Aadhar based Finger print EVM System

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Abstract

This paper proposes policy regarding the electronic approaches and developments towards electronic data storage and transmission. The finger print devices for voting machine and different existing identity documents are mentioned and enforced. The voting system is managed in an easier manner since all the users should login by Aadhar card number and password and click on his/her interested candidates to cast the vote. This system has high security in which voter high security password is confirmed before the vote is accepted in the main database of Election Commission of India (ECI). The proposed EVM consisting of finger print module, raspberry pi board, touch based Graphical LCD panel and also it having voter information storage device (Thumb impression) and management system. The software Qt4 GUI with C++ in embedded Linux platform is developed for automated electronic voting machine system.

Keywords: EVM, finger print module, touch panel, Embedded Linux, Qt4.

I. INTRODUCTION

A ballot is a device that is used to cast votes in any elections. In this method they may be used a piece of paper or a small ball for secret voting, which was originally a small ball- see blackball – which is used to record decisions made by voters. Each one of the voter uses one ballot, which are not shared[1]. In simplest elections ballot may
be a simple scrap of paper on which each voter writes in the name of a candidate. In general body or governmental elections use pre-printed to protect the secrecy of the votes. The person who votes they can casts his/her ballot in a box at a polling station. The word "ballot" is taken to used for an election process, within an organization, such as a trade union "holding a ballot" of its members. To increase the efficiency and accuracy of voting procedures, large number of computerized voting systems were developed to help collecting and counting the votes, which include Lever Voting Machines, Voting based Punched Cards and Optical Mark-Sense Scanners and Direct Recording Electronic (DRE) voting systems. Even though if we are having many technologies, each and every advance technology having some disadvantages. Such as the electronic voting machine which we are using nowadays also has few disadvantages.

An Electronic voting (E-voting) system is a voting system in which the election data is recorded, stored and processed primarily as digital information. The research on E-voting is an important topic for the progress of democracy in the world. If a secure and convenient E-voting system is provided, it will be used more frequently to collect people's opinion through cyberspace[2]. Traditional paper-based voting can be time taking and inconvenient. E-voting not only accelerates the whole process, but makes it less expensive and more comfortable for the voters and the authorities as well. It also, reduces the chances of the errors. E-voting system should provide all the basic features and information what conventional voting method does further, it should furnish more services in order to make the process more trusted and secure.

Voting machines are the combination of mechanical and electronic equipment including firmware and software is used to define ballots to cast and count votes to report or display the election results too. In a biometric recognition system, the biometric pattern is usually stored on a central server during enrolment. The candidate’s biometric template captured by the biometric device which is sent to the server where the processing and matching steps are performed [3]. The field of biometrics was formed. Still, the human fingerprint remains a very common identifier and the biometric method of choice among law enforcement. These concepts of human identification have led to the development of fingerprint scanners that serve to quickly identify individuals quickly and assign access privileges. The procedure for fingerprint recognition is the electronic methods of recording and recognizing an individual fingerprint and which substantially advanced during the decade of the 21st century. As a result, the use of EVM which includes recording, storing, searching, matching and identifying of true voters.

II. HARDWARE
The block diagram of Electronic Voting Machine (EVM) shown in Figure 1, have following units, which includes
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1). Graphical Touch Screen LCD display
2). Finger print Module
3). Raspberry PI Processor
4). Power Supply

Figure 1: The block diagram of touch screen based EVM

A. Graphical LCD display (touch screen)
Graphical LCD with touch screen provides good GUI and it works on bases of four - wire resistive technology which is the simplest to understand and production. It uses both the upper and lower layers in the touch screen “sandwich” to determine the X and Y coordinates. Typically made with uniform resistive coatings of indium tin oxide (ITO) on the lower sides of the layers and silver bus bars along the edges, the combination sets up lines of equal potential in both X and Y [5]. The controller first applies 5V to the back layer. Upon touch, it probes the analog voltage with the coversheet, reading 2.5V, which represents a left-right position or X axis. It then flips the process, applying 5V to the coversheet, and probes from the back layer to calculate an up-down position or Y axis. At any time, only three of the four wires are in use (5V, ground, and probes).

B. Finger print module
The skin on our palms and fingers represents a flow like patterns of ridges and valleys. The papillary ridges on the finger, called friction ridges, which help the hand to grasp objects and increase friction and improve the tactile sensing of the surface
structure. These ridge patterns are now proved as unique for every person. The cuts and burns in a person’s finger may alter these patterns temporarily but they reappear after the injury heals. Fingerprints are now used widely for identification and verification purpose [4].

