

Electronic Voting Machine

Introduction

India is at present the world's most populated country. To handle such a population, to represent so many voices of the country appropriate representatives should be chosen. The election institution of our country ensures that the leader of people's choice is elected.

But still, there are many hurdles faced by us in terms of unbiased elections. Many cases are registered where some tampering is done with electronic devices or some authority is bribed to disrupt the voting. There are still many people who are neglected due to certain disadvantages such as racial differences or physical disabilities such as deafness or blindness.

Our project aims to tackle these issues and try to make a machine that has the least human influence and is completely automated.

Components

- Microprocessor- atmega2560
- 16x2 LCD Display
- Quartz crystal
- Number pad
- EEPROM
- Speaker and buzzer
- LEDs
- Capacitors, resistors and inductors
- Potentiometer
- Buttons, voltage-controlled switch
- 20V Battery

Design and Implementation

Software

For the simulation and circuit building of the EVM circuit we have used Proteus 1.8.13. For programming the IC chip we used Proteus in-built Arduino IDE.

Keypad (a.k.a Finger-print sensor)

For the verification of voter we decided to use the concept of finger-print sensor. Since Proteus does not have any finger print module like SM630 or R307. Instead we used a Number Pad to resemble a finger-print sensor. Following numbers represent following identities-

Numbers- {1,2,3,4,5,6,7,8,9} - Valid Voters

Special character- {*} - Pre-defined Invalid Voter

Special character- {#} - Officer's Authentication to display vote count of each candidate

EEPROM (Memory Unit)

In the EEPROM of the microprocessor, details of the voters and candidates is stored. Each number on the Number-pad resembles the unique finger-print of each voter. When a number is pressed EEPROM is checked to see if the voter is valid or has he/she already voted. Once a voter casts a vote, the status of the voter is changed in the EEPROM from valid voter to invalid voter so that he/she cannot vote again. In our demo we have 9 voters and 5 candidates.

LCD Screen

16x2 LCD screen is used to display if the voter has been verified or if the vote has been casted correctly. It will also be used to display the total count of votes each candidate has received if the “#” character is pressed in the keypad.

Buttons and LEDs

A voter has to choose from 5 candidates by pressing one of the 5 buttons for more than 10 seconds. If not pressed for an appropriate time (10 seconds defined for this EVM) you have to again choose your candidate. The LED across a candidate's button lights-up when you hold that button.

