Arduino based Smart Electronic Voting Machine

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Abstract— **The basic idea of this project is to create an electronic voting machine that will help to eradicate defrauding of the manual voting systems and prior versions of electronic voting. The thesis looks into and proposes a system that includes multiple layers of verifications to ensure the reliability of the device. With the inclusion of biometric fingerprint sensor, each voter is entered into the system only after being recognized and checked with the given database of enlisted voters. Once the corresponding fingerprint 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 a 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, Arduino, Finger print sensor, LCD.

I. INTRODUCTION

Election is the act of party casting votes [1,3] to elect on individual for some type of position. Election may involve a public or private vote depending on the position. Most position in the local, state, and federal governments are voting on in some type of election. In paper-based elections, voters cast their votes by simply depositing their ballots in sealed boxes distributed across the electoral circuits around a given country. When the election period ends, all these boxes are opened and votes are counted manually in presence of the certified officials. In this process, [2] there can be error in counting of votes or in some cases voters find ways to vote more than once. Sometimes votes are even manipulated to distort the results of an election in favor of certain candidates. In order to avoid these shortcomings, [4-7] the government of India came up with direct-recording electronic (DRE) voting system which are usually Electronic voting machine (EVM). These devices have been praised for their simple design, ease of use and reliability. However, it has been found that EVMs are not tamper proof and are easily hacked. Moreover this attacks, hardware as well as software, go without any detection but are quite simple to implement. This made us to bring forth a system that is secure, transparent, reliable as well as easy to use for the citizens. Biometric e-voting systems are not a phenomenon anymore they are being actively used in countries like Ghana and Ireland and are spreading in many other developing nations. In this project, we propose an idea to avoid fraudulence in mechanism to make e-voting in India a reality. It improves the security performance and avoid forgery vote because naturally one human finger print is different from other human.

Lot of methods have been developed to avoid fraudulence in voting systems, but we are not able to eradicate it completely [8, 9]. The objective of this project is to improve the security performance in the voting machine as well as to provide easy access to cast the vote by using finger print for authentication. By using Arduino IDE software and SFG demo v2.0 we scan the finger print of every individual. The scanned finger print is authenticated, If matches the individual is allowed to cast the vote..

II. HARDWARE PROTOCOL

A. Arduino UNO:

Arduino is an open source prototype platform based on an easy-to-use hardware and software. Arduino Uno is a microcontroller board based on the ATmega328 (datasheet).

Fig.1 Arduino Board

It has 14 digital input/output pins [12] (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. Microcontroller: ATmega328, Operating Voltage: 5V, Input Voltage (recommended): 7-12V, Input Voltage (limits): 6-20V, Digital I/O Pins: 14 (of which 6 provide PWM output), Analog Input Pins: 6, SRAM: 2 KB (ATmega328), DC Current per I/O Pin: 40 mA, DC Current for 3.3V Pin: 50 mA, Flash Memory: 32 KB of which 0.5 KB used by boot loader, EEPROM: 1 KB (ATmega328), Clock Speed: 16 MHz.
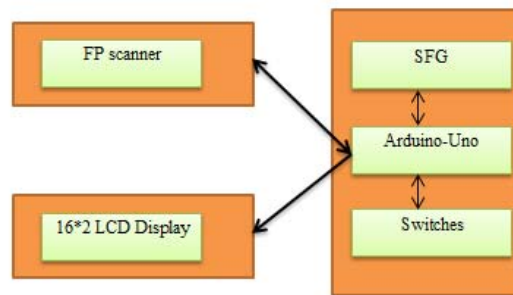
B. Optical Finger Print Sensor:

A fingerprint sensor is an electronic device used to capture a digital image of the fingerprint pattern [10]. The captured image is called a live scan.

This is a Fingerprint 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 [11] 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. Basic Power: 8-12v AC/DC, Interface: RS232, Matching Mode: 1:1 and 1:N, Baud rate: 9600 – 115200. Default: 57600, Storage Capacity: 256, Average Search Time: < 1sec, Image Acquire Time: <0.5sec.
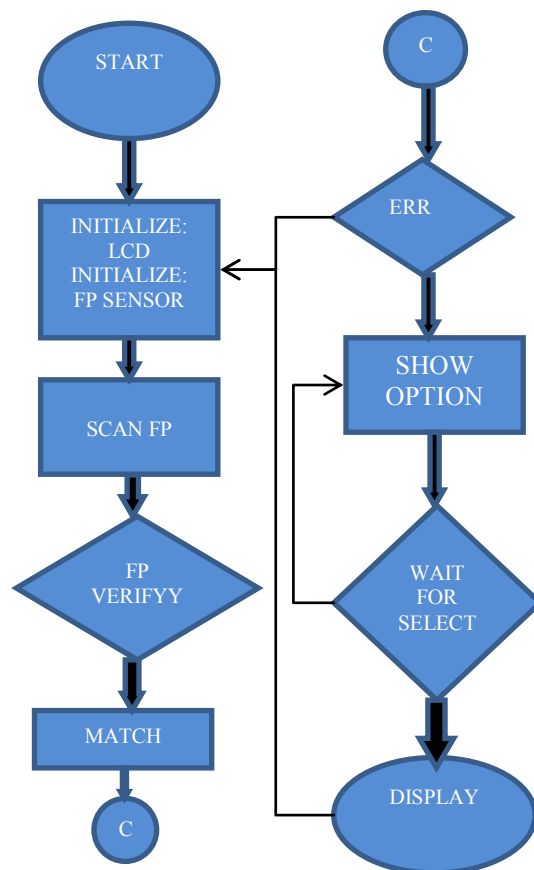

