SMART VOTING SYSTEM

A MINI-PROJECT REPORT

Submitted by

KEERTHANA J	**210701118**
THOUFEEQ MOHAMMED M	**210701503**

in partial fulfilment of the award of the degree

of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

RAJALAKSHMI ENGINEERING COLLEGE, CHENNAI

ANNA UNIVERSITY

MAY 2024

BONAFIDE CERTIFICATE

Certified that this project **"SMART VOTING SYSTEM"** is the bonafide work of **"KEERTHANA J (210701118), THOUFEEQ MOHAMMED M (210701503)"** who carried out the project work under my supervision.

SIGNATURE

Dr. N. DURAIMURUGAN, M.E., Ph.D.

ACADEMIC HEAD

Associate Professor

Dept. of Computer Science & Engineering

Rajalakshmi Engineering College

Thandalam, Chennai -602105.

Submitted for the **ANNA UNIVERSITY** practical examination Mini-Project work viva voce held on ___________

INTERNAL EXAMINER **EXTERNAL EXAMINER**

ACKNOWLEDGEMENT

We express our sincere thanks to our beloved and honourable chairman **MR. S. MEGANATHAN** and the chairperson **DR. M. THANGAM MEGANATHAN** for their timely support and encouragement.

We are greatly indebted to our respected and honourable principal **Dr. S.N. MURUGESAN** for his able support and guidance.

No words of gratitude will suffice for the unquestioning support extended to us by our head of the department **Dr. P. KUMAR, M.E., Ph.D**. for being ever supporting force during our project work.

We also extend our sincere and hearty thanks to our internal guide **Mr. K. DURAIMURUGAN N, M.Tech., Ph.D.,** for his valuable guidance and motivation during the completion of this project.

Our sincere thanks to our family members, friends and other staff members of information technology.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATION

ABBREVIATION	DEFINITION
IOT	Internet of Things
LDR	Light Dependent Environment
LCD	Liquid Crystal Display
IDE	Integrated Development Environment

ABSTRACT

The proposed system integrates Arduino technology with electoral processes in order to eliminate manual errors and fraud, thus improving the integrity and efficiency of elections. This means that voters can have an interface which will allow them click on switches meant for each political party so as to select their desired candidates hence minimizing chances of mistakes in the counting process. The LCD screen also has a display panel showing the selected candidates and votes counted presently in this way; it helps the people vote honestly because they can see their marked choice. Additionally, there is a button on which once pressed, calculates results automatically making it easy to know who won by how many votes before announcing winners. The goal of this project is therefore to bring voting practices into the modern era while advancing equality, precision, responsibility and trust among democratic societies.

CHAPTER 1

INTRODUCTION

1.1 INTODUCTION

The “SMART VOTING SYSTEM” Using Arduino represents a pivotal advancement in electoral technology, addressing the critical need to safeguard the integrity of democratic processes. This innovative project seeks to eliminate the vulnerabilities inherent in manual and previous iterations of electronic voting systems, offering a reliable solution to combat fraud and ensure fairness in elections. By harnessing Arduino technology, the system provides a user-friendly interface comprising pushbuttons representing candidates from various political parties. Voters can seamlessly navigate the selection process, with their choices instantly displayed on an LCD screen for transparency and validation. Furthermore, the inclusion of an automated result calculation feature streamlines the tallying process, enhancing efficiency and accuracy. With the flexibility to accommodate a variable number of candidates, this project demonstrates adaptability to diverse electoral contexts. By empowering voters and enhancing trust in the electoral system, the Simple & Smart Electronic Voting Machine Using Arduino heralds a new era of secure and accountable democratic governance.

1.2 SCOPE OF THE WORK

The scope of the "SMART VOTING SYSTEM" Using Arduino encompasses the development and implementation of an electronic balloting answer designed to make sure the integrity and fairness of electoral processes. This consists of the design and production of the vote casting gadget hardware using Arduino technology, the improvement of person-pleasant interfaces for electorate, the integration of features for transparent candidate selection and actual-time result show, and the trying out and validation of the gadget's functionality to make certain reliability and accuracy in various electoral contexts. Additionally, the task may additionally involve the exploration of capability packages in exclusive democratic settings and the evaluation of its impact on enhancing public accept as true with and participation in elections.

1.3 PROBLEM STATEMENT

The trouble announcement for the "SMART VOTING SYSTEM" Using Arduino revolves around the vital to cope with vulnerabilities in present electoral generation, which includes guide and previous digital voting structures, to guard the integrity of democratic approaches. The assignment lies in fighting fraud and making sure equity in elections through the improvement and implementation of a reliable digital balloting answer. This machine ought to offer a person-pleasant interface, transparent candidate selection, actual-time result display, and automatic tallying to beautify efficiency, accuracy, and public believe in electoral results.

1.4 AIM AND OBJECTIVES OF THE PROJECT

The intention of the "SMART VOTING SYSTEM" Using Arduino is to pioneer a transformative method to electoral generation, making sure the integrity and equity of democratic techniques. By addressing the vulnerabilities inherent in guide and previous iterations of electronic vote casting structures, the project seeks to fight fraud and beautify self belief in electoral results. Through the utilization of Arduino technology, the gadget targets to offer a consumer-friendly interface for citizens, facilitating transparent and efficient candidate selection. The targets embody the improvement of a reliable digital vote casting solution that offers seamless navigation, real-time end result show, and automatic tallying, thereby selling performance and accuracy in numerous electoral contexts. Ultimately, by means of empowering voters and fostering agree with within the electoral device, this assignment objectives to herald a brand new technology of stable and accountable democratic governance.

