic Voting Machine

**IV. ALGORITHM**

- Step 1: Start
- Step 2: Scan the QR Code of Aadhar Card.
- Step 3: Check wither QR code matched with Govt Sever Data.
- Step 4: If QR Code don't matches with Govt Sever Data then user is not valid.
- Step 5: If QR code Match then send user to Next process.



- Step 6: Then Scan the Finger Print of the user.
- Step 7: Check scanned Finger Print match with Aadhar Card Data.
- Step 8: If Finger Print don't matches then user is invalid.
- Step 9: If Finger Print matches with Govt Sever Data then Voter is Genuine.
- Step 10: User allowed for voting process.
- Step 11: End

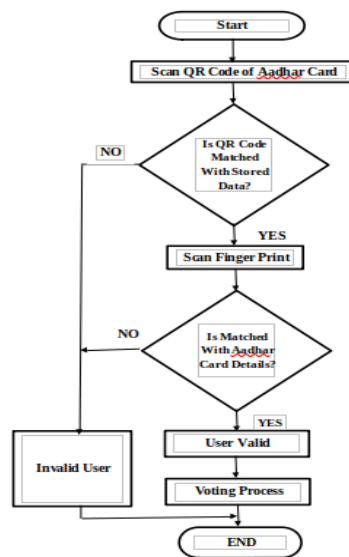


Fig.3 . Flowchart

V. SIMULATION RESULTS

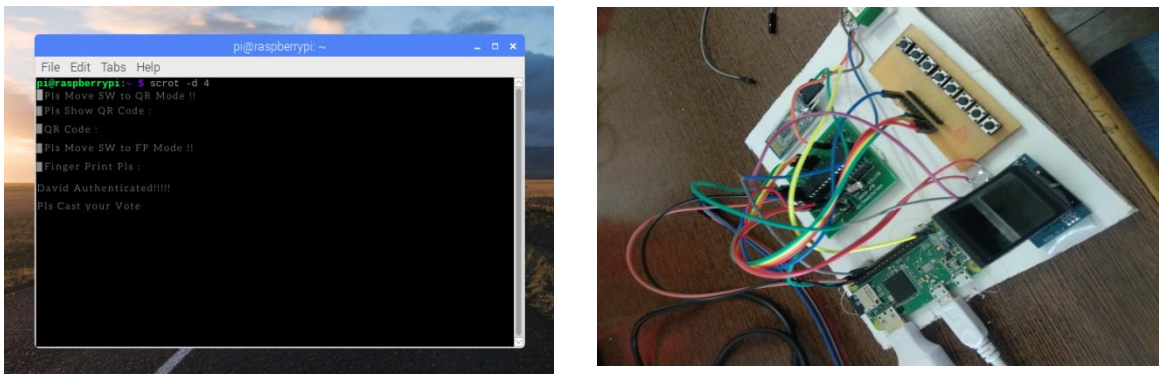


Fig.4. Front-end (User Interface) and project

For showing result output which is front-end user interface used Raspberry Pi OS and showed authentication process of voter name as David. Screen shows procedure of vote and there commands. Its start from entering voter into Election booth to cast their votes. one by one every voter can cast vote very easily and as the data is recorded in digital form in server it is easy to calculate vote and show the result of election very soon. The result is stored in cloud so it is more secure than anything. Only authenticated person can have access of that servers.



## VI. CONCLUSION AND FUTURE WORK

The Raspberry Pi Based Advance Electronic Voting Machinis based on the current scenario of making Aadhar mandatory in all aspects. It can be used as a IoT based real time application instead of using EVM in polling booths because it avoids consecutive verification of voter, provides greater security and avoid false casting of votes. By the end of Election Day, the ratio of polling obtained is calculated automatically when compared to old system of voting.

## REFERENCES

- [1] Biometric finger print based electronic voting system for rigging free governance using ARM7 TDMI process based LPC2148 controller, K.Mallikarjuna1, T.Mallikarjuna2, INTERNATIONAL JOURNAL OF ENGINEERING & SCIENCE RESEARCH (IJESR/May 2014/ Vol-4/Issue5/410-414) e-ISSN 2277-2685, p-ISSN 2320-976
- [2] Fingerprint Based e-Voting System using Aadhaar Database, Rohan Patel1, Vaibhav Ghorpade2, Vinay Jain3 and Mansi Kambli4, INTERNATIONAL JOURNAL FOR RESEARCH IN EMERGING SCIENCE AND TECHNOLOGY, (Volume-2, Issue-3, March-2015) E-ISSN: 2349-7610
- [3] Fingerprint and RFID Based Electronic Voting System Linked With AADHAAR for Rigging Free Elections, B.Mary Havilah Haque1, G.M.Owais Ahmed2, D.Sukruthi3, K.Venu Gopal Achary4, C.Mahendra Naidu5 INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING (Vol. 5, Issue 3, March 2016) ISSN (Print): 2320 – 3765, ISSN (Online): 2278 – 8875
- [4] Aadhar Based Electronic Voting System, Prof.R.L.Gaike1, Vishnu P. Lokhande2, Shubham T. Jadhav3, Prasad N. Paulbudhe4 INTERNATIONAL JOURNAL OF ADVANCE SCIENTIFIC RESEARCH AND ENGINEERING TRENDS (Volume 1, Issue 2, May-2016) ISSN (Online) 2456-0774
- [5] Fingerprint Based Authentication System using ARM7, Ambavarapu Bhavana1, M. Jasmine2, INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH (IJSR) (Volume 5 Issue 5, May 2016) Index Copernicus Value (2013): 6.14 | Impact Factor (2015): 6.391 ISSN (Online): 2319-7064
- [6] Ch. Manjulatha, "Electronic Voting Machine Using Finger Print" International Journal Of Professional Engineering Studies, Issue 4 / November 2016
- [7] Alaguvel.R, "Biometrics using Electronic Voting System with Embedded Security", International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 2, Issue 3, March 2013.
- [8] Nagamma.N.N, "Development of Secure Electronic Voting System with Touch Screen and Finger Print Authentication", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, January 2017.930 N.N.Nagamma, Dr. M.V. Lakshmaiah and T.Narmada
- [9] AADHAR based Electronic Voting Machine using Arduino, R. Murali Prasad, Polaiiah Bojja, Madhu Nakirekanti, INTERNATIONAL JOURNAL OF COMPUTER APPLICATIONS (0975 – 8887) (Volume 145 – No.12, July 2016
- [10] Makurdi, Nigeria.G.Senthilkumar, K.Gopalakrishnan, V. Sathish Kumar "Embedded Image Capturing System Using Raspberry pi System" international journal of emerging trends & technology in computer science (IJETTCS).

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