Electronic Voting Machine Using Arduino

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Abstract: This document contains information about electronic voting machine using Arduino. Defrauding of manual voting systems will be eradicated is the basic idea of this project and also the prior versions of voting. The system will be provided with n number of switches or buttons where n stands for different political parties. The voters can select their preferred candidates of their choice displayed on the screen. For the satisfaction of the voters the result of the final vote is displayed on the LCD screen. Hence the Arduino plays a vital role in this project, therefore it is the brain and heart of the system. The voting process is completely controlled by Arduino such as generating result, reading switches and sending votes and result onto the lcd display and incrementing voting values

Keyword: Arduino UNO, LCD Display, Pot 10K, Switch Buttons.

I. INTRODUCTION

Elections allows the population to choose their representatives and express their choose for how they will be governed. Basically, the integrity of the entire election process is fundamental to the democracy itself. [1] The election process must be sufficient to withstand a variety of frauds and must be transparent enough and comprehensive so that the voters and candidates must accept the results in an election. There have been several studies in using a variety of computer technologies to improve the election process in a democratic country. The studies stand against the risk to adopt electronic voting machines because of software engineering challenges, network vulnerabilities and auditing challenges. Electronic voting machine is a very simple machine which can be operated by both polling personal and voters , being a standalone machine which is without any network connectivity where interface is not possible and which does not manipulate the results keeping a vast power supply positions in many places of the country the voting system have been made to run with batteries it has two unites generally the control unit and the ballet unit where the control unit plays the vital role in storing all the data and also controls the functioning of a voting machine , programs that controls the functioning of control unit is burnt onto a microchip which is one time programmable basses . [2] Once if it is burnt it cannot be read, altered or copied out, the voting system uses dynamic codes to enhance the security of data transmitting from ballot to control unit.

Although there have been several cryptographical researchers on the electronic voting systems and also new approaches have come on the table such as voter verifiable audit trial for enchaning the security of electronic voting machine where the voter verifiable audit addresses the privacy concern of voters. [3] Some vendors claim that it is a defense for security through obscurity despite the security had a brief conference on inadequacy of obsecurity to provide protection.

The electronic voting technology includes a variety of optical scan voting system, punched cards and a specialized voting kiosks therefore the transmission of ballots and votes through phones, private computers an internet is also involved. And of course, the e voting systems helps in maintaining confendiatel voting system without the use of any ballot papers therefore by concluding the voting system just press the button and there you have the result.

The design of making a good electronic voting system or traditional paper ballot or mechanical devices should satisfy a wide range of criteria the privacy of voters should be preserved and also it must guaranty voters' safety when it is voting against a male volent candidate and they must guaranty the voters that they have no proof and evidence to which candidate they received the votes as a result of this it gives evidence to purchase the votes from the candidates. The voting system also includes a wide range of a tax such as ballot stuffing by voters and incorrect talling of votes by the insiders.

The elections that held in state elections or central elections where a voter caste his/her candidate as per there concern using the folding ballot paper as a prescribed before putting it to an any ballot box. [4] This was very long, excess time-consuming process which was prone to errors and hence this situation continued till the entire process of election and later the electronic voting machine came into existence since then the use of ballot boxes, ballot papers, stamping boxes etc. were prohibited and all these where condensed into a small box which is known as ballot unit of electronic voting system. Since biometric identifiers cannot easily be replaced, shared or forgotten as they were concerned as more reliable for the recoginization of a person, knowledge-based method or traditional tokens. The electronic voting machine have been evolved based on the current technologies.

There are researchers in the electronic voting field that has already reached conselsus packs to follow core properties that a voting system should have. [5] First is accuracy where in this vote cannot be altered, a validated vote cannoted be eliminated from the final tally and invalid vote cannot be voted in final tally. Second is availability where any voter will have access to the vote from the starting to the end of the poll. Third is democracy, the only eligible candidates are allowed

to vote and it must be only once. Fourth is privacy in which the voters have no proof that he/she has voted to particular candidate, neither the authorities or anyone can link to any ballot to whom it has casted its vote.