CHAPTER 2

SYSTEM SPECIFICATIONS

2.1 HARDWARE SPECIFICATIONS

1. Arduino UNO Board
2. 16x2 LCD Display
3. Potentiometer 10K
4. Connecting Wires
5. Push Button Switch
6. Breadboard

2.2 SOFTWARE SPECIFICATIONS

1. Window 11 Operating system
2. Arduino IDE

CHAPTER 3

MODULE DESCRIPTION

3.1 Arduino UNO Board

One popular kind of microcontroller board is Arduino Uno that is dependent on the ATmega328P microcontroller. Recognized widely is the most as well as most versatile and easy to use board in the Arduino family of the Uno board because of the wide community support available. The Uno board has 14 digital input/output pins, 6 can be used as analog inputs, 6 has PWM outputs, a USB connection for programming and power, a 16 MHz crystal, a power jack, and an ICSP header. It may be brought into existence to perform prototyping, play with electronics secure electronics and build out-of-the-box engaging projects such as robotics, sensors, and IoT devices.

3.2 LCD Display

In IoT (Internet of Things) space and place, the Liquid Crystal Display (LCD) mops the attention to users become a user interface component for facing the characteristics of visual representations embedded in the broader complexity of an IoT device like the presentation of notifications or the description of warnings, etc.

With the assistance of an LCD, the internet of things (IoT) displays are capable of indicating in real-time data such as sensor measurements (temperature, humidity, etc.), the status of certain tasks (the device connects/disconnects), alerts about incidents, or other types of timely data. Eventually, this helps users to control IoT equipment and monitor their performance using only a display, regardless of additional software interfaces like computers or smartphones.

Specifically, use of an LCD display in IoT devices provides a direct way for communications by delivering instant visual feedback and data irrespectively of the remote provision of information by the use of applications or web-based services only.

3.3 Bread Board

The device that can be prototyped using Breadboard technology is the remote measurement of temperature and humidity data. The prototype will involve three components: the IoT device that will be responsible for measuring, the relay, and a fan.

Due to this, Breadboards are a very important tool for IoT developers as they help us to build and test the circuits quickly. These circuits could involve many kinds of sensors like temperature sensors, humidity sensors, motion sensors, and many more.

Breadboard is typically used in IoT development:

1. Component Placement
2. Connection
3. Prototype Testing
4. Modification and Iteration

CHAPTER 4

SYSTEM DESIGN

4.1 STATE CHART DIAGRAM

A state chart diagram is a visual representation in software engineering depicting the states and transitions of an object or system, illustrating its behavior over time. It is commonly used to model the dynamic aspects of a system's design.

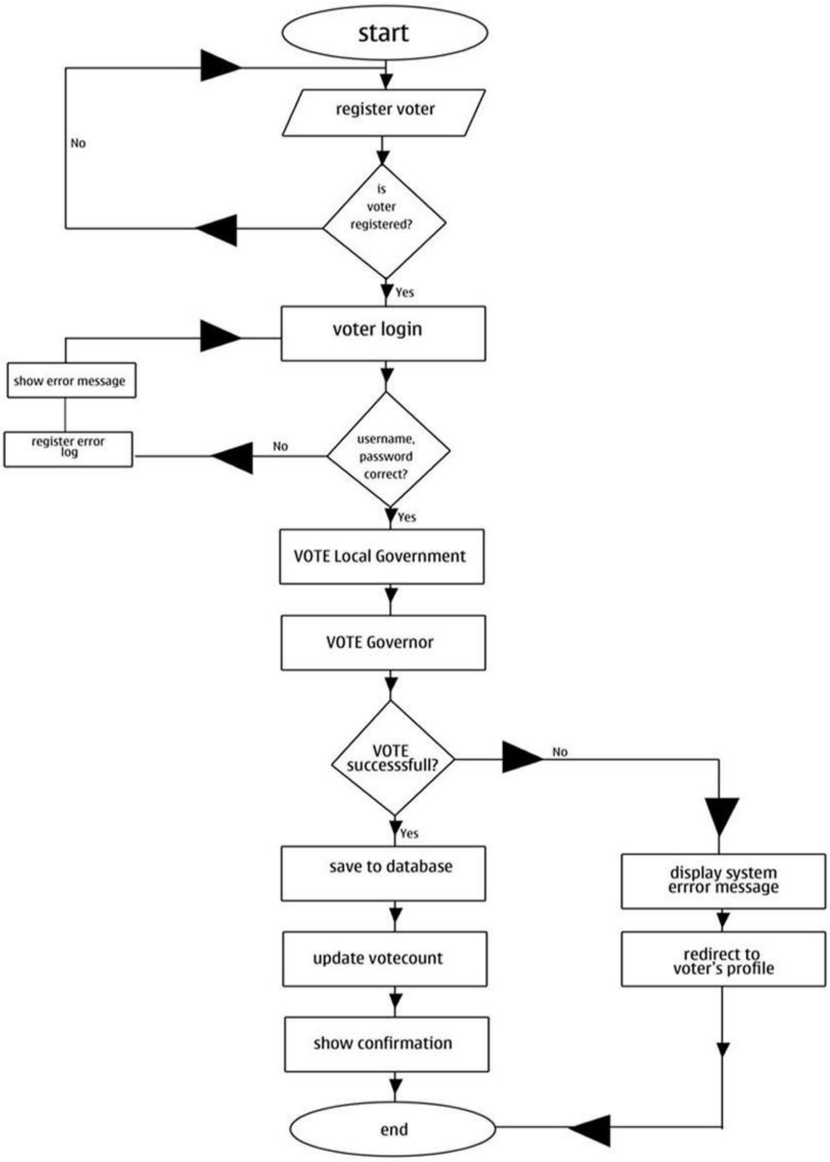

Figure 4.1 State Chart Diagram

4.2 USECASE DIAGRAM

A use case diagram is a visual representation in software engineering illustrating the interactions between a system and its external actors, showcasing the system's functionality through use cases. It helps identify and clarify system requirements from an end-user perspective.

