

PROJECT REPORT

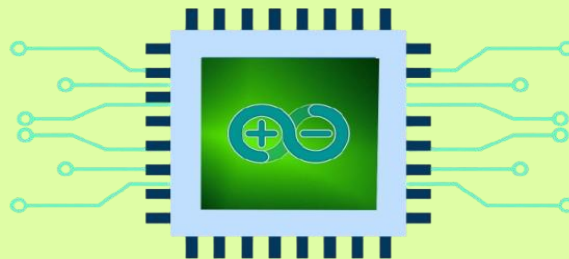
On

“Electronic Voting Machine Using Arduino”

This project & Research Report has been independently developed by me and is not submitted to any college or university for academic evaluation

Developed by

Name:-Suzen Kumar Mohanty (**Reg. No.** 2421331063)



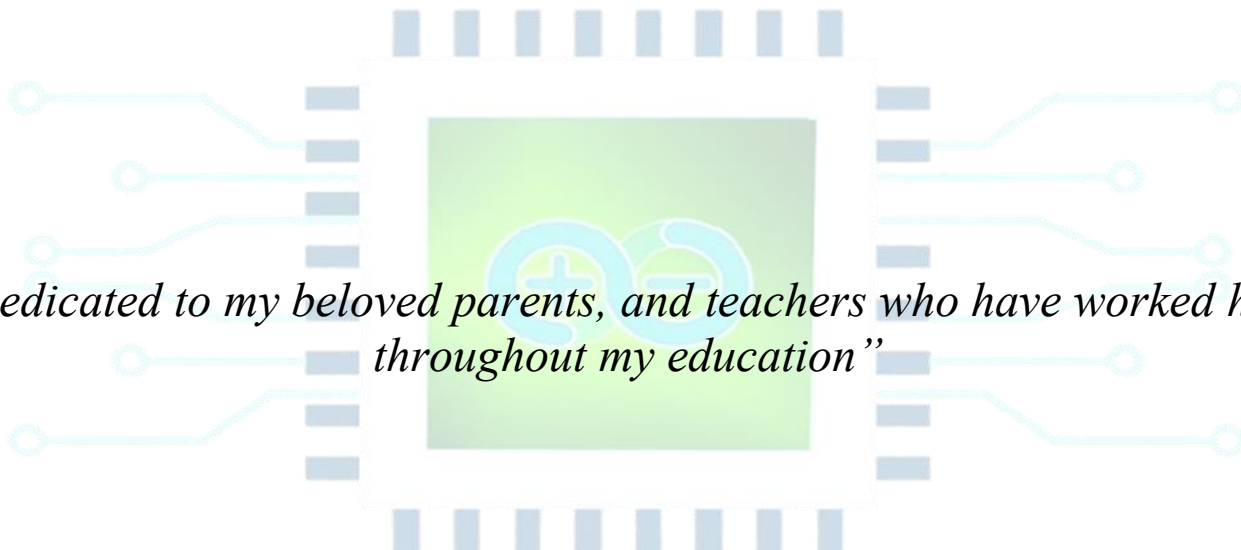
SKMP PROJECT MANAGEMENT

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DEPARTMENT OF IOT

POLISHLINE.BALASORE,ODISHA, INDIA

MAY -2026



*“Dedicated to my beloved parents, and teachers who have worked hard
throughout my education”*

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CERTIFICATE

This is to certify that the project entitled "Electronic Voting Machine Using Arduino" has been independently developed and completed by Suzen Kumar Mohanty for the purpose of enhancing technical knowledge, skills, and practical understanding.

This project is a self-initiated work carried out with personal interest and research. It has not been submitted to any college, university, or institution for the award of any degree or diploma.

The work presented in this project is genuine and has been completed by the developer himself.



Suzen Kumar Mohanty
(Project Developer)

Date: 26 / 05/ 2026
Place: Balasore, Odisha, India

SELF ATTESTATION

I hereby declare that I have personally worked on the project entitled "Electronic Voting Machine Using Arduino".

All the data, analysis, and implementation presented in this project are the result of my own efforts and genuine work. Any external sources of information, if used, have been properly acknowledged.

This project is created solely for learning, skill development, and professional improvement, and has not been submitted to any institution for academic purposes.

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Suzen Kumar Mohanty
(Project Developer)

Date: 26 / 05/ 2026
Place: Balasore, Odisha, India

DECLARATION

I hereby declare that the project titled “Electronic Voting Machine Using Arduino” is an original work carried out by me based on my own idea, research, and implementation.

This project has not been submitted previously, in part or in full, to any college, university, or institution for the award of any degree, diploma, or certification.

I confirm that all the information presented in this project is true to the best of my knowledge. Any references or sources used have been properly acknowledged.

