Biometric Based Electronic Voting Machine Using Raspberry PI

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ABSTRACT: India is world's largest democracy and the essence of any democracy lies in the fact that people choose their own representatives. But in present era, the fair election process is facing a lot of problems like booth capturing, rigging, fake voting, tampering with the Electronic Voting Machines (EVMs) etc. Being responsible engineers, it's our duty to do something to curb this menace. Today authenticity of the voter is a big concern and it also should be made sure that a same voter is not able to vote two times. This issue can be dealt with by introducing biometric based voting system, where the authenticity of a voter is established based on fingerprints. This shall facilitate all the voters to get registered on the portal automatically, which can be classified on the basis of regions and constituencies based on their unique identification i.e. their finger prints. This shall enable the device developed in the present research work, at the national level of application by using it in elections conducted around the country. This shall lead to a significant contribution for the betterment of the Indian election system.
Keywords: Aadhaar,Raspberrypi, Biometrics,EVM,Fingerprint scanning,fake voting,Rigging,UIDAI.

I. INTRODUCTION

Electronic voting (also known as e-voting) is voting that uses electronic means to either aid or take care of casting and counting votes. Depending on the particular implementation, e-voting may use standalone electronic voting machines (also called EVM) or computers connected to the Internet. It may encompass a range of Internet services, from basic transmission of tabulated results to full-function online voting through common connectable household devices. The degree of automation may be limited to marking a paper ballot, or may be a comprehensive system of vote input, vote recording, data encryption and transmission to servers, and consolidation and tabulation of election results.Biometrics is the science and technology of measuring and analyzing biological data. 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. The field of biometrics was formed and has since expanded on to many types of physical identification. Among the several human fingerprints remain a very common identifier and the biometric method of choice among law enforcement.

DRAWBACKS

Elections are a defining feature of democratic government, but all too frequently, we take the actual mechanics of the election for granted. We speak at length of such issues as who is allowed to vote, how campaigns are conducted, and how they are financed, but no one gives priority to the understanding of the actual voting process. The EVMs are now manufactured by the above two undertakings. An EVM consists of two units, i) Control Unit, ii)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. It ensures that vote casting cannot be altered by unauthorized person. The voter authentication in online e-voting process can be done by formal registration through administrators and by entering OTP Certificate. In Offline e-voting process authentication can be done using facial recognization, fingerprint sensing and RFID(smart cards) which enables the electronic ballot reset for allowing voters to cast their votes. Also the voted data and voters details can be sent to the nearby Database Administration unit in a timely manner using GSM System with cryptography

technique. The criteria are Registration through Administrator, Voter identification and verification process is done through GSM with one time password. The second Offline e-voting process includes Facial Reorganization; Fingerprint sensing, RFID and Polling data processing using Cryptography Technique with RC4 Algorithm. The final process concludes the analysis of polling data in real time and immediate resulting system of e-voting system

➢ Complex voting procedure
➢ More time to vote
➢ Expensive to test, complete tests are extremely rare
➢ Expensive to move and store
➢ Difficult to test
➢ Complex to maintain
➢ Far from secure against vote fraud.

PROPOSED SYSTEM

In the proposed system, We Endeavour to improve the easy usage of the voting machine with authentication and an acknowledgement slip will provide for every polling which occurs. And a fingerprint reader touch screen is used to give input so it is so highly easy to overcome the button problem. Initially, the User needs to enroll finger or voters (in this code max limit of the voter is 25) with the help of push buttons/keys. To do this user need to press ENROLL key and then LCD asks for entering Enrollment ID where finger will be a store, Now LCD will ask for placing finger over the finger print module. Now user needs to put his finger over finger print module. Then LCD will ask to remove the finger from finger print module and again ask for placing the finger. Now user needs to put his finger again over finger print module. Now finger print module takes an image and converts it into templates and stores it by selected ID in to the finger print module's memory.

ADVANTAGES

1. The system is highly reliable, tamper-proof and secure.
2. In the long run the maintenance cost is very less when compared to the present systems.
3. Illegal practices like rigging in elections can be checked for.
4. It is possible to get instantaneous results and with high accuracy.
5. This unique fingerprint voter ID card can be used for Identification purpose in Govt. /Semi-Govt. bodies E.g.: When applying Passport, Driving license, etc.

