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Research Article

Defensible Electronic Voting Machine using Face Recognition

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Abstract

Voting is one of the fundamental rights of every citizen of a democratic country. By utilizing the right of the voting, people elect their most suitable leader who will lead them. In this modern era where technology is being used in every aspect of life, the election is a place to apply the best technology. Some of them misused it so that we can make the voting machine with Face recognition. In this proposed system we have used Face recognition that can identify each voter, count votes and can prevent fake votes. The proposed system is a more digital, technology-based and secured system. Once the corresponding fingerprint and Iris 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 an LCD for the satisfaction of voters. The proposed project displays transparency and also carries the feature of being autonomous during the course of operation.

Keywords: Electronic Voting Machine; Face recognition; Raspberry Pi; LCD display; RFID Reader.

Introduction

Face detection is a computer technology that determines the locations and sizes of human faces in arbitrary (digital) images. It detects facial features and ignores anything else, such as buildings, trees, and bodies. Human face perception is currently an active research area in the computer vision community. Human face localization and detection is often the first step in applications such as video surveillance, human computer interface, face recognition, and image database management. Locating and tracking human faces is a prerequisite for face recognition and/or facial expressions analysis, although it is often assumed that a normalized face image is available. In this paper, we intend to implement the Haar-Classifier for Face detection and tracking based on the Haar Features [1].

Proposed system

In the proposed method, the details of the voter will get from the AADHAR card database. It was already developed a database which is having all the information about the people. By using this database we took the voter's information will be stored in the cloud or server. Face recognition refers to the automated method of verifying a voter [7]. Face scanner Capture the Face image and compare or match to the database, captured Face and database Face matched means this person will be valid for polling section otherwise send a fake voter face through Mail. It uses an advanced controller of using a Raspberry Pi instead of Arduino microcontroller, so that the time will be reduced [2].

Block diagram

The system using RFID card and that Card has information about the user and all the details are displayed on the LCD display as shown in the block diagram in fig. 1.

Hardware

Raspberry Pi

Raspberry Pi has high processing capacity, relatively low price, and its ability to adapt in different programming modes. The device uses Linux as an operating system, which has access to a large number of libraries and applications compatible with it. Raspberry Pi has

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an Ethernet port allowing us a network connection, as long as we are in the same subnet with the device we want to access and manage, 4 USB ports used to connect devices like a keyboard, mouse, camera, and other devices that connect through a USB port, and an HDMI port giving us access to the interface of the operating system installed, and can also be used the first time while installing the devices. It has 40 pins that allow us to receive and send signals. They are divided in half into two groups: the 3V, and the 5V group [4]. Therefore, one side of the microcontroller gives a voltage of 3V and the other 5V. Besides the 40 voltage pins, it has pins that are used to receive signals, which in our case was used to connect the button, that will send the signal for the face identification [3].

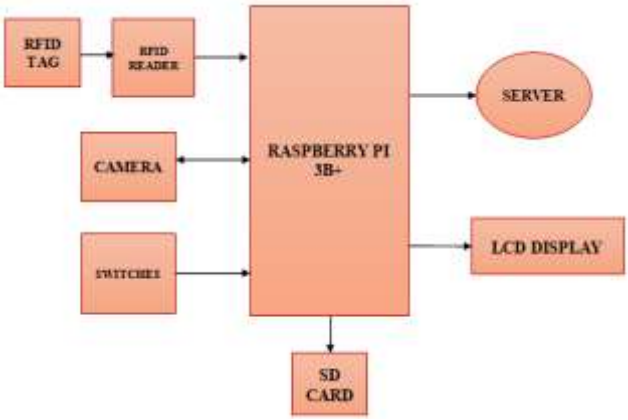

Fig. 1. Block diagram

LCD display

When sufficient voltage is applied to the electrodes the liquid crystal molecules would be aligned in a specific direction... The power supply should be of +5v, with maximum allowable transients of 10mv. To achieve a better/suitable contrast for the display the voltage (VL) at pin 3 should be adjusted properly. A module should not be removed from a live circuit [7].

The ground terminal of the power supply must be isolated properly so that voltage is induced in it. The module should be isolated properly so that stray voltages are not induced, which could cause a flicking display. LCD is lightweight with only a few, millimeters thickness since the LCD consumes less power, they are compatible with low power electronic circuits, and can be powered for long durations. LCD does not generate light and so light is needed to read the display. By using backlighting, reading is possible in the dark. LCDs have a long life and a wide operating temperature range [4].

RFID Reader

An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data. A number of factors can affect the distance at which a tag can be read (the read range). The frequency used for identification, the antenna gain, the orientation and polarization of the reader antenna and the transponder antenna, as well as the placement of the tag on the object to be identified will all have an impact on the RFID system's read range [5].