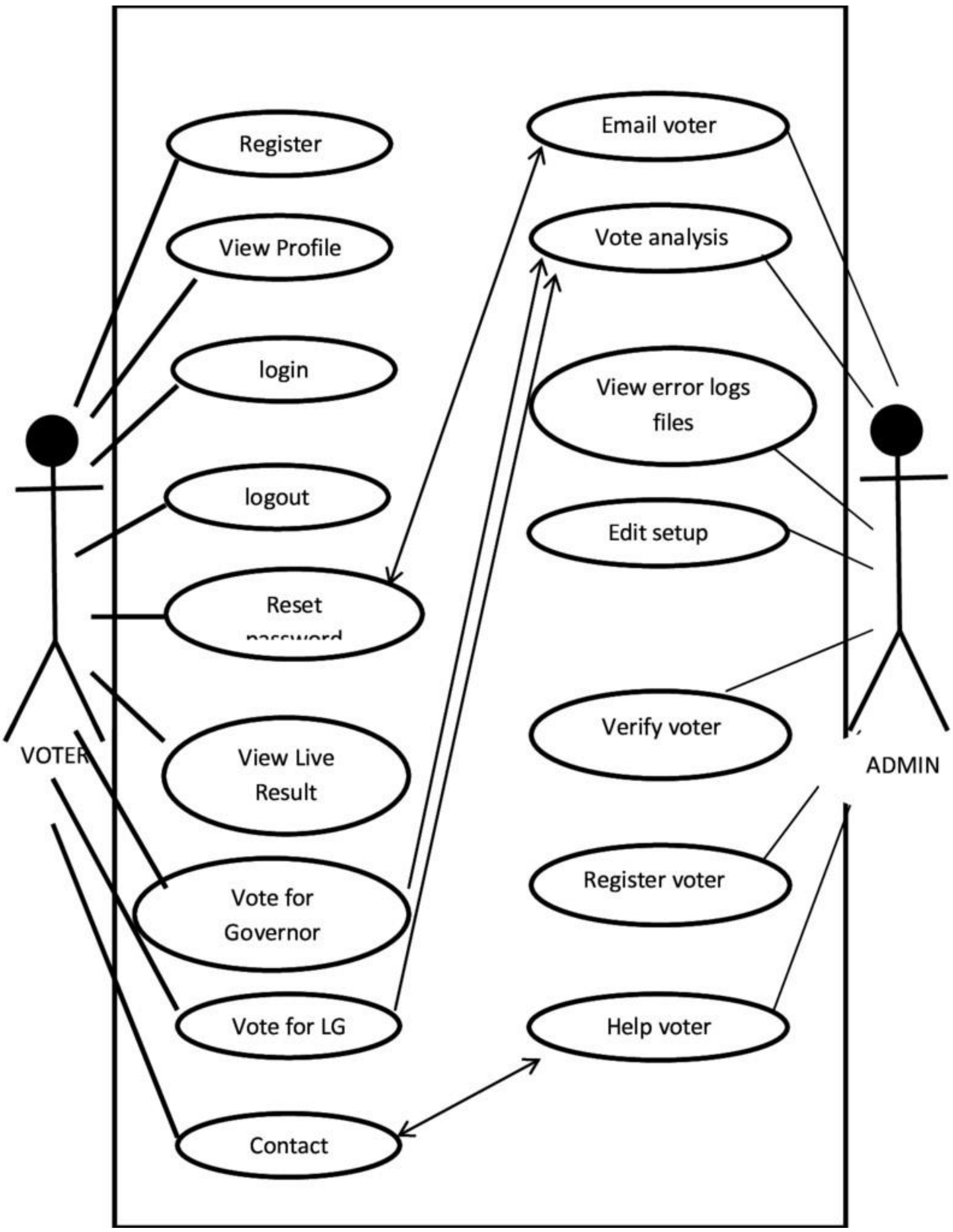

Figure 4.2 Use case Diagram

4.3 CLASS DIAGRAM

A class diagram is a visual representation in software engineering that illustrates the structure of a system by showing classes, their attributes, methods, and the relationships between classes. It serves as a blueprint for designing and understanding the organization of objects in object-oriented programming.