I take full responsibility for the authenticity and originality of this work.

SKMP PROJECT MANAGEMENT

Name: Mr. Suzen Kumar Mohanty

Branch: Computer Science And Engineering

Institution : [Srinix Collage Of Engineering , Independent]

Date: [26/05/2026]

My PortPolio Link:- <https://suzen-kumar-mohanty-8fdv.vercel.app/>

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to everyone who directly or indirectly supported me in the successful completion of my personal project “Electronic Voting Machine Using Arduino”.

This project is a result of my own idea, research, and continuous effort to enhance my technical knowledge and practical skills in the field of Internet of Things (IoT). Working on this project has provided me with valuable learning experiences and improved my understanding of real-world applications.

I would also like to thank my family and friends for their constant encouragement, motivation, and support throughout the development of this project.

Finally, I am thankful to all the online resources, tutorials, and communities that helped me gain knowledge and solve challenges during the project development.

Developed By:
Suzen Kumar Mohanty

ABOUT MY SELF

I am **Mr. Suzen Kumar Mohanty**, a passionate and dedicated **Web Developer** from the field of **Computer Science and Engineering**, with strong expertise in HTML, CSS, JavaScript, I specialize in building scalable, responsive, and high-performance web applications that deliver seamless user experiences across all devices and screen sizes.

With a keen eye for detail, I focus on writing clean, maintainable, and well-structured code. My development approach is centered around creating intuitive user interfaces, ensuring both functionality and aesthetic quality. I follow modern front-end development practices such as component-based architecture, responsive design principles, and performance optimization techniques to build efficient and user-friendly applications.

Beyond web development, I actively work on **IoT-based solutions**, where I integrate hardware and software to create smart, real-world systems. I have hands-on experience with Arduino Uno and various sensors, enabling me to develop projects such as environmental monitoring systems, smart automation solutions, and real-time data tracking applications. One of my key strengths lies in connecting IoT devices with web technologies. I build interactive dashboards that allow real-time data visualization, giving users the ability to monitor, analyze, and control devices remotely. My work focuses on bridging the gap between the physical and digital world by transforming raw sensor data into meaningful insights.

I am deeply interested in developing innovative, data-driven solutions that combine web technologies with embedded systems. My goal is to create impactful applications that solve real-world problems while improving efficiency, automation, and user experience.

With a strong passion for continuous learning and innovation, I consistently explore new tools, frameworks, and technologies to enhance my skills and deliver high-quality, future-ready solutions.