BLOCK DIAGRAM:
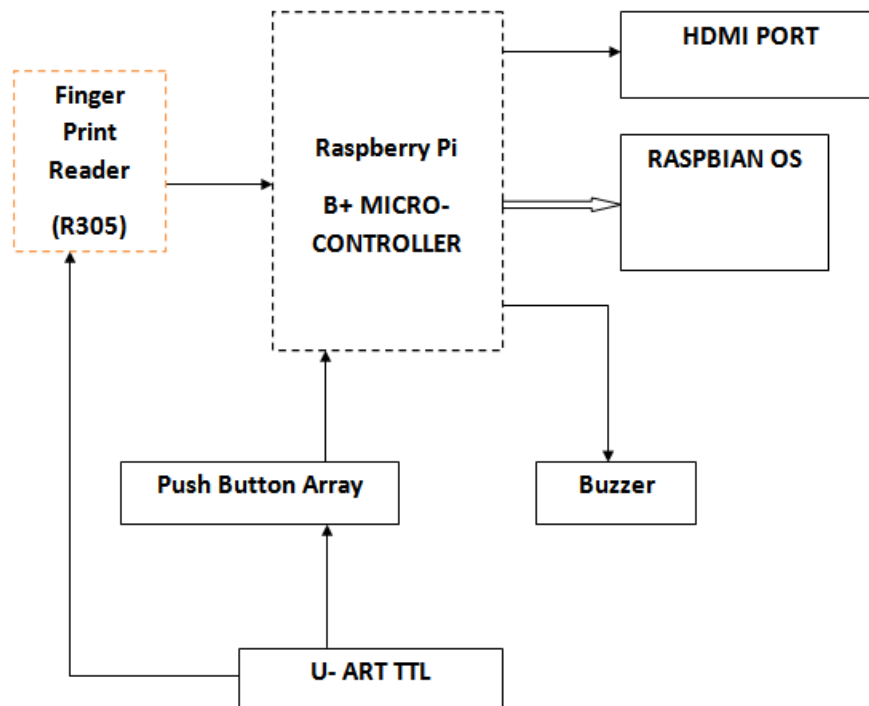
RASPBERRY PI

Raspberry Pi 3 B+ is one of the most popular controllers in industry. It is like a minicomputer which consists of the USB port, input-output pins, Wi-Fi port, HDMI port, SD card reader and much more functionality.