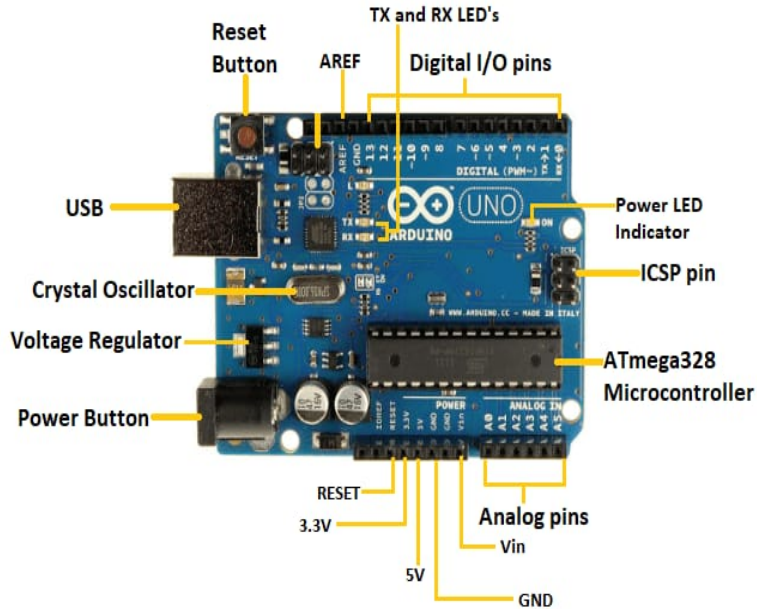## II. HARDWARE COMPONENTS

Arduino Uno
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Fig 1. Arduino UNO

Arduino uno (Fig 1) is a flexible, programmable, easy to use, open-source microcontroller board which is based on microchip ATmega328P microcontroller which is low in lost that is integrated into various variety of electronic projects. The board can be interfaced with Arduino shields, Arduino boards, raspberry pi boards and it will control relays motors, LCDs, sensors and motors as an output. [6] A set of digital and analog input/output pins are equipped in the board that may be interfaced to various expansion boards, shields and other circuits. The Arduino board has 14 digital I/O pins and 6 analog I/O, and programming is done in Arduino IDE, via type B cable. The board is powered by usb cable and external 9-volts battery, it also accepts voltages between 7-20 volts. It is similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions.
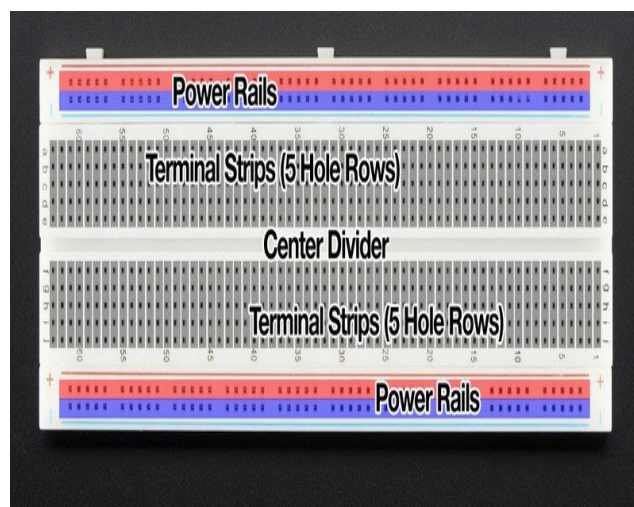
Bread Board

Fig 2: Bread board

A breadboard (Fig 2) is also called as plug block; it is used for building temporary circuits. [7] The components can be removed and replaced easily, hence it is useful to designers. helps to build a circuit and to demonstrate its action, therefore to reuse all the components in making other circuits. Breadboard is a type of prototyping where soldering technique is not required, that makes them less permanent as compared to PCB. They have sockets that can push the components into and allows to remove, change if needed, solderless breadboards are suitable for permanent circuits. There are basically two types of breadboards, these are solder and solderless breadboards. The size of breadboard is 1.2mm diameter through holes that accommodate parts such as diodes, resistors, capacitors etc. There is no solder mask, so you can cut traces. Most of the engineers use breadboard for basic circuits, they have taken it to extreme level and have built entire working of computers with sounds, keyboard and graphical output. They are used in creating one-of-a-kind systems but later making them commercial products. Holes in the breadboard are called socket strips where electricity can flow through the rows, the vertical rails on breadboard are called as bus strips, therefore connected by conductive metal and later the power is supplied to the circuit.