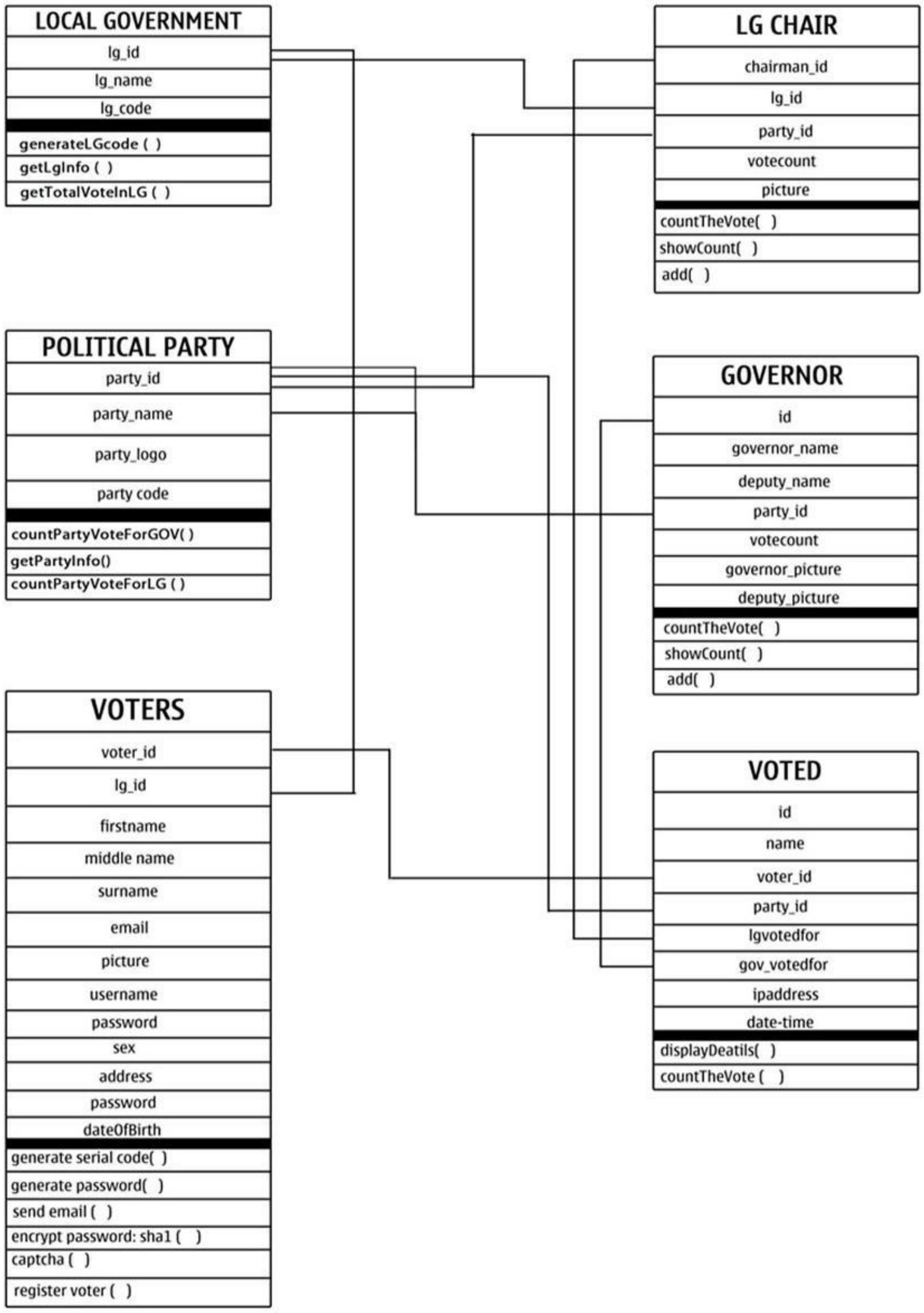

Figure 4.3 Class Diagram

4.4 SEQUENCE DIAGRAM

A sequence diagram is a visual representation in software engineering that depicts the interactions and order of messages between objects or components over time. It illustrates the dynamic behavior of a system, helping to understand the flow of operations during the execution of a use case.

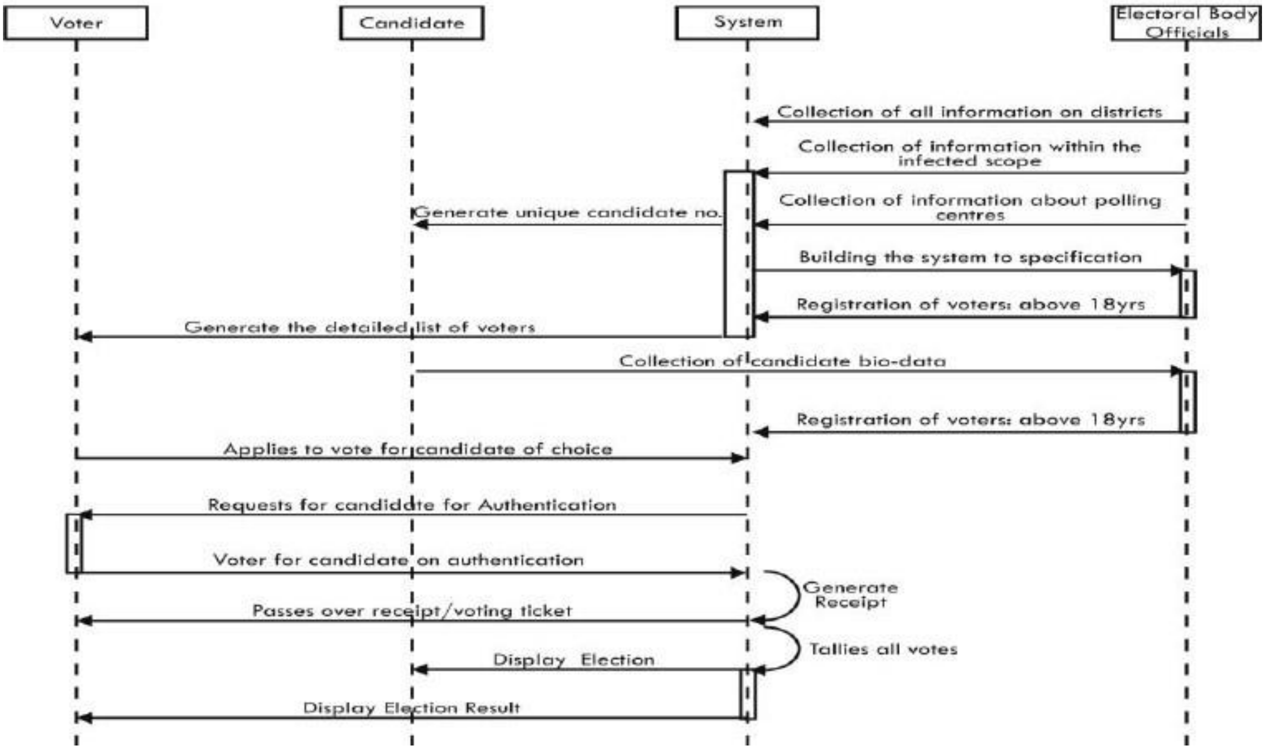

Figure 4.4 Sequence diagram

4.5 ACTIVITY DIAGRAM

An activity diagram is a visual representation in software engineering that models the flow of activities within a system or process, depicting actions, decisions, and concurrent behavior. It provides a dynamic view, emphasizing the sequence and conditions of workflow to facilitate system understanding and analysis.

