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# **E-Voting System**

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## **Abstract**

E-Voting system is needed nowadays in the shade of the transformation of all interactions between people to the Internet for their convenience and to protect them from epidemics and diseases. E-Voting system is an electoral system, in an electronic form, which means we won't need paper voting in schools and will replace it with small machine that will be available everywhere. Giving citizens the right to vote at anytime and anywhere they want. This can be achieved using sources: First, through a website, which enables many operations such as: to check the ability to vote, search using national ID, view candidate's election programs, inquire for the nearest voting machine using address, check status of voting using national ID, fill a form to request a representative for voting at home "For disabled people" and follow up number of votes of each candidate, know who tops ranking.

Second, voting machines, which authenticate the citizen using her/his fingerprint to vote and choose a candidate from the list and vote for him/her.

The objectives of developing this system are:

Creating a reliable system that is easy to deal with, ensure the validity of the vote for non-fraud, save citizens time, effort, and money.

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## **List of Abbreviations**

Abbreviation	Full Form
CSS	Cascading Style Sheet
DB	Database
EVM	Electronic Voting Machine
GPS	Global Positioning System
HTML	Hyper Text Markup Language
ID	Identification
MVC	Model-View-Controller
UI	User Interface

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# Chapter 1

# Introduction

# Chapter 1

## 1.1 Motivation

In today's world, technology has become an integral part of the twenty-first century. The world is currently heading towards digital transformation in various areas of life. Digital transformation is the process of changing how an enterprise leverages technology, people, and processes to improve business performance and embrace new business models.

This transformation is cultural in nature and affects all elements of the business including sales, marketing, operations, customer service and is typically accompanied by a move to modern cloud technologies. Like E-learning, online shopping, and government digital service, especially during the coronavirus pandemic. That has led us to think about E-Voting System that would facilitate voting process to the people by existing machine-like ATM in many places available all day to allow them to vote any time during the day.



## **1.2 Problem Definition**

Sometimes people are lazy to go to the school that belongs to the address in their national ID, the time for Voting Process is limited by a certain time, waiting queues that voters wait to enter the room to vote. During corona virus we seek to reduce people gathering in a specific place to avoid the spread of infections among people.

Also, old and disabled people are not able to go to vote and they miss voting process. And the bad organization of voting process may lead to that some people don't go for voting at all.

Also, there are many problems the government faces during the election process. First, identity forgery and impersonating dead people and voting instead of them. Second, paper forgery where persons vote instead of the people who abstained from voting. Finally, forgery in results where people change the voting papers with other papers for the sake of a specific candidate.

## **1.3 Objective**

We aim to create an E-Voting system to facilitate the election process by saving the massive efforts, minimize expenses the government consumes on this process, eliminate the forgery and impersonation that may happen whether in the election process or in the stage of counting votes which lead to untrusted results.

And to achieve these objectives, we split our project into two parts, the first part is E-voting web application which is mainly dedicated for inquiry and the second part is the voting machine in which the on-ground voting process takes place.

## **1.4 Document Organization**

This documentation is structured as follows.

First, chapter 1 introduction about our graduation project, problem definition and objective from our project.

Second, chapter 2 presents detailed description of the field of the project, the scientific background related to it. And, we will demonstrate the work done and a description of existing similar systems.

Third, chapter 3 presents many examples of works similar to the proposed project in detail.

Fourth, chapter 4 presents analysis and design diagrams conducted during the first phases in the development lifecycle of the project.

Fifth, chapter 5 explain how the system is built, how all its modules are structured and how it is operated and used to achieve the intended goal

Sixth, chapter 6 describe in details how to operate the project along with screen shots of the project representing all steps.

Seventh, chapter 7 present the conclusion and the future work.

## Chapter 2

# Background

## **Chapter 2**

### **Background**

In this chapter, we will present a detailed description of the field of the project, the scientific background related to it. Also, we will demonstrate the work done and a description of existing similar systems and related works and how our project added a value to the existing ones.