Software

In this voting machine, we use SD card formatted and win 32 for installing Os and putty is used to add wifi network. Then Advanced Ip scanner is used to identify the IP, VNC viewer is used for view the Desktop of Raspberry Pi [6].

Operating systems

Various operating systems for the Raspberry Pi can be installed on a MicroSD, MiniSD or SD card, depending on the board and available adapters; seen here is the MicroSD slot located on the bottom of a Raspberry Pi 2 board. The Raspberry Pi Foundation recommends the use of Raspbian, a Debian-based Linux operating system [8]. Other third-party operating systems available via the official website include Ubuntu MATE, Windows 10 IoT Core, RISC OS and specialized distributions for the Kodi media center and classroom management. Many other operating systems can also run on the Raspberry Pi.

Other operating systems (Not Linux-based)

- RISC OS Pi (a special cut down version RISC OS Pico, for 16 MB cards and larger for all models of Pi 1 & 2, has also been made available.)
- FreeBSD
- Net BSD
- Plan 9 from Bell Labs and Inferno (in beta)

Other operating systems (Linux-based)

- Android Things – an embedded version of the Android operating system designed for IoT device development.

- SUSE Linux Enterprise Server 12 SP2
- Raspberry Pi Fedora Remix
- Penetration testing.
- Media center operating system

Firmware

The official firmware is a freely redistributable binary blob, and it is closed-source. A minimal open source firmware is also available [10].

Third party application software

- Astro Print – AstroPrint's wireless 3D printing software can be run on the Pi 2.
- C/C++ Interpreter Ch – Released 3 January 2017, C/C++ interpreter Ch and Embedded Ch are released free for non-commercial use for Raspberry Pi, ChIDE is also included for the beginners to learn C/C++.
- Mathematical & the Wolfram Language. Programs can be run either from a command line interface or from a Notebook interface. There are Wolfram Language functions for accessing connected devices. There is also a Wolfram Language desktop development kit allowing development for Raspberry Pi features from the loaded Mathematical version such as image processing and machine learning.
- Minecraft – Released 11 February 2013, a modified version that allows players to directly alter the world with computer code.
- RealVNC – Since 28 September 2016, Raspbian includes Real VNC's remote access server and viewer software.

Results and discussion

The proposed system is mainly used to provide electronic voting system and it is mainly used to reduce fake voting by using the technology of face recognition. The LCD display provides the information about each process (Fig. 2) and finally, the fake voters are identified by sending their photos to the respective Election Commission. This will help to reduce the fake voters and people are feels independent to choose their leaders [8].

As we see that existing voting system has many defects such as lengthy process, time taking, not secure, bogus voting, no security level but now we can say that our approach is more useful and secure from the existing system. Since we are using three levels of security in this proposed system the false voters can be easily identified. The facial authentication technique is very much useful in identifying the fraud voters, so we can avoid the bogus votes during election commission [9]. The voters can cast their voting from anywhere by login to our proposed smart voting system through the internet. As every operation is performed through internet connectivity so, it is a onetime investment for the government. Voters' location is not important but their voting is important. As data is stored in a centralized repository so, data is accessible at any time as well as backup of the data is possible. A smart voting system provides an updated result at each and every minute. Also requires less manpower and resources. The database needs to be updated every year or before the election so that new eligible citizens may be enrolled and those who died are removed from the vote list [6].

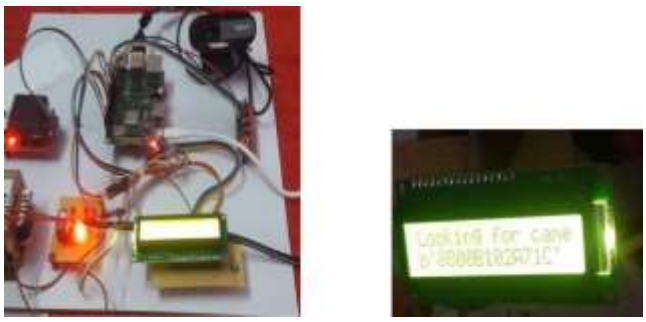

Fig. 2. Shows the output of the proposed system

Conclusions

Block chain technology is currently in a nascent state. There haven’t been enough distributed-ledger-technology and block chain-based applications to sufficiently evaluate whether this technology is superior to current voting systems. No full implementation of BEV for a national election has occurred yet. However, we argue that BEV has a future in elections and might transform voting. BEV can ensure security and transparency and reduce electoral violence. It can also produce more mathematically accurate election results. Because BEV doesn’t require management from a central authority, voting related costs will decrease. Finally, BEV should reduce the cost of paper based elections and increase voter participation

Conflicts of interest

Authors declare no conflict of interest.

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