In the present developed system the secure is provided by integrations fingerprint module with RPI. The Biometric identification from a print made by an impression of the ridges in the skin of a finger is used as evidence in criminal investigations [6]. In present work The (R305) fingerprint module was used. This is an optical biometric fingerprint reader/sensor (R305) module with TTL UART interface for direct connections to a RPI. 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. This module can directly interface with any 3.3V or 5V microcontrollers, but a suitable level converter/serial adapter is required for interfacing with the serial port of a PC.

1. Raspberry Pi

In 2008 Raspberry Pi Foundation belongs to Eben Upton of the University of Cambridge (England) Computer Laboratory Developed low-cost Commodore-64s and TRS-80s of previous generations that allowed a simple programming platform. It consist of a model A and model B. Both models contain many of the same components including a USB connector, HDMI slot, and a 3.5mm audio jack. Each version also requires an SD card that the Pi will use to boot with and use for its local persistent storage[7]. The processor is a 700 MHz arm6 chip9. For these similar reasons its also a very good choice for the Raspberry Pi. It having the ARM11 processor is a 32 bit RISC. 512MB of RAM, Two USB port, Ethernet port, SD card socket, HDMI (hidef digital video/audio) port, Analog sound output, Analog (composite) video output, General purpose digital input/output pins and Media Center / DVR . it using worldwide in thousands of different projects.

2. SOFTWARE DEVELOPMENT

In the present work the software for the touch screen board SEVM was developed using embedded Linux and its GUI C++ with QT. Linux is one of the few, ever expanding endeavors it is a kernel, but ‘Linux’ in day to day terms rarely means so. Embedded Linux generally refers to a complete Linux distribution targeted at embedded devices [8]. There is no Linux kernel specifically targeted at embedded devices, the same source code can be built for a wide range of devices, workstations, embedded systems, and desktops though it allows the configuration of a change of optional features in the kernel itself. In the embedded development context, there can be an embedded Linux system which uses the Linux kernel and other software or an embedded Linux distribution which is a prepackaged set of applications meant for embedded systems and is accompanied by device.
3. QT Programming
The Qt framework first became publicly available in May 1995. It was initially developed by Harvard Nord (Troll tech’s CEO) and Eirik Chambe-Eng (Trolltech’s Chief Troll). Qt has long been available to non-C++ programmers through the availability of unofficial language bindings, in particular PyQt for Python programmers [9]. Qt’s popularity has grown unabated and continues to grow to this day. This success is a result of the quality of Qt. In the past decade, Qt has gone from being a product used by a select few “in the know” to one that is used daily by thousands of customers and tens of thousands of open source developers all around the World.

3.1 FLOW CHART

![Figure 2: Flow chart of this work](image)

3.2 EXPLANATION OF EXPERIMENTAL SETUP
When the thumb is placed on the finger print scanner, the scanner checks the thumb impression which is already stored in the memory and displayed on the screen. If the displayed thumb impression is matched with the thumb impression which is stored in the memory, then a message displays as “access granted” that means a voter can cast his/her vote to his/her interested candidate, otherwise the message displays as “access denied” which means a voter is not a genuine person as shown in figure 3.
When the thumb is matched then the Aadhar details whatever already stored in the data base is displayed with corresponding photograph, then the party symbol window is opened to vote.

The next step involved in voting process is to display voting sheet of this button which is selected. It represents the sheet of different party symbols allotted for the various contested candidates. If the voter touches any symbol on the screen then the red indicator changes to green the vote is voted to the interest person by the voter and immediately menu comes to the green color on voting sheet as shown in figure 4. After the voting, the same process is continued up to end time of the voting process and finally machine is sealed by the electoral personal.

The final step involved in the voting process is get in the ‘get reports’. To count the votes, we have to touch the option of counting votes in the data base, then immediately the (Biometric Electronic Voting Machine) BEVM displays the results as given in figure-4. From the above figure details pertaining to each party symbols will be displayed. By pressing EXIT button the whole process come out from the procedure. All the EVM are stored in strong room and bring them to the counting
 halls to count the number of votes in the presence of all involved candidates. When we enter into the admin with password, the EVM displays the following results as shown in figure 5.

![Figure 5: Window of counting sheet after polling completed.](image)

**RESULTS AND DISCUSSIONS**

As the present work is focused on the design and development of EVM, for the authentication of voter. The developed system output is presented here in screen shot and it is having more advantages as compared with the traditional and other electronic systems in the points of flexibility, portability and effortless understanding, use and maintenance. The developed touch screen based EVM is tested for all the functions and observed that the system working very accurately. It gives confidence in voting system; only the legitimate voter is allowed to gain access to voting. The system is user friendly, in the sense that the user can easily understand the system even though the user does not known previously. This is because of the designing techniques, and over all we conclude that the EVM is an emerging field and there is a good scope for research and development to implement this system with an advanced features.

**REFERENCES**