Pushbutton
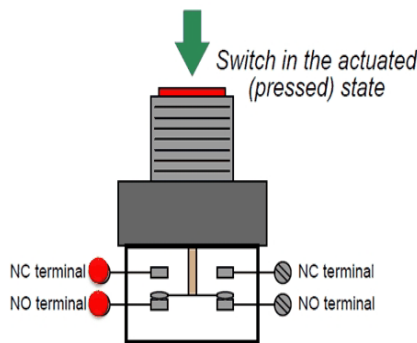
Fig 3. Pushbutton

Pushbutton or simple button (Fig 3) is a simple mechanism to control the process of some aspect of a machine. The buttons are usually made of metal or plastic which is typically made out of hard material. [8] The pushbutton surface is flat to accommodate human fingers, so that it can easily be pushed or depressed. There are basically two types of pushbuttons such as momentary or latching push buttons, and also it is "push to make" and "push to break". Hence when the button is compressed it will connect and therefore switch will make the circuit.

Potentiometer :
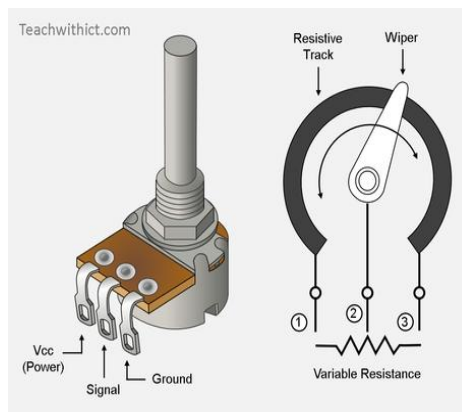
Fig 4. Pot 10k

Potentiometer (Fig 4) is an instrument used to measure the unknown voltage by comparing it with the voltages which are known, the internal resistance of a given cell is determined and also to compare the emf of different cells. It is also called as position sensor and measure displacement in any direction. Rotary potentiometer measures rotational displacement and linear potentiometer measures linearly displacement. [9] A potentiometer is commonly called as pot. Audio control, both linear and rotary potentiometer are control equipment for changing audio related signals and changing the loudness. Therefore, they are used in controlling the picture brightness, contrast and colour response. It is a 3 terminal variable resistor in which the flow of current is varied manually, where 2 terminals (blue and green) are connected to resistive element and

third terminal (black) is connected to adjustable wiper, potentiometer also works as rheostat, potentiometer acts as an adjustable voltage divider. They are primarily for measurement in millivolt and microvolt range.
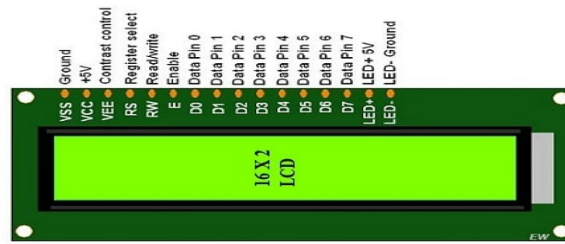
LCD

Fig 5. LCD (16*2)

LCD - Liquid Crystal Display (Fig 5) is a flat panel display which basically uses liquid crystals as a primary form of operation, they are commonly found in smartphones, computer monitors, television and instrumental panels. The basic principle of lcd is without any voltage applied between liquid crystal molecules, transparent electrodes are aligned in parallel with the glass surface. When the voltage is applied, the direction changes and it turns vertical to glass surface. The panel is designed to project all the information of microcomputer onto a large screen with the aid of overhead projector, therefore as a result of this a large number of audiences can view on screen information. As compared to CRTs, the display of LCD is not only small in size but also thin in thickness, has low operating voltage (1.5-6V), power consumption is also low, non-radiative, flicker free and can be matched directly to CMOS integrated circuits. It is manufactured by assembling two thin sheets of glass and making a sandwich, in one layer transistor layer is formed by depositing indium tin oxide and an unusual metal alloy that we can actually see through. The smallest element image that is displayed on LCD is pixel.