Name: Mr. Suzen Kumar Mohanty

Branch: Computer Science And Engineering

My PortPolio Link:- <https://suzen-kumar-mohanty-8fdv.vercel.app/>

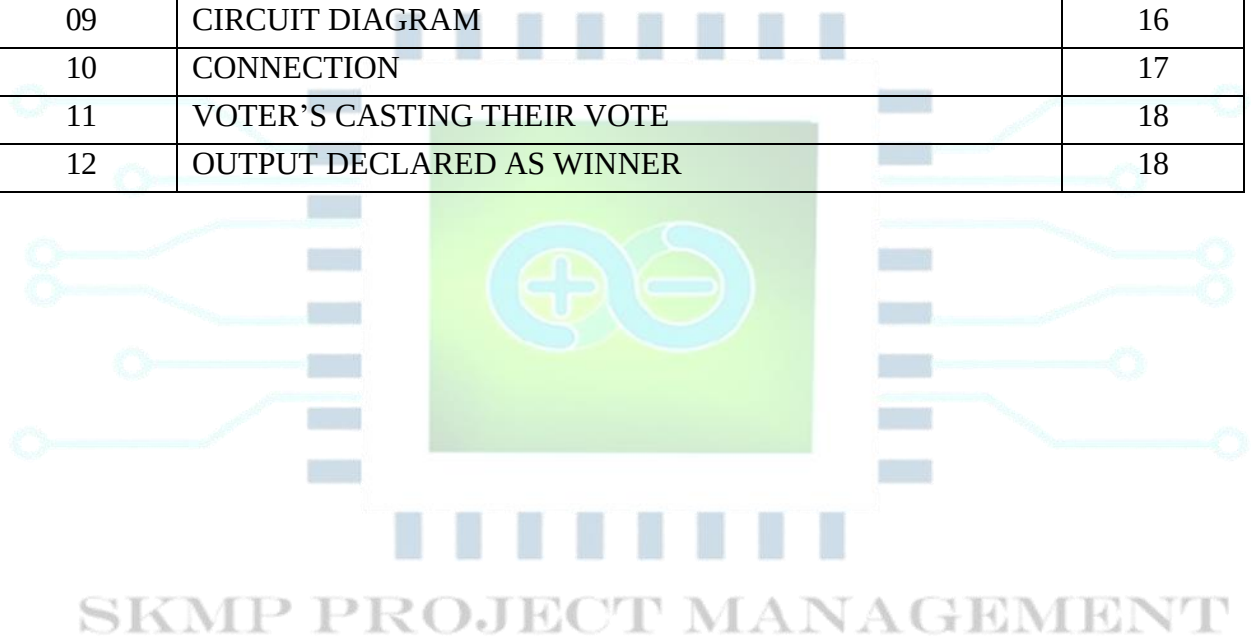
ABSTRACT

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

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LIST OF FIGURES

Figure No.	Figure Title	Page No.
01	INTRODUCTION EVM USING ARDUINO UNO	08
02	ARDUINO UNO	10
03	BREADBOARD	11
04	PUSH BUTTON	12
05	LED'S	12
06	LCD	13
07	ARDUINO UNO SOFTWARE	14
08	BLOCK DIAGRAM OF EVEN USING ARDUINO UNO	15
09	CIRCUIT DIAGRAM	16
10	CONNECTION	17
11	VOTER'S CASTING THEIR VOTE	18
12	OUTPUT DECLARED AS WINNER	18

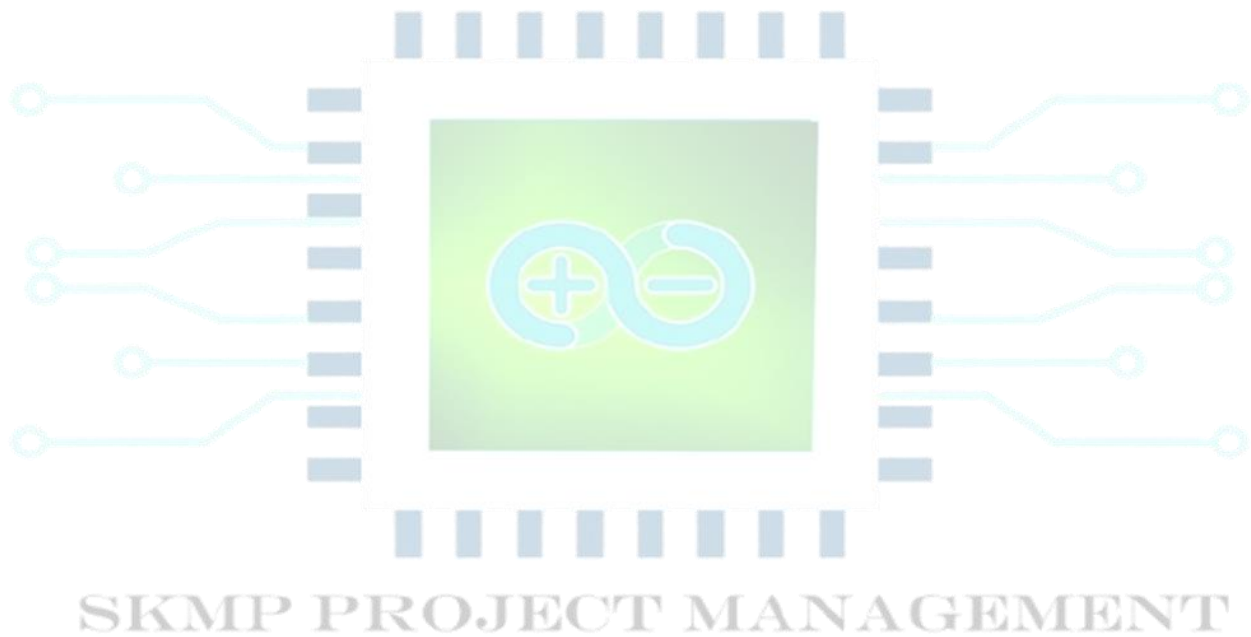


INDEX

The entire Table of Contents was generated by AI, so some headings and page numbers may be incorrect. Please review and correct them according to the actual document.