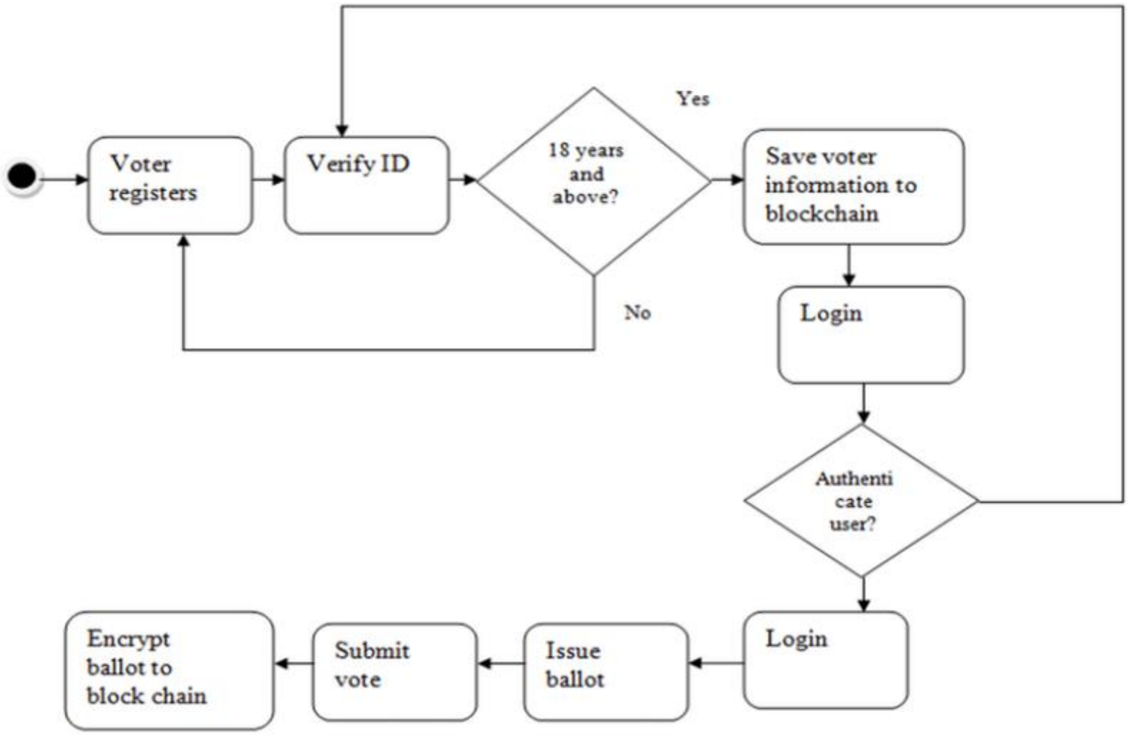

Figure 4.5 Activity Diagram

4.6 ER DIAGRAM

An Entity-Relationship (ER) diagram is a visual representation in database design illustrating the relationships among entities in a database. It uses entities, attributes, and relationships to provide a conceptual overview of the database structure, aiding in the organization and understanding of data relationships.

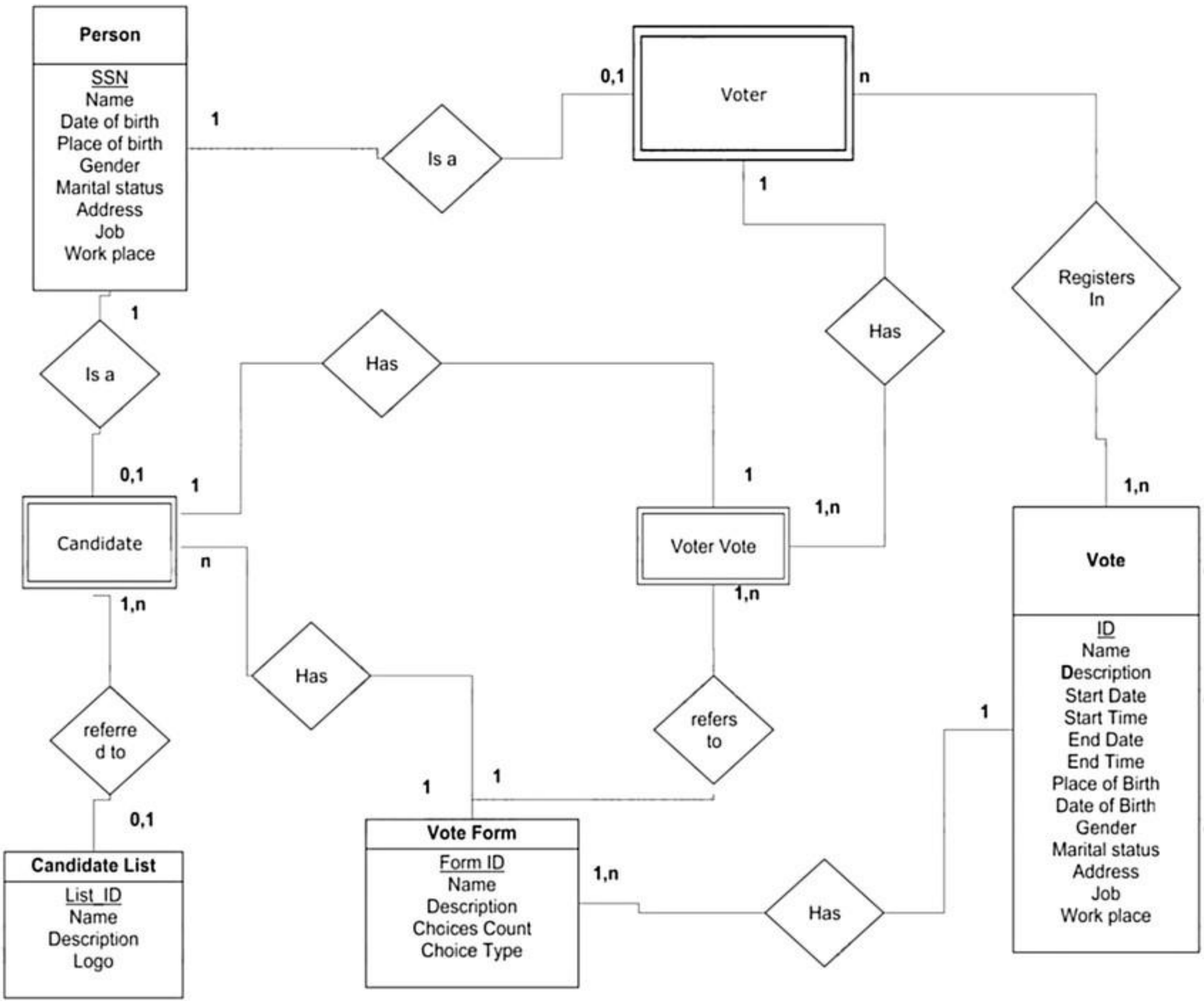

Figure 4.6 ER Diagram

CHAPTER 5

SAMPLE CODING

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(13, 12, 11, 10, 9, 8);