#### **2.1 Project Description**

Our project is considered as a governmental system which serves a huge governmental process as the election process that take place in the whole country. Also, our project serves another field the world is going towards it which is being Eco-Friendly that's an Environmental field. Election process is done on ground in 3-4 days. In which most of the schools stop working as the election process takes place in schools. A lot of organizers work on this process for 3-4 days, taking salaries, consuming time. So the project serves the government in organizing this huge, time-consuming and effort-consuming process. Also, for the Election process to be done the government uses a huge amount of paper, plastic and vehicles for transferring voting paper which are so harmful resources affecting the environment and spreading many types of pollution. Our project serves the environment as it replaces all this resources with an electronic system.

## **2.2 The Scientific background related to the project**

Our project is considered as a reliable, data-based system. It is divided into two partitions: Software part and Hardware part.

**The Software part** is divided into: Web Application for Inquiries and Mobile Application for the voting machine.

**The Web application** is implemented with MVC technique which is Model-View-Controller construction. Model has all the classes of data that the website uses it. The View has all the UI classes which the user deals with. The Controller has the controlling class which deals with the Model and the View to connect between them.

The Front-End of the Web Application is implemented using HTML, CSS, Bootstrap 4, JavaScript and C#.

The Back-End of the Web Application is implemented using C#. And using Firebase database.

In which Firebase is a Google-backed application development software that enables developers to develop iOS, Android and Web apps. It's considered as a cloud database which can be accessed from any place and by many application types as demonstrated above.

**The Mobile application** is implemented using MVC technique that is demonstrated above as it is an organized technique which gives the system a good form of organization and the ability to be maintained, updated and modified easily.

The Front-End and Back-End of the Mobile Application is implemented using Java, Android Studio and Firebase database.

**The Hardware part:** We used Fingerprint scanner, Arduino Uno, Jumpers. It required a good knowledge of hardware constructions, Sensors. Also, it required a good familiarity with Arduino IDE and C programming language.

## **2.3 Survey of work done**

### **1. Database**

Constructed Successfully in Firebase.

### **2. Hardware Constructions**

Constructed Successfully with a real interface for the machine.

### **3. Web Application**

A. Users Port:

1. Homepage
2. Search for voter by National ID page
3. Voting ability or status inquiry page
4. View candidates' election programs page
5. Find nearest voting machine page

6. Search for specific candidate by Name page -
7. Fill a request to vote at home “for disabled people” page
8. Follow-up the election process second by second page -
9. Apply for Presidency page

**B. Admin Port:**

1. Manage candidate’ requests page
2. Manage “voting at home” requests page
3. Manage Machines page

**4. Mobile Application**

1. Authentication Page
2. Voting page

## Chapter 3

# Related Works



## **Chapter 3**

### **Related Works**

**In this chapter, we will present many examples of works similar to the proposed project in detail.**

#### **[1] Canada: Online Voting “A path Forward for Federal Elections”**

Online Voting System in Canada for Federal Elections over the internet using email, a web application or an internet-based fax or phone.

#### **[2] Brazil: Electronic Voting Machine**

The primary design goal of the Brazilian voting machine is extreme simplicity, the model being a public phone booth, Voter identified by National ID, And the voting process takes place in the presence of representatives designated by the political parties.

#### **[3] Australia: Electronic Voting at Federal Elections**

An isolated static electronic voting where voters cast their votes at polling stations on a stand-alone computer or a local area network without an internet connection

#### **[4] UK: Electronic Voting Machines**

An EVM consists of two units, a control unit, and the balloting unit. The two units are joined by a five-meter cable. Balloting unit facilitates voting by a voter via labeled buttons while the control unit controls the ballot units, stores voting counts and displays the results on 7 segment LED displays.