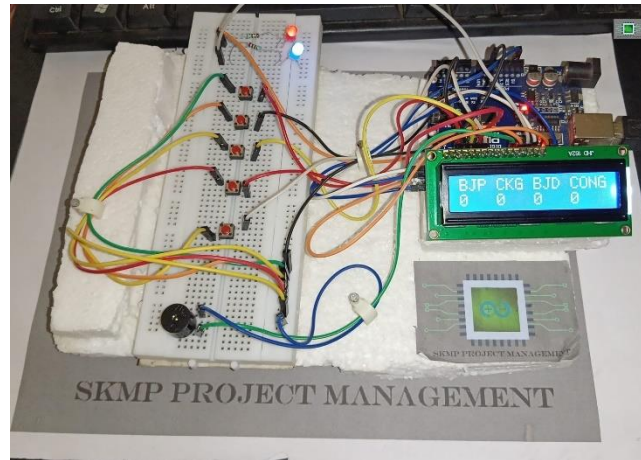
Chapter No.	Contents	Page No.
	Project Report (Cover Page)	I
	Dedication	II
	Certificate	III
	Self Attestation	IV
	Developer Signature	V
	Declaration	VI
	Acknowledgements	VII
	About Myself	VIII
	Abstract	X
	List of Figures	XI
Chapter 1	Introduction	8
Chapter 2	Hardware Components	10
2.1	Arduino UNO	10
2.2	Breadboard	11
2.3	Push Button	12
2.4	LED	12
2.5	LCD Display	13
Chapter 3	Software Requirements	14
3.1	Arduino IDE	14
Chapter 4	Proposed Methodology	15
4.1	Block Diagram of EVM Using Arduino UNO	15
4.2	Circuit Diagram	16
Chapter 5	Implementation	17
5.1	Hardware Connections	17
5.2	Voting Process	18
5.3	Result Display	18
Chapter 6	Source Code	19
6.1	Arduino Program	19–24
Chapter 7	Project Links	25
7.1	Website Link	25
7.2	Google Drive Link	25
7.3	Video Link	25

Chapter 8	Future Scope	26
Chapter 9	Conclusion	27–28
Chapter 10	References	29–30
	End Page	31



Chapter 1

INTRODUCTION



(FIG-01)

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 trail for enhancing 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 obscurity 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 and internet is also involved. And of course, the e voting systems helps in maintaining confidential 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 malevolent 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 tallying of votes by the insiders.

The elections that held in state elections or central elections where a voter casts his/her candidate as per their concern using the folding ballot paper as a prescribed before putting it to an any ballot box. [4] This was very long, excess timeconsuming 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 were 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 recognition 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 consensus 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 can not 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.

Chapter 2

HARDWARE COMPONENTS

➤ Arduino Uno

Arduino uno (Fig 2) is a flexible, programmable, easy to use, open-source microcontroller board which is based on

microchip ATmega328P microcontroller which is low in cost 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

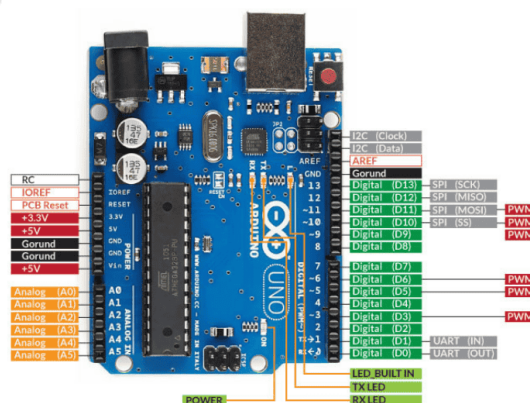
be interfaced to various expansion boards, shields and other circuits. The Arduino board has 14 digital I/O pins and 6 analog

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.



(FIG-02)

➤ Bread Board

A breadboard (Fig 3) 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

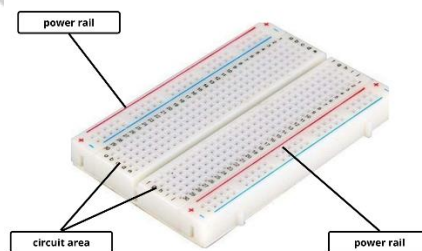
engineers use breadboard for basic circuits, they have taken it to extreme level and have built entire working of computers

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.



(FIG-03)

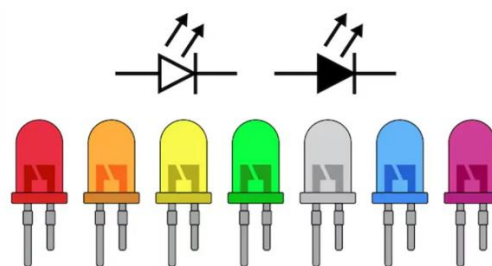
➤ Pushbutton

Pushbutton or simple button (Fig 4) 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. here I use



➤ LED

LED stands for Light Emitting Diode. It is a semiconductor device that emits light when an electric current flows through it. LEDs are commonly recognized for their efficiency, long lifespan, and compact size. Unlike traditional bulbs, LEDs do not have a filament and instead rely on the movement of electrons for light production. (FIG-5) here I use



(FIG-5)

➤ LCD

Liquid Crystal Display (Fig 6) 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.