III. SOFTWARE REQUIREMENTS

Arduino IDE

Fig 6. Arduino IDE

Arduino IDE (Fig 6) is an open source arduino software which makes easy to write code and upload it to the board. The software can only be usec in arduino board. It connects all the arduino components to the hardware to upload programs and communicate with them. [10] Arduino IDE is generally written in C++, where it is a human raedable language. Arduino is a simple and easy to understand coding platform through arduino IDE. It is friendly to students who are new in electronic projects, compiling, simplifying coding and uploading them into boards and also eliminating the need for external programmer. Arduino is used in controlling the traffic lights and it can also be used for real time control systems with pedestrian lighting and programmable timings, there is no main function in arduino ide and its replaced by loop & setup, instead of one function which is mandatory we have 2, therefore all the arduino programs must include those function calls. The arduino integrated development environment contains a text editor for text console, writing code,a message area, a toolbar with buttons for common functions and series of menus. The user community that designs and manufactures the single board microcontroller kits for digital devices.
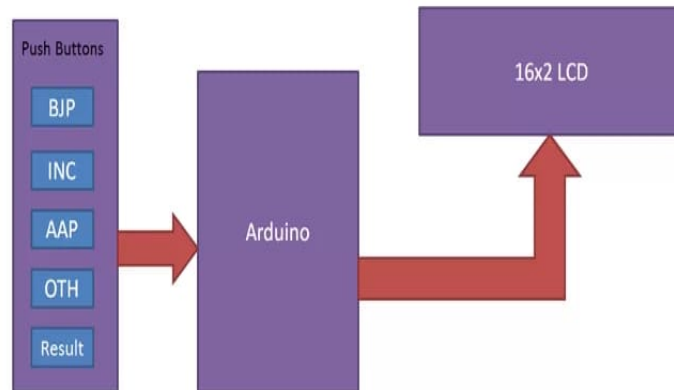
IV. PROPOSED METHODOLOGY

Fig 7. Block diagram

This proposed method (Fig 7) consists of Arduino UNO, LCD display, push buttons, bread board, pot 10k where all the components are connected on the bread board. Arduino plays a major role in the entire process. The voting processes is completely controlled by the Arduino such as sending votes and results onto a lcd and incrementing voting value and also reading the switches and therefore generating results. After uploading the program in Arduino UNO, the candidates name will be displayed on the screen, using the pot brightness of the screen can be adjusted. The voters start casting there vote by the means of push button, the final vote is then displayed onto an LCD for the satisfaction of voters. In the end, by pressing the result button the final result will be automatically calculated.
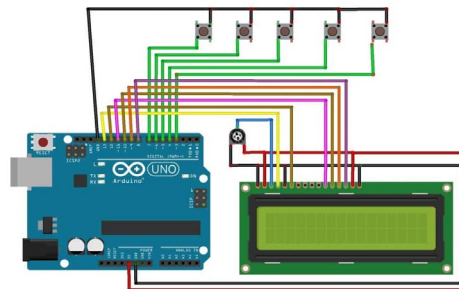