Buzzer

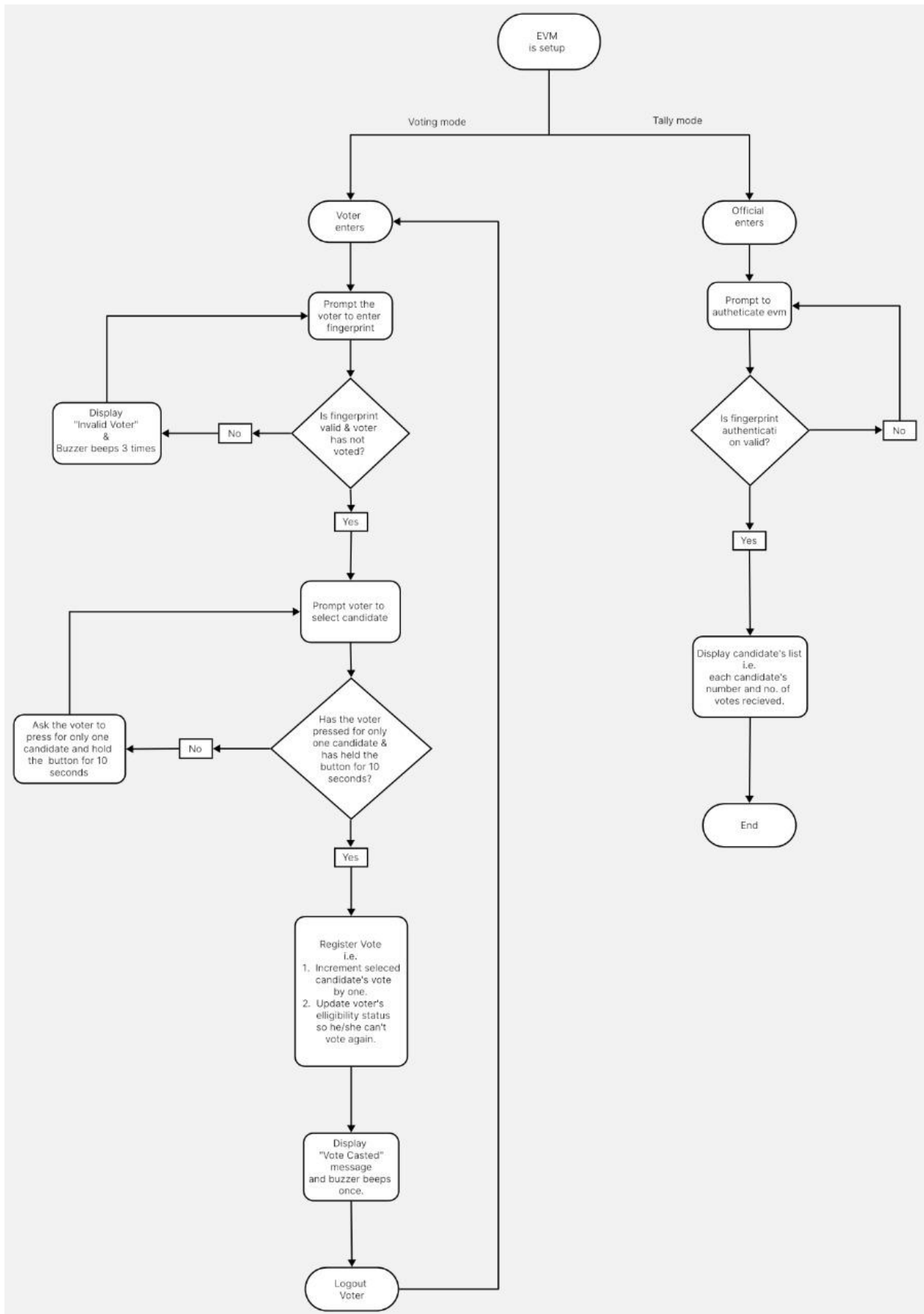
At the beginning if an invalid voter or a voter who has already voted uses fingerprint the buzzer makes sound 3 times. At the end once a vote has been casted, the buzzer makes a sound for 5 seconds.

Quartz Crystal

A quartz crystal has been used to create a clock of 16MHz for the microprocessor.

Buck Converter

Since a lead battery has voltage more than 20V, we need buck converter to step-down the voltage so that the circuit is not damaged. For introducing desired duty-cycle, we used a voltage controlled-switch which is connected to a PWM pin of microprocessor.



Key Features

Our EVM is an autonomous machine i.e it requires no human assistance to verify the voter, cast the vote or to save the votes. In India, only the voting part is done by the EVM and the voter verification is done manually. But our machine bypasses that by using a finger-print sensor. It has a few extra components such as LEDs and buzzer to assist people who are blind or deaf. Our EVM will be powered by a lead-acid battery for which we have used a buck-converter to step down the DC voltage supplied by the battery to make the machine more efficient. The final count of the vote can be viewed on the same machine by an election officer.

Limitations of our EVM

- ❖ Finger-print module was unavailable in proteus so we used a numpad instead to resemble its working. We used a one-digit number
- ❖ Our EVM cannot hold large amount of data. We couldn't integrate sd-card module in proteus so we used internal EEPROM of the microprocessor to save the voter and candidate info.
- ❖ It has many delicate components such as the quartz crystal clock, buzzer, finger-print sensor which can be damaged easily.