FIG(06)

Chapter 3

SOFTWARE REQUIREMENTS

➤ Arduino IDE

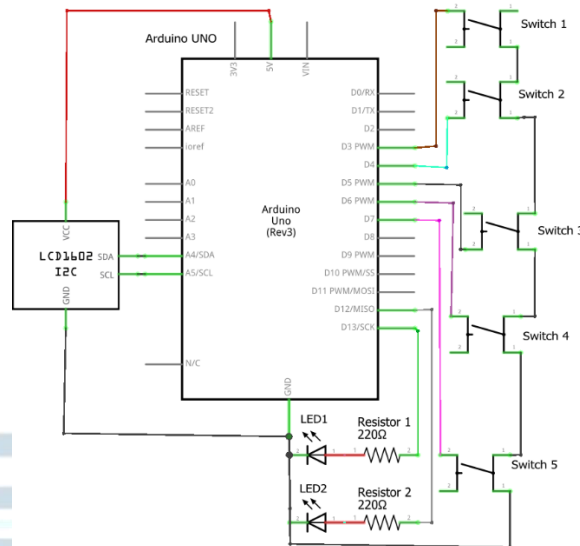


FIG(07)

Arduino IDE (Fig 7) 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.

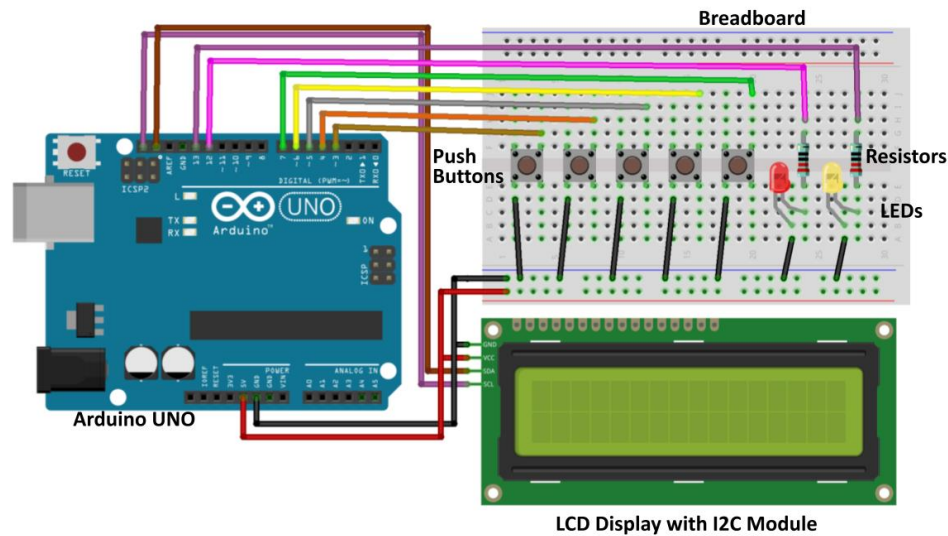
Chapter 4

PROPOSED METHODOLOGY



(FIG-08) Block Diagram Of Evm using Arduino Uno

This proposed method (Fig 8) 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-09) Circuit Diagram

As shown in the circuit diagram (Fig 9) connect five pushbuttons to digital pins 7,6,4,5,3 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 eradicating 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.

Chapter 4

IMPLEMENTATION

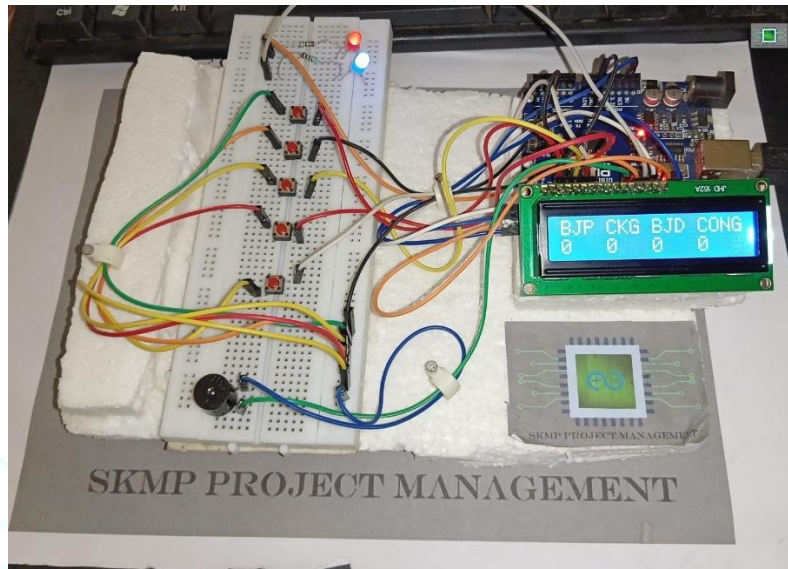


Fig 10. Connections

The connections (Fig 10) 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 11).