Fig 8. Circuit diagram

 As shown in the circuit diagram (Fig 8) connect five pushbuttons to digital pins 7,6,45,4,3 of Arduino uno and similarly connect pin 4,6,11,12,13,14 of lcd to the digital pins 13,12,11,10,9,8 of Arduino uno. The project is about smart and simple electronic voting machine using Arduino uno and the idea behind this project is to eradicati**ng** defrauding of manual voting systems. In this project we have five push buttons   where four are candidates who are taking part in election, we can also increase the number of candidates as per the requirements and the last pushbutton define the final result. When a voter press any of the four buttons then voting value will be incremented each time and it will be displayed on the lcd screen. Once the whole voting process is done the result button can be pressed to display the result at the end.
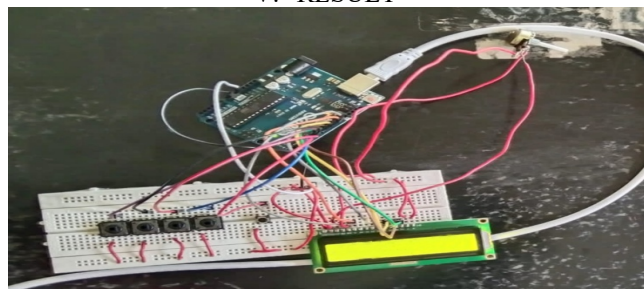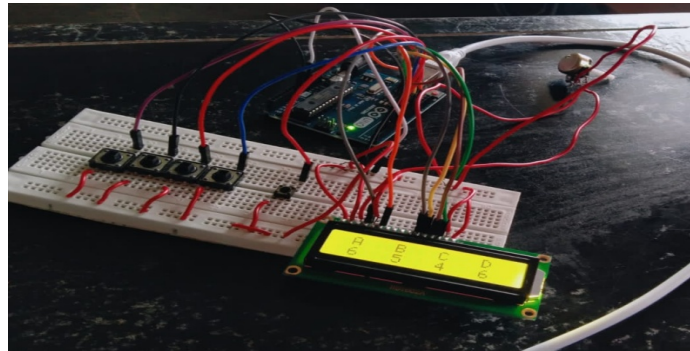
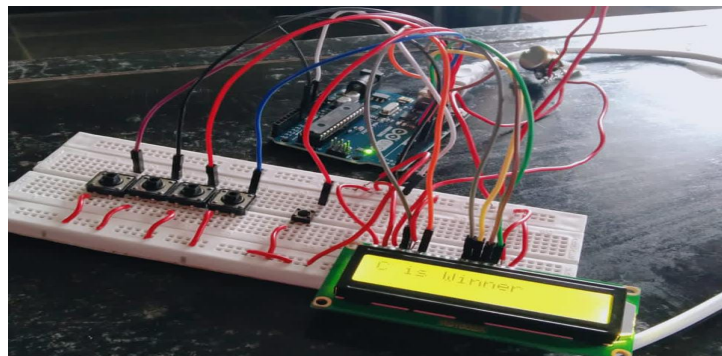## V. RESULT

Fig 9. Connections

The connections (Fig 9) are quite easy which contained Arduino uno, lcd, pushbuttons and a pot where Arduino controls the complete process like generating result, sending votes and result to lcd therefore we have headed five push buttons in which four buttons stands for A, B, C, D and last one is used for calculating and displaying the final result (Fig 10).


Fig 10. Voters casting their vote

The result (Fig 11, Fig 12) of the proposed method is the display of the voters casting there vote and the increments of the votes displayed onto an LCD screen.

Fig 11. Output declared as winner

In the end, the result can be automatically calculated by pressing the result button. The output will be displayed on the LCD screen, who has got the maximum votes as the winner or tie up
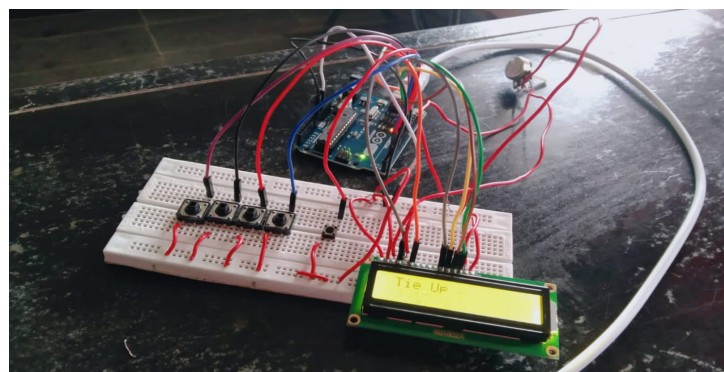
Fig 12. Output declared as Tie up

VI. CONCLUSION

It has concluded that voting through electronic voting machine is need of times as all developed countries are making use of it. This paper suggests that EVM system as to be further studied and innovated by clearing the issues of the EVM, Taxonomy and Biometric based EVM. So that the voter confidence will increase and it will be conducted smooth, secure, tamp resistant elections and it will reach all the levels of community as review discussed about EVM and its variations. Most of the methodologies that is provided above helps in making a safe and transparent voting process. Also, we are hoping the voting percentage will increase in our country further by sing this system in the voting process.

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