#define S1 7
#define S2 6
#define S3 5
#define S4 4
#define S5 3
int vote1=0;
int vote2=0;
int vote3=0;
int vote4=0;
void setup()
{
        pinMode(S1, INPUT);
        pinMode(S2,INPUT);
        pinMode(S3,INPUT);
        pinMode(S4,INPUT);
        pinMode(S5,INPUT);
        lcd.begin(16, 2);
        lcd.print(" Electronic ");
        lcd.setCursor(0,1);
        lcd.print(" Voting Machine ");
        delay(4000);
        digitalWrite(S1, HIGH);
        digitalWrite(S2, HIGH);
        digitalWrite(S3, HIGH);
        digitalWrite(S4, HIGH);
        digitalWrite(S5, 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(S1)==0)
        vote1++;
        while(digitalRead(S1)==0);
        if(digitalRead(S2)==0)
        vote2++;
        while(digitalRead(S2)==0);
        if(digitalRead(S3)==0)
        vote3++;
        while(digitalRead(S3)==0);
        if(digitalRead(S4)==0)
        vote4++;
        while(digitalRead(S4)==0);
        if(digitalRead(S5)==0)
        {
        int vote=vote1+vote2+vote3+vote4;
```

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

```
        lcd.clear();
    }
    else if((vote3 > vote1 && vote3 > vote2 && vote3 > vote4))
    {
        lcd.clear();
        lcd.print("C is Winner");
        delay(3000);
        lcd.clear();
    }
    else if(vote4 > vote1 && vote4 > vote2 && vote4 > vote3)
    {
        lcd.setCursor(0,0);
        lcd.clear();
    {
        lcd.clear();
        lcd.print("No Voting....");
        delay(3000);
        lcd.clear();
    }
    vote1=0;vote2=0;vote3=0;vote4=0,vote=0;
    lcd.clear();
}
}
```

CHAPTER 6

SYSTEM DIAGRAM

6.1 CIRCUIT DIAGRAM

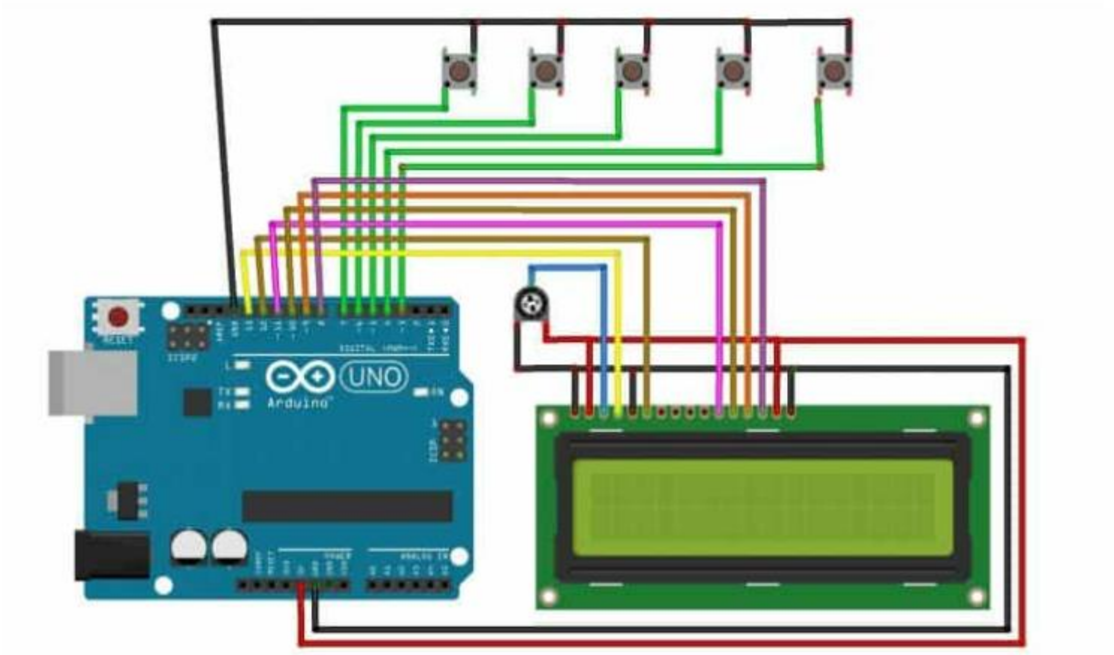

Figure 6.1 Circuit Diagram

6.2 BLOCK DIAGRAM

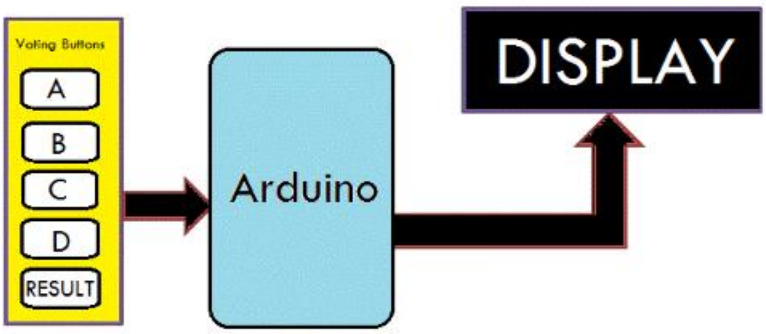

Figure 6.2 Block Diagram

CHAPTER 7

SCREEN SHOTS

7.1 INITIAL DIAGRAM