Fig. 2 Optical finger print sensor

III. DESIGN AND IMPLEMENTION:

A. VOTING MACHINE:

Voting machine consist of Arduino Uno, Fingerprint sensor, LCD display, SFG Demo V2 Software, switches. Arduino UNO act as the controller unit. In order to unlock the device and as security a Finger print sensor has been attached to the machine. LCD and switches is also used.

Fig. 3 Voting Machine

Fig. 4 Flow chart

In this project we have used four push buttons for four different candidates. We can increase the number of candidate but for better understanding we have limited it to four. When any voter press any of four button then respecting voting value will increment by one each time. After whole voting we will press result button to see the results. As the "result" button is pressed, Arduino calculates the total votes of each candidate and show it on LCD display. Circuit of this project is quite easy which contains Arduino, push buttons and LCD. Arduino controls the complete processes like reading button, incrementing vote value, generating result and sending vote and result to LCD. Here we have added five buttons in which first button is for KMK, second for AKMK, third is for

SMK, forth is for SDK and last button is used for calculating or displaying results.
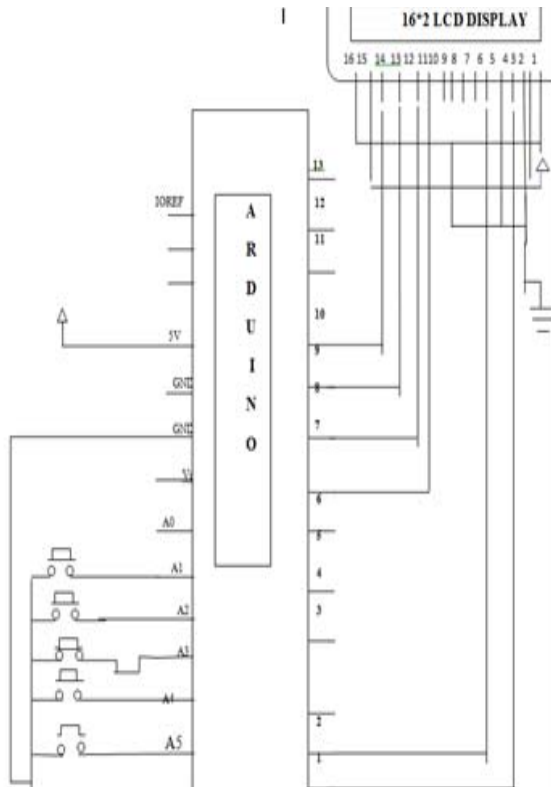
IV. BLOCK DIAGRAM:

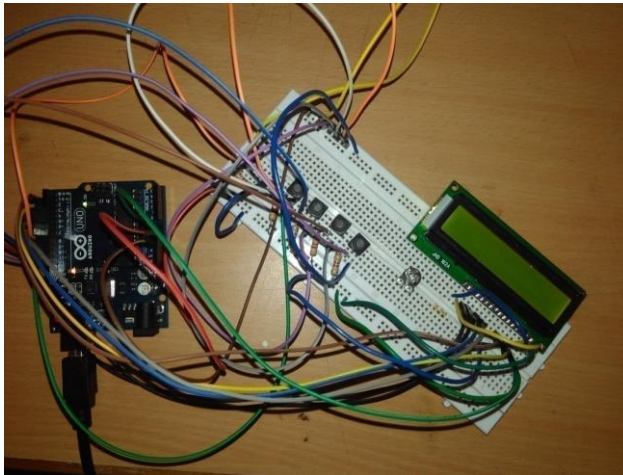Fig. 5 Pin Diagram of Voting Machine

V. RESULT

Fig.6 Voting Machine Prototype

The initial setup of the Electronic voting machine is shown above, here the LCD and Push buttons are interfaced to the Arduino according to the pin connection in Fig. 5.

Fig.7 Casting vote

The above image shows the polling count of the vote for individual party

The polling is done by pressing the Push button

A1 for KMK

A2 for AKMK

A3 for SMK

A4 for SDK

Fig.8 Final Result On LCD

Push button A5 is pressed to display the result.

Application:

Automated train ticket system.

Automated bus ticket system.

Unauthorized vehicle detection system.

Traffic signal breaking detection system.

CONCLUSION

The concept of electronic voting systems is not a new one. However for its use to widely spread it is important to aim for a system that properly is able to fulfill all the requirements expected as well as the standards achievable by the use of technology. The system provided by this paper goes the lengths to cover the necessities that met the requirement for a fair, transparent and reliable election tool. This project assures that, if this system is brought into practice it will reduce the rate of Corruption in a honest and sincere way. This system is a small contribution for a fair election. But corruption in voting system cannot be erased through this system if there is no sincerity.

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