#### **[5] India: Electronic Voting Machines**

Electronic Voting Machines in India uses Biometric for Authentication and election process which adds a high security in voting process

#### **[6] Italy: Electronic Ballot Box**

The electronic ballot box is done through a touchscreen ballot box and it has a support mechanism for electoral activity only when the voter is expressing their “Voting Preference” for the earlier stages of finding and registering voters. Paper is still necessary, and individuals still have to present a valid form of paper ID and physically sign a polling register.

#### **[7] Pakistan: Electronic Voting Machine**

Election process goes as follow: The voter shows his identification card, then choose a candidate presented in the voting machine, the machine prints a paper having the chosen candidate’s name and slogan then the votes are collected in a plastic box to be counted by the end of the election process duration.

## Chapter 4

# Analysis and Design

## Chapter 4

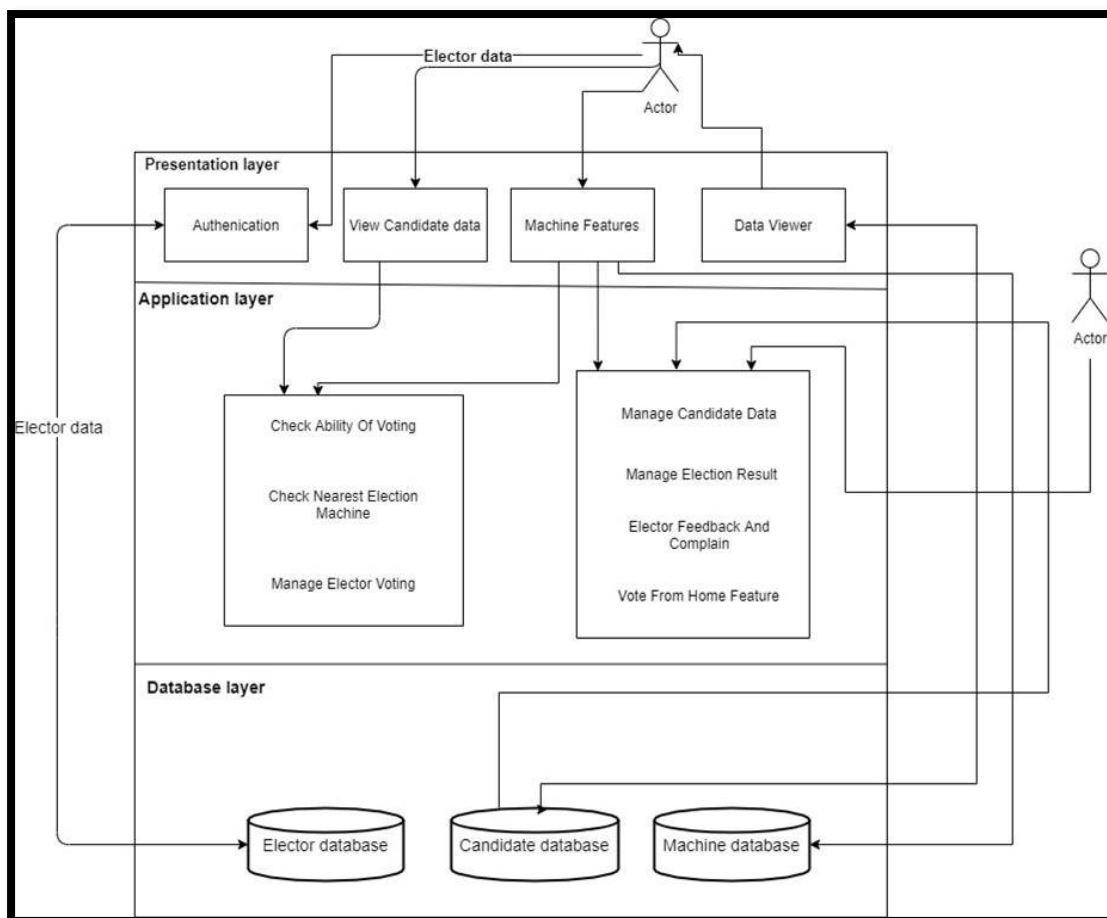
### Analysis and Design

In this chapter, we will present analysis and design diagrams conducted during the first phases in the development lifecycle of the project.