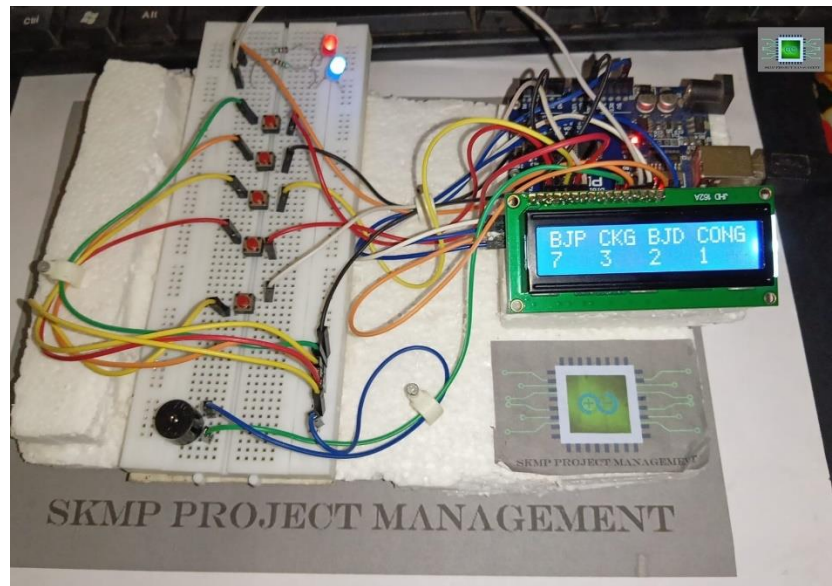


Fig 11. Voters casting their vote

The result (Fig 12, Fig 13) 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 12. 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

Chapter 5

SOURCE CODE

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);

#define v1 3
#define v2 4
#define v3 5
#define v4 6
#define v5 7
int vote1=0;
int vote2=0;
int vote3=0;
int vote4=0;

void setup()
{

  pinMode(v1, INPUT);
  pinMode(v2, INPUT);
  pinMode(v3, INPUT);
  pinMode(v4, INPUT);
  pinMode(v5, INPUT);
  pinMode(13, OUTPUT);
  pinMode(12, OUTPUT);
```

```

lcd.begin() ;
lcd.backlight() ;
lcd.clear() ;
lcd.setCursor(3,0) ;
lcd.print("Roboarmy      ") ;
delay(2000) ;
lcd.setCursor(0,0) ;
lcd.print("Digital Voting ") ;
lcd.setCursor(0,1) ;
lcd.print("Machine") ;

delay(2600) ;
digitalWrite(v1, HIGH) ;
digitalWrite(v2, HIGH) ;
digitalWrite(v3, HIGH) ;
digitalWrite(v4, HIGH) ;
digitalWrite(v5, HIGH) ;
lcd.clear() ;
lcd.setCursor(1,0) ;
lcd.print("A") ;
lcd.setCursor(5,0) ;
lcd.print("B") ;
lcd.setCursor(9,0) ;
lcd.print("C") ;
lcd.setCursor(13,0) ;
lcd.print("D") ;
}

void loop()
{

```

```

lcd.setCursor(1,0);
lcd.print("A");
lcd.setCursor(1,1);
lcd.print(vote1);
lcd.setCursor(5,0);
lcd.print("B");
lcd.setCursor(5,1);
lcd.print(vote2);
lcd.setCursor(9,0);
lcd.print("C");
lcd.setCursor(9,1);
lcd.print(vote3);
lcd.setCursor(13,0);
lcd.print("D");
lcd.setCursor(13,1);
lcd.print(vote4);

if(digitalRead(v1)==0)
{
    digitalWrite(12,HIGH);
    vote1++;
    while(digitalRead(v1)==0);
    digitalWrite(12,LOW);
    delay(100);
}

if(digitalRead(v2)==0)
{
    vote2++;
    digitalWrite(12,HIGH);
    while(digitalRead(v2)==0);

```

```

    digitalWrite(12, LOW);
    delay(100);
}

if(digitalRead(v3)==0)
{
    digitalWrite(12, HIGH);
    vote3++;
    while(digitalRead(v3)==0);
    digitalWrite(12, LOW);
    delay(100);
}

if(digitalRead(v4)==0)
{
    digitalWrite(12, HIGH);
    vote4++;
    while(digitalRead(v4)==0);
    digitalWrite(12, LOW);
    delay(100);
}

if(digitalRead(v5)==0)
{
    digitalWrite(13, HIGH);
    int vote=votel1+vote2+vote3+vote4;
    if(vote)
    {
        if((votel1 > vote2 && votel1 > vote3 && votel1 > vote4))
        {
            lcd.clear();

```