The **Raspberry Pi** is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards and mice) and cases. However, some accessories have been included in several official and unofficial bundles.
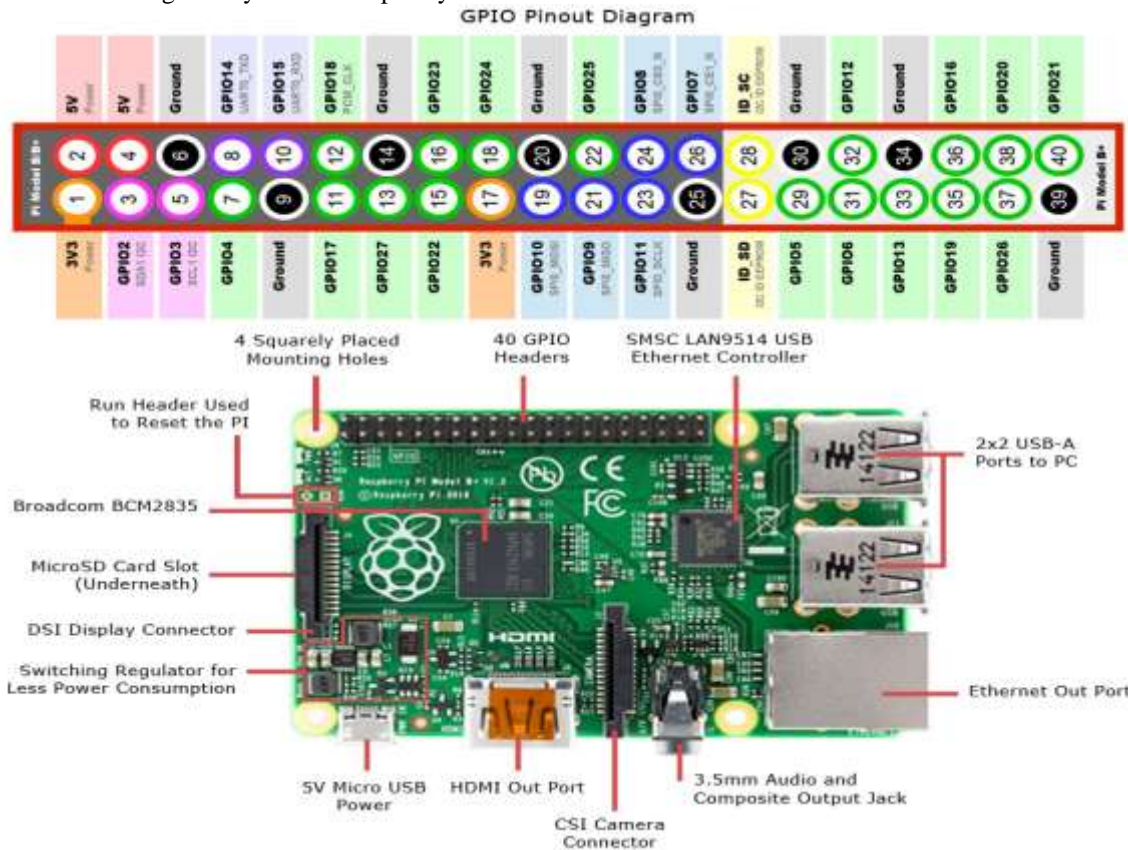
RASPBIAN OPERATING SYSTEM

NOOBS (New Out Of Box) is an easy operating system installed which contains raspbian and LibreELEC. It also provides a selection of alternative OS which is then downloaded from the internet and installed.

OPENCV

OpenCV can be interfaced with python for image processing. It is mainly aimed at real-time computer vision. It is written in python and its primary interface in python, OpenCV has also supported programming language such as python, java, MATLAB and here we are using OpenCV python.

SPECIFICATIONS:

- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board
- 100 Base Ethernet
- 40-pin extended GPIO
- 4 USB 2 ports
- 4 Pole stereo output and composite video port
- Full size HDMI
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touch screen display
- Micro SD port for loading your operating system and storing data

- Upgraded switched Micro USB power source up to 2.5A

POWER SUPPLY

A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load. As a result, power supplies are sometimes referred to as electric power converters. Some power supplies are separate standalone pieces of equipment, while others are built into the load appliances that they power. Examples of the latter include power supplies found in desktop computers and consumer electronics devices.

FINGER PRINT MODULE:

This is a finger print sensor module with TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The FP module can directly interface with 3v3 or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC serial port.

Optical biometric fingerprint reader with great features and can be embedded into a variety of end products, such as: access control, attendance, safety deposit box, car door locks.

Features

- Integrated image collecting and algorithm chip together, ALL-in-One
- Fingerprint reader can conduct secondary development, can be embedded into a variety of end products

- Low power consumption, low cost, small size, excellent performance
- Professional optical technology, precise module manufacturing techniques
- Good image processing capabilities, can successfully capture image up to resolution 500 dpi

BUZZER:

A **buzzer** or **beeper** is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

PUSH BUTTON:

A push-button (also spelled pushbutton) or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal.[1] The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching.

Store the data in Raspberry Pi:

Store the data of Voter ID linked with Aadhaar to the Raspberry pi.

II. CONCLUSION

The proposed system the fingerprint-based secured voting mechanism, it safe to say that, this system has managed to overcome most of the problems faced during the voting period by EVM system. The efficiency of the system depends on the User Interface design and the flexibility that it provides as well as the usability for it. This ensures a safer voting method which is totally required for the healthy growth of a developing nation. In this paper, the proposed online voting system using biometrics that is the fingerprint scanner is better and faster than the previous system.

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