#### 3.1 System Overview

In this section, we will present an overview of the system including system architecture, functional and non-functional requirements, system users, use case diagram, class diagram, sequence diagram, database diagram.

##### 3.1.1 System Architecture



**Figure 1: System Architecture.**

## **1. Database Layer:**

- I. **Elector DB:** stores the data of the voters as their name, age, fingerprint, etc.
- II. **Candidate DB:** stores the data of candidates as their name, nationality, election program, etc.
- III. **Machine DB:** stores all the data of machines as address, working status, etc.

**2. Application Layer:** controls the communication between DB layer and presentation layer that takes place in the web application and the voting machine too. As in the following functions:

- I. Check the ability of voting
- II. Get nearest voting machine
- III. Manage elector voting
- IV. Manage candidates' data
- V. Manage election results
- VI. Manage 'voting from home' requests

**3- Presentation Layer:** Includes all the views that the user directly deals with them. As:

- I. Authentication page to be able to vote
- II. Choosing the candidate to vote for page
- III. View candidate programs
- IV. Inquiry pages
- V. View election process moment by moment
- VI. View election results

### 3.1.2 Functional Requirements

- Voter shall vote using his fingerprint.
- System shall authenticate voter's fingerprint.
- Voter shall choose a specific candidate to vote for.
- Voter shall check the ability to vote by searching using national ID.
- Voter shall check the status of voting using national ID .
- Voter shall view candidates' election programs.
- Voter shall get the nearest voting machine using address.
- Voter shall fill a form to request a representative for voting at home "for disabled people".
- Voter shall follow-up number of votes of each candidate, who tops the ranking.
- Candidate shall apply for Presidency online.
- Admin shall manage disabled people's requests for voting at home.
- Admin shall manage candidates' requests to apply for presidency.
- Admin shall manage machines.

### 3.1.3 Non-functional Requirements

- **Security:** The system handles safe login using his fingerprint.
- **Reliability:** The website and the voting machine's system is implemented with MVC technique so this avoids system crashing and checks data validation.
- **Usability:** The system has user friendly interface.
- **Availability:** The Web page is available and avoids being crashed.
- **Portability:** The website can be used at any browser.

### 3.1.4 System Users

*A. Intended Users:* Voters, Candidates.