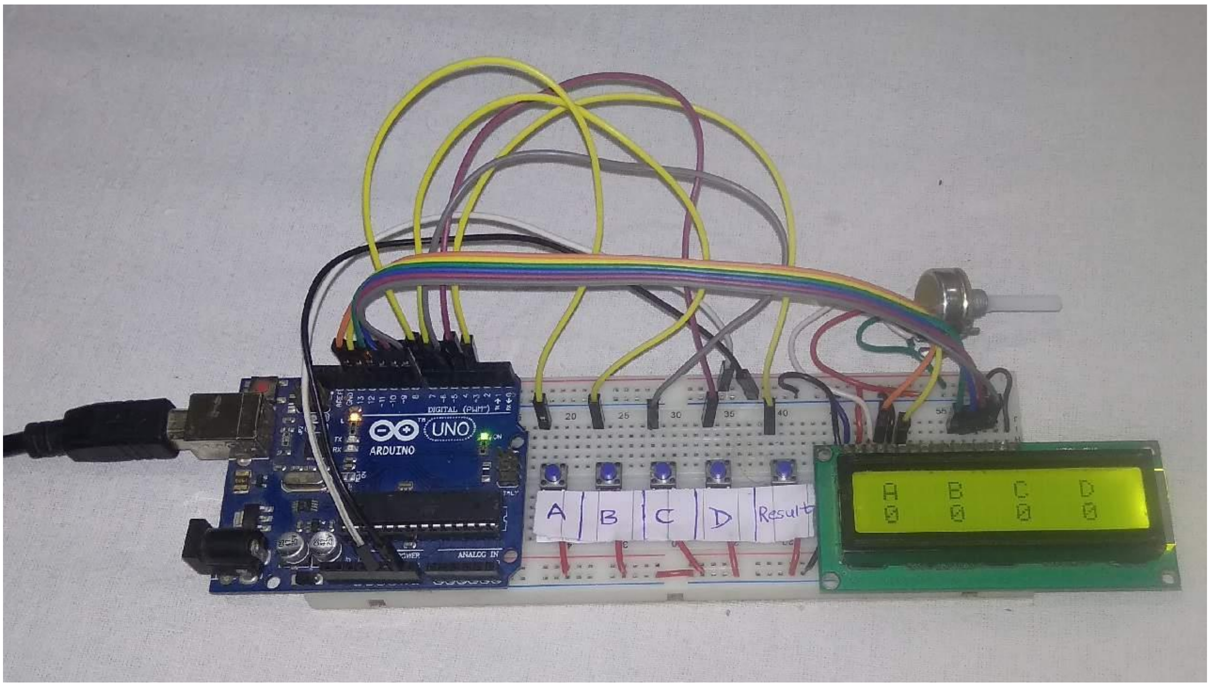

Figure 7.1 Initial Diagram

7.2 VOTING DIAGRAM

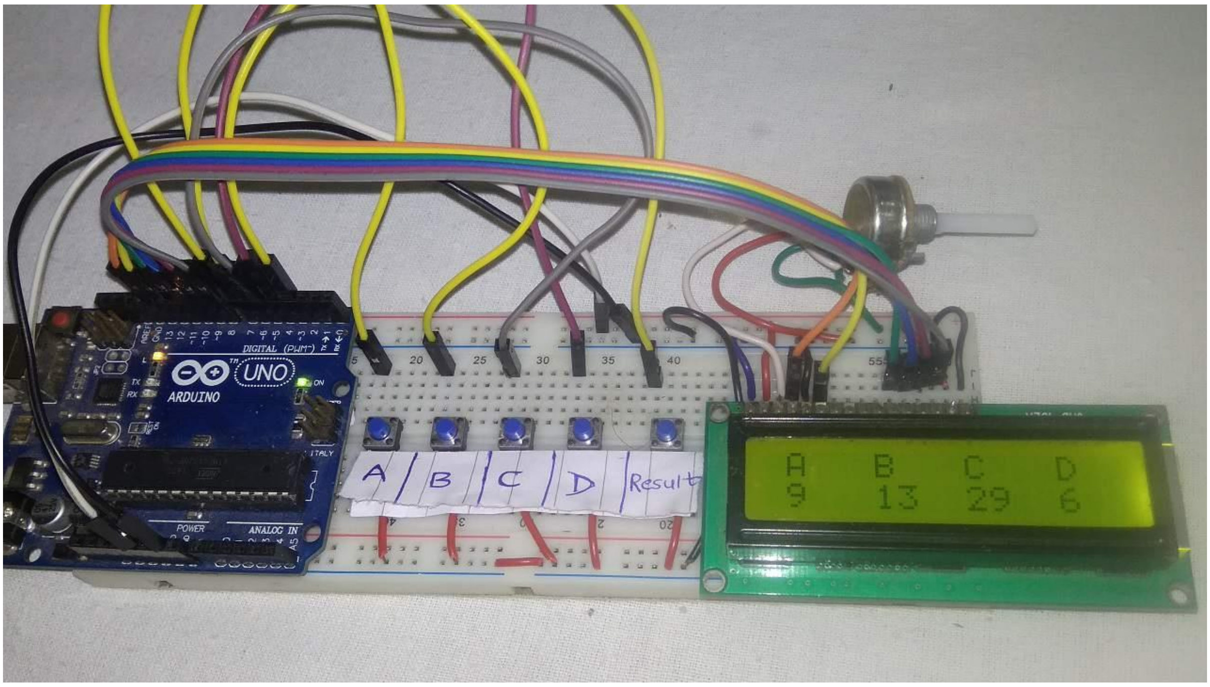

Figure 7.2 Voting Diagram

7.3 OUTPUT DIAGRAM

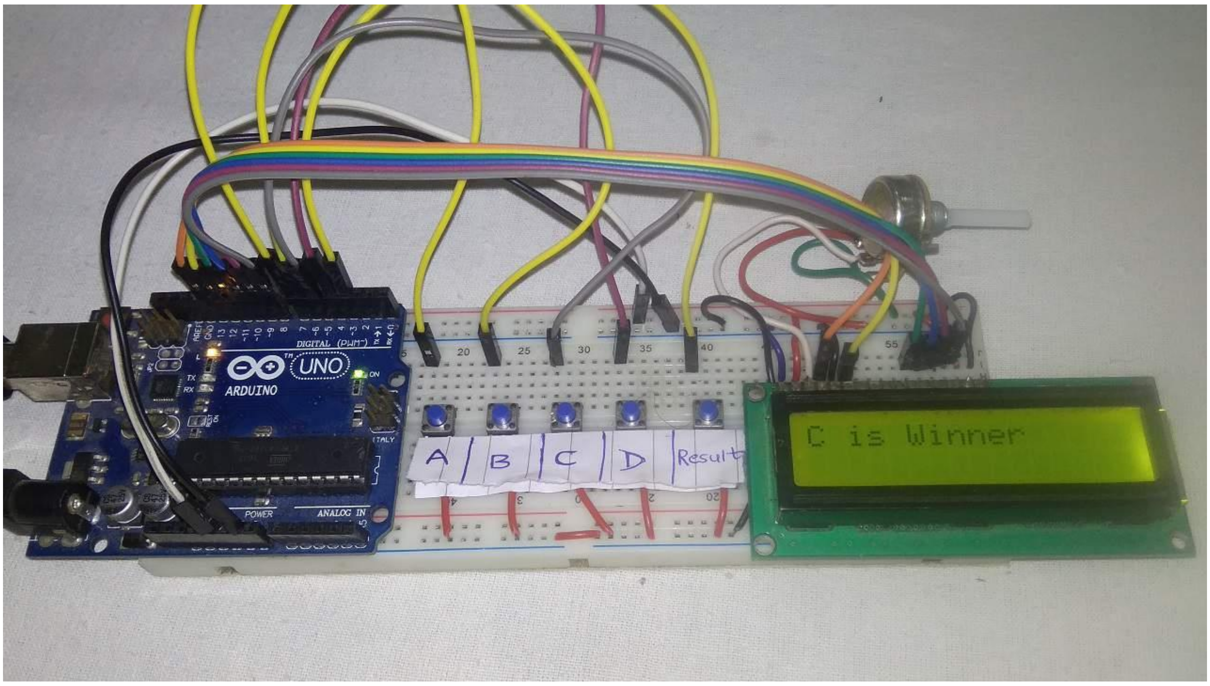

Figure 7.3 Output Diagram

CHAPTER 8

CONCLUSION AND FUTURE ENHANCEMENT

In conclusion, the smart voting technology is a huge step forward in modernizing and protecting the election process. Its deployment resulted in numerous significant benefits. For starters, it has significantly increased the efficiency of voting operations, lowering wait times and expediting the ballot-counting process. Second, the system has improved election accuracy and integrity by incorporating technology like biometrics and block chain to assure vote validity and prevent tampering or fraud. Furthermore, the emphasis on accessibility has made voting more convenient and inclusive, particularly for rural or impaired voters. Moreover, the transparency provided by elements such as block chain gives voters confidence that their votes are correctly reflected and tabulated. There are several prospects for future developments, such as improved usability, greater verification processes, and interaction with upcoming technologies. By constantly improving and developing the smart voting system, we can strengthen its function as a pillar of democratic government, encouraging confidence, participation, and integrity in election processes.

When considering the future of the smart voting system, various improvements can boost its efficacy, security, and inclusivity. Integrating sophisticated biometric authentication, such as face recognition or iris scanning, might improve voter verification and reduce identity theft. Block-chain technology, with its immutable ledger, can be used to improve the integrity of the