```

lcd.print("A Wins");
delay(3000);
lcd.clear();
}
else if((vote2 > vote1 && vote2 > vote3 && vote2 > vote4))
{
lcd.clear();
lcd.print("B Wins");
delay(3000);
lcd.clear();
}
else if((vote3 > vote1 && vote3 > vote2 && vote3 > vote4))
{
lcd.clear();
lcd.print("C Wins");
delay(3000);
lcd.clear();
}
else if(vote4 > vote1 && vote4 > vote2 && vote4 > vote3)
{
lcd.setCursor(0,0);
lcd.clear();
lcd.print("D Wins");
delay(3000);
lcd.clear();
}

else
{
lcd.clear();
lcd.print(" Vote Tied ");

```

```

lcd.setCursor(0,1);
lcd.print("  ");
delay(3000);
lcd.clear();
}

}
else
{
    lcd.clear();
    lcd.print("No Vote Polled");
    delay(2000);
    lcd.clear();
}
vote1=0;
vote2=0;
vote3=0;
vote4=0;
vote=0;
lcd.clear();
digitalWrite(12,HIGH);
digitalWrite(13,LOW);
}
}

```

Chapter 6

PROJECT LINK

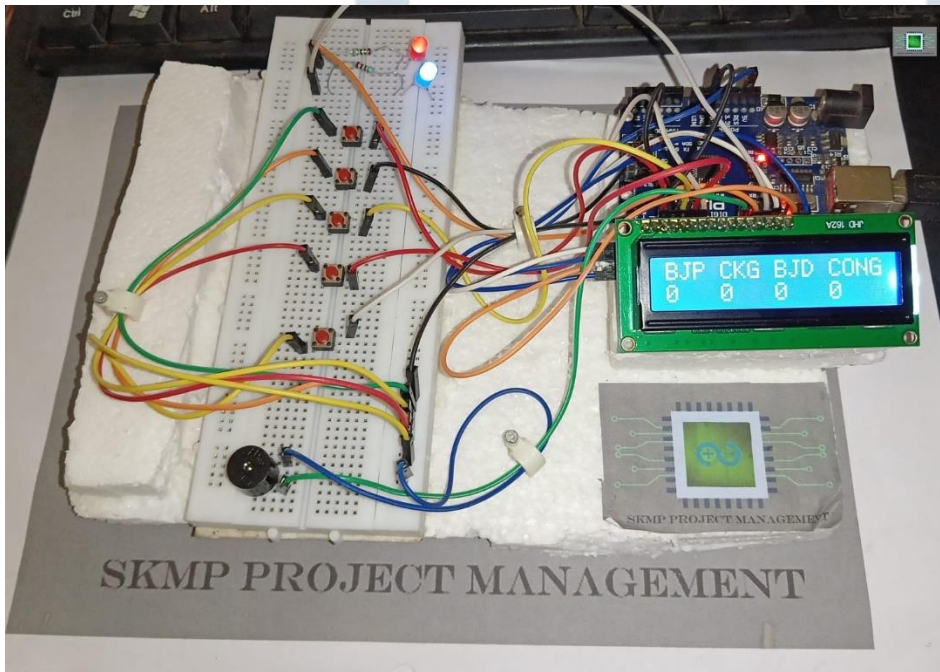
Website Link:- <https://skmp-project-management.vercel.app/>

Google Drive Link:-

https://drive.google.com/drive/folders/1_eHiNkwedKo9Qt7Y7OEoQSgyFGRwD6of?usp=sharing

Video Link:-

<https://youtu.be/eOheJ0iZPyQ?si=rsOAUVSvMnxY9U6v>



Last Chapter

CONCLUSION & FUTURE

SCOPE

➤ FUTURE SCOPE

The **Electronic Voting Machine (EVM) using Arduino UNO** is a basic prototype designed for educational and demonstration purposes. In the future, this project can be enhanced with advanced technologies to improve security, reliability, and usability. The following are the future scope areas:

1. **Biometric Voter Authentication**

- Integrate fingerprint or facial recognition to ensure that only authorized voters can cast their vote.
- Prevent duplicate and fraudulent voting.

2. **Aadhaar/Voter ID Verification**

- Connect the system with a voter database for real-time identity verification before allowing a vote.

3. **Internet of Things (IoT) Integration**

- Enable secure transmission of voting data to a central server using Wi-Fi, GSM, or LoRa technology.
- Allow remote monitoring of polling stations.

4. **Cloud-Based Vote Storage**

- Store encrypted voting records securely on cloud servers to improve data backup and accessibility.

5. **Blockchain Technology**

- Implement blockchain for tamper-proof vote storage, ensuring transparency, integrity, and trust in the election process.

6. **VVPAT (Voter Verifiable Paper Audit Trail)**

- Add a thermal printer to generate a paper slip showing the selected candidate for voter verification.

7. **Touchscreen Voting Interface**

- Replace push buttons with a touchscreen display for a more user-friendly and modern voting experience.

8. **Artificial Intelligence (AI)**