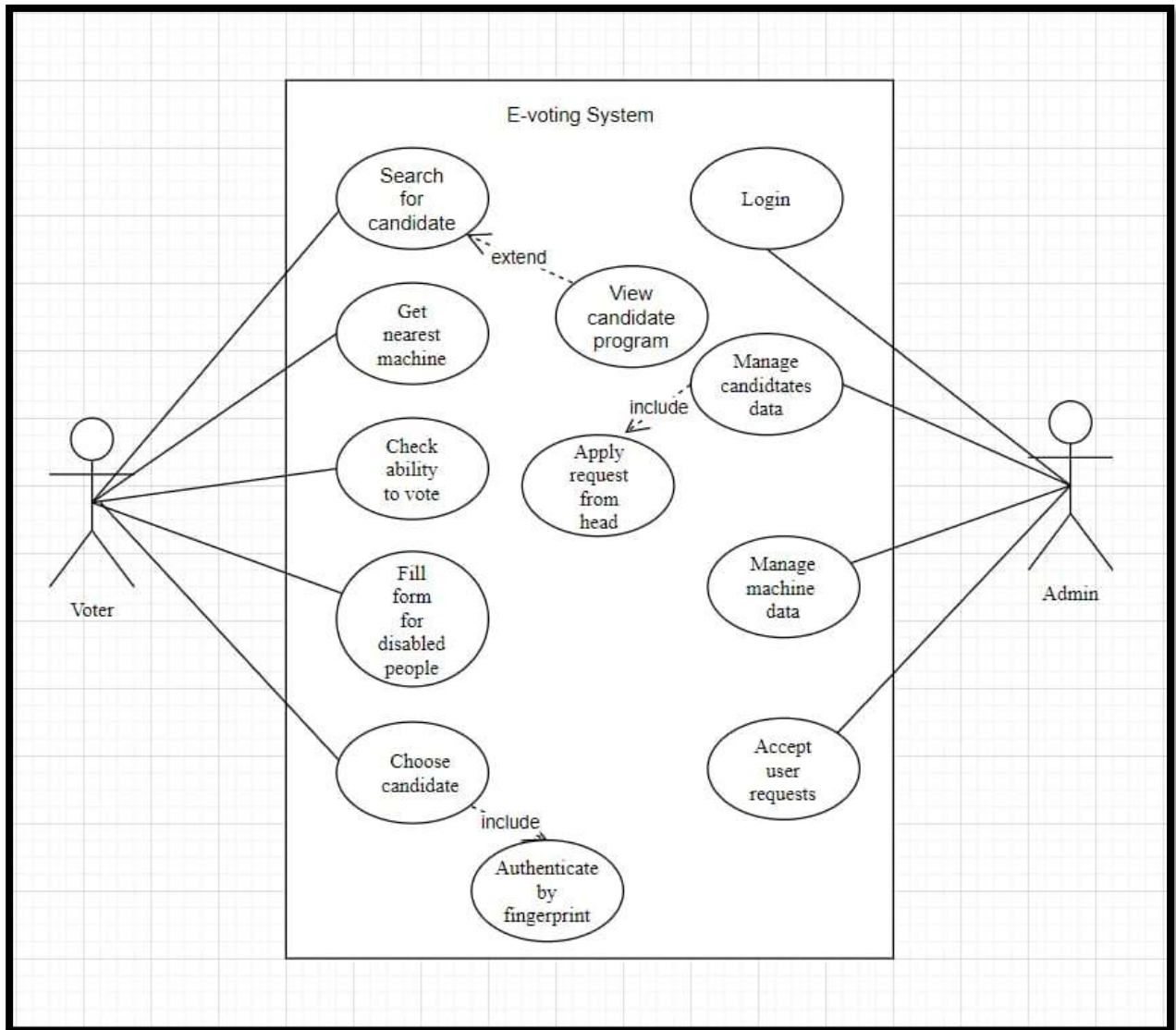
**Voters:** Voters have the ability to vote using the voting machine, Voters have the ability to check their voting ability and status, Voters have the ability to view candidates' programs, to check the nearest voting machine to their current address, to fill a request for voting at home if the voter is considered as "disabled". Voters can follow-up the progress of the election process moment by moment.

**Candidates:** Candidates can apply for Presidency Online as an initial step for having the President position.

#### *B. User Characteristics*

No technical experience or skills needed for the user to benefit from the system.

### 3.2 Use Case Diagram



**Figure 2: Use Case Diagram.**

#### **1-Voter Functions:**

1. Voter shall vote using his fingerprint after system authentication is done successfully
2. Voter shall choose a specific candidate to vote for after login using fingerprint



3. Voter shall check the ability to vote and the status of voting by searching using national ID
4. Voter shall view candidates' election programs either by navigating all the candidates or by searching for a specific candidate
5. Voter shall get the nearest voting machine using his/her current address and no need for the address in the national ID
6. Voter shall fill a form to request a representative for voting at home "for disabled people".
7. Voter shall follow-up number of votes of each candidate, who tops the ranking moment by moment

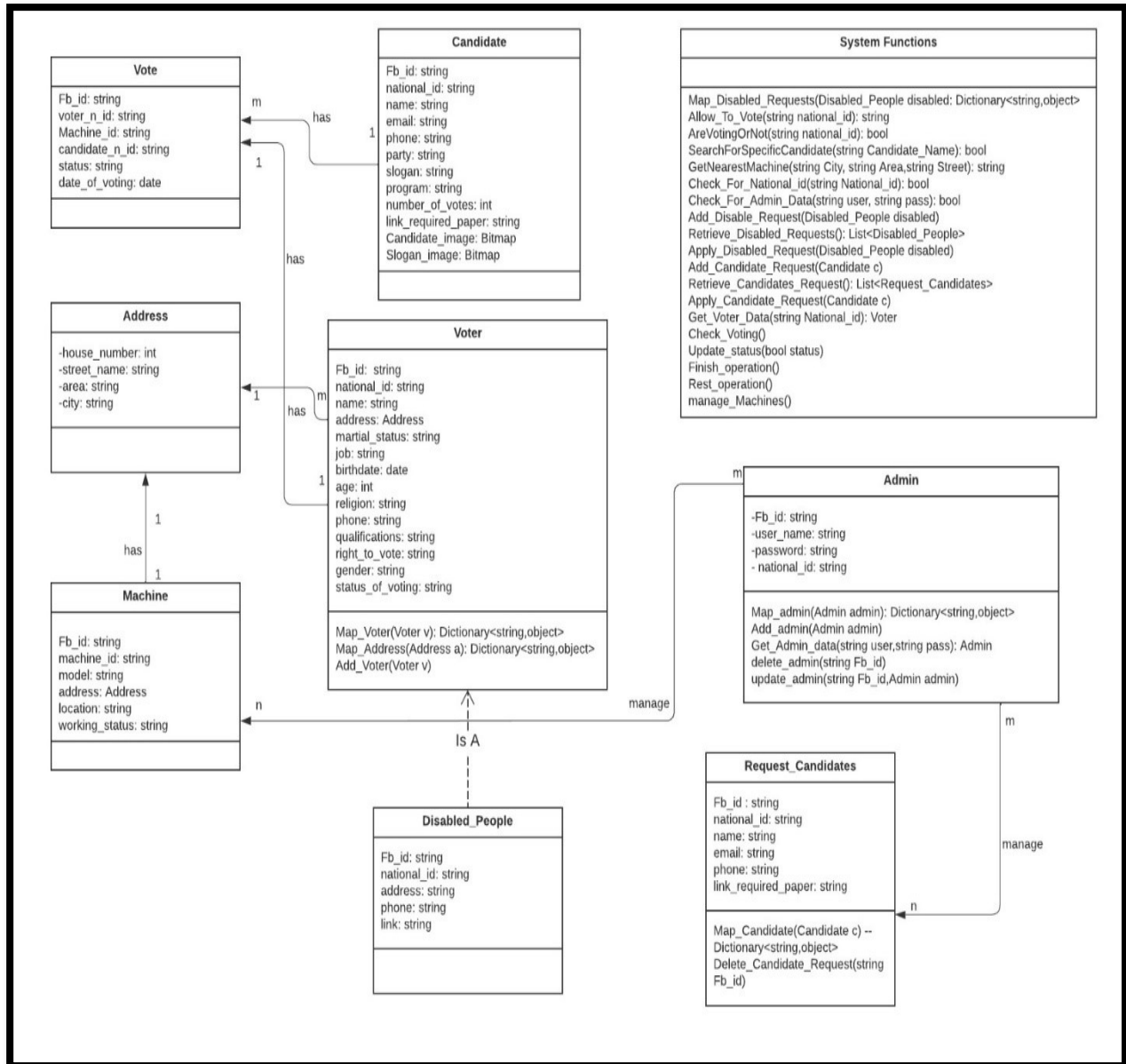
## **2-Admin Functions:**

1. Admin can login using a specific account given by the government
2. Admin can manage candidates' data
3. Admin can manage machines' data

## **3.3 Class Diagram**

In this section, we will present details regarding the class diagram of the proposed project which consists of:

1. Voter
2. Candidate
3. Admin
4. Disabled People
5. Vote
6. Machine
7. Address
8. Request Candidates
9. System Functions



**Figure 3: Class Diagram.**

**Voter class:** contains all the data and functions related to voters who are citizens in Egypt even if they have the right to vote or not.

**Candidate class:** contains all data and functions of the candidates who applied for presidency and their application is accepted by the government.

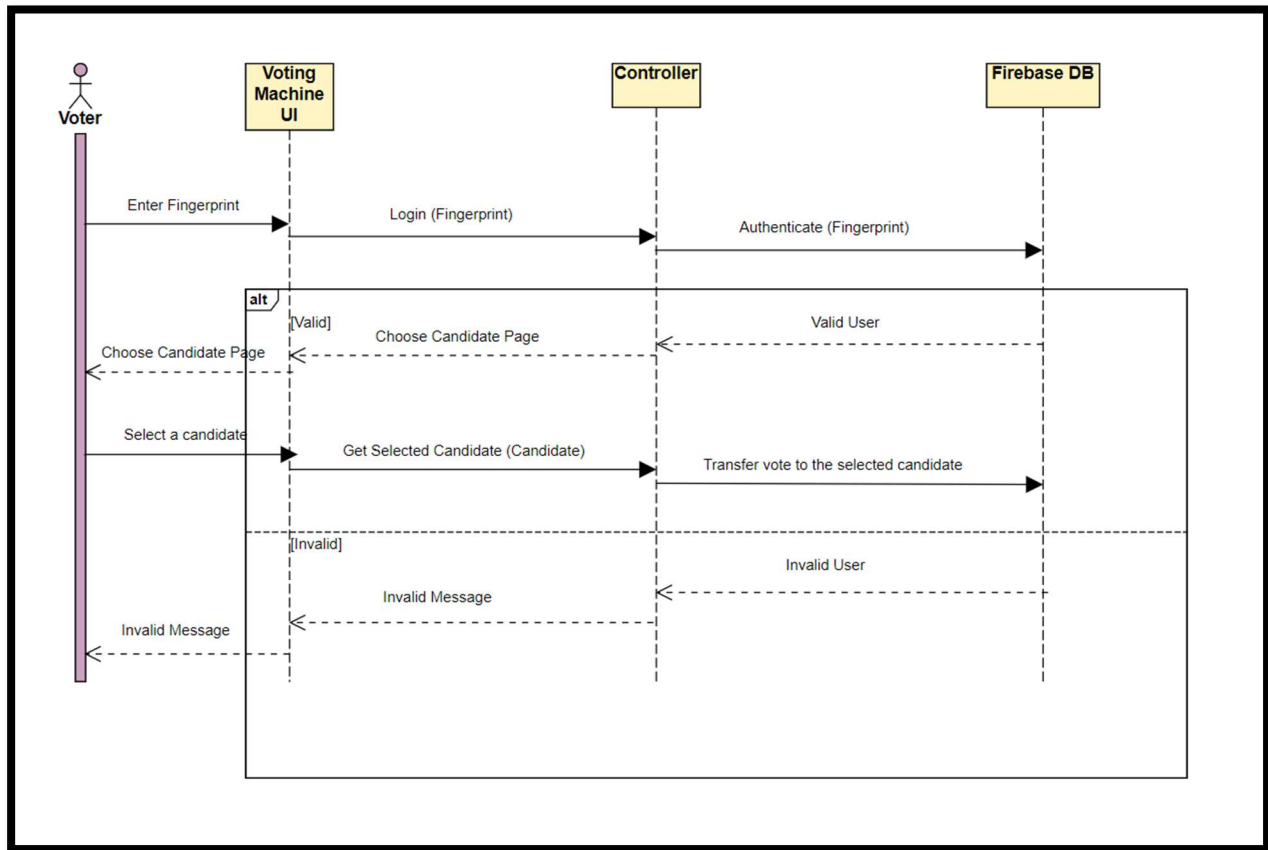
**Admin class:** contains all functions for managing candidates, machines and the election process.

**Machine class:** contains all the data of the machine as version, address and working status.

### 3.4 Sequence Diagram