voting process. A specialized mobile voting software might improve accessibility by allowing voters to safely cast ballots from any location, potentially increasing turnout. Accessibility tools such as screen readers and language translation should be included to accommodate those with impairments and different linguistic backgrounds. Strengthening cybersecurity standards, educating voters, and enabling real-time monitoring can all help to improve security and engagement. Furthermore, investigating methods for anonymous voting and assuring worldwide interoperability would improve the system's adaptability and credibility. With these improvements, the smart voting system may grow into a durable, transparent, and inclusive cornerstone of democratic government.

REFERENCES

[1] Anitha, V., Márquez, O. J., Sudharsan, R., Yoganandan, S., & Vimal, M. (2023, February 1). *Transparent voting system using blockchain*. Measurement. Sensors. https://doi.org/10.1016/j.measen.2022.100620

[2] Chafiq, T., Azmi, R., & Ouadoud, M. (2024, January 1). *Blockchain-based electronic voting systems: A case study in Morocco*. International Journal of Intelligent Networks. https://doi.org/10.1016/j.ijin.2024.01.004

[3] Liu, H., Hu, F., Zhu, D., & Luan, J. (2009, June 1). *Parameterized computational complexity of control problems in voting systems*. Theoretical Computer Science. https://doi.org/10.1016/j.tcs.2009.04.004

[4] Durand, F., Macé, A., & Núñez, M. (2024, May 1). *Voter Coordination in Elections: A case for Approval Voting*. Games and Economic Behavior. https://doi.org/10.1016/j.geb.2024.04.007

[5] Okubo, Y., Kitasuka, T., & Aritsugi, M. (2013, January 1). *A Preliminary Study of the Number of Votes under Majority Rule in Crowdsourcing*. Procedia Computer Science. https://doi.org/10.1016/j.procs.2013.09.133