- Use AI to detect suspicious voting patterns, system anomalies, or unauthorized access attempts.

9. **Solar-Powered Operation**

- Design the EVM to operate using solar energy, making it suitable for remote and rural polling locations.

10. Real-Time Result Monitoring

- Develop a secure web or mobile dashboard for election officials to monitor voting statistics without revealing vote details.

11. GPS-Based Polling Booth Tracking

- Integrate GPS modules to track the location and movement of EVMs during transportation and deployment.

12. Enhanced Security Features

- Implement password protection, OTP authentication, encryption, and secure communication protocols to improve system security.

13. Wireless Data Synchronization

- Synchronize voting data between multiple polling booths using secure wireless communication technologies.

14. Scalable Multi-Candidate Election System

- Expand the system to support a larger number of candidates, constituencies, and multiple voting booths.

15. Portable and Low-Power Design

- Develop a compact, battery-operated version with improved power management for long-duration election use.

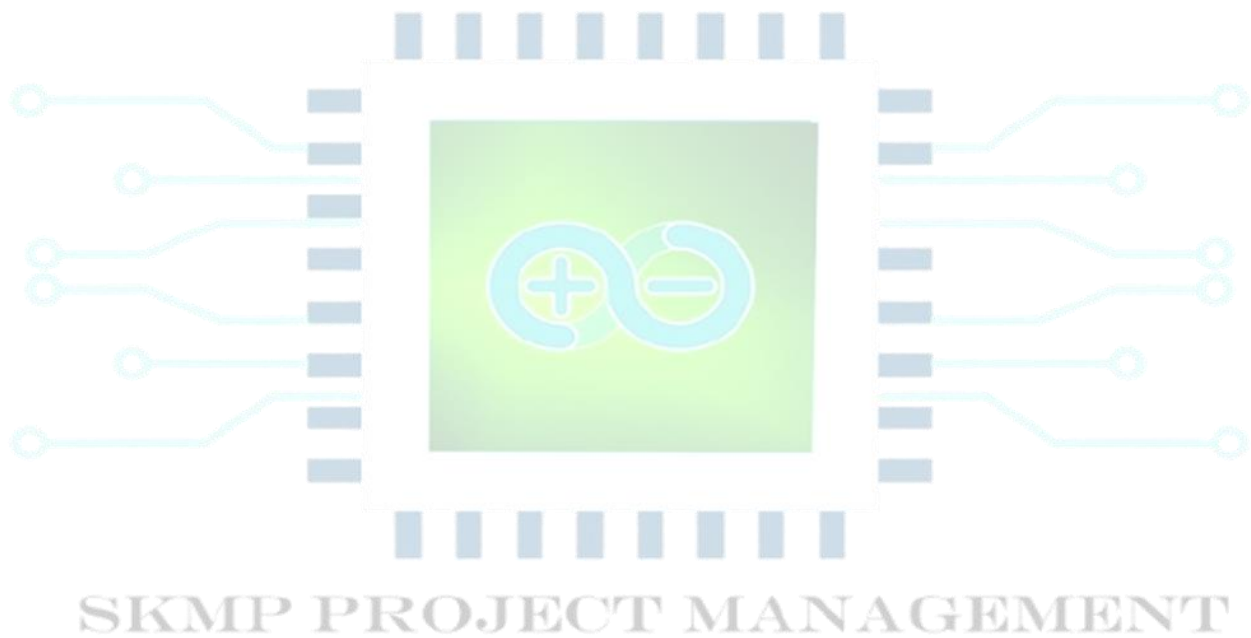
➤ Conclusion

The **Electronic Voting Machine (EVM) using Arduino UNO** project demonstrates a simple, reliable, and cost-effective electronic voting system suitable for educational and prototype applications. The system successfully records votes through push buttons, processes the inputs using the Arduino UNO microcontroller, and displays the voting status and results on an LCD display. It minimizes human error, speeds up the voting process, and provides accurate vote counting compared to traditional paper-based voting methods.

This project also enhances practical knowledge of embedded systems, microcontrollers, sensors, displays, and programming using the Arduino platform. Although the current prototype has limitations in terms of security and large-scale deployment, it provides a strong foundation for developing advanced electronic voting systems.

With future enhancements such as **biometric authentication, RFID-based voter identification, cloud connectivity, blockchain technology, VVPAT integration, and encrypted data storage**, the system can be made more secure,

transparent, and suitable for real-world election environments. Overall, the Arduino UNO-based EVM is an effective learning project that demonstrates the principles of electronic voting while offering significant potential for further development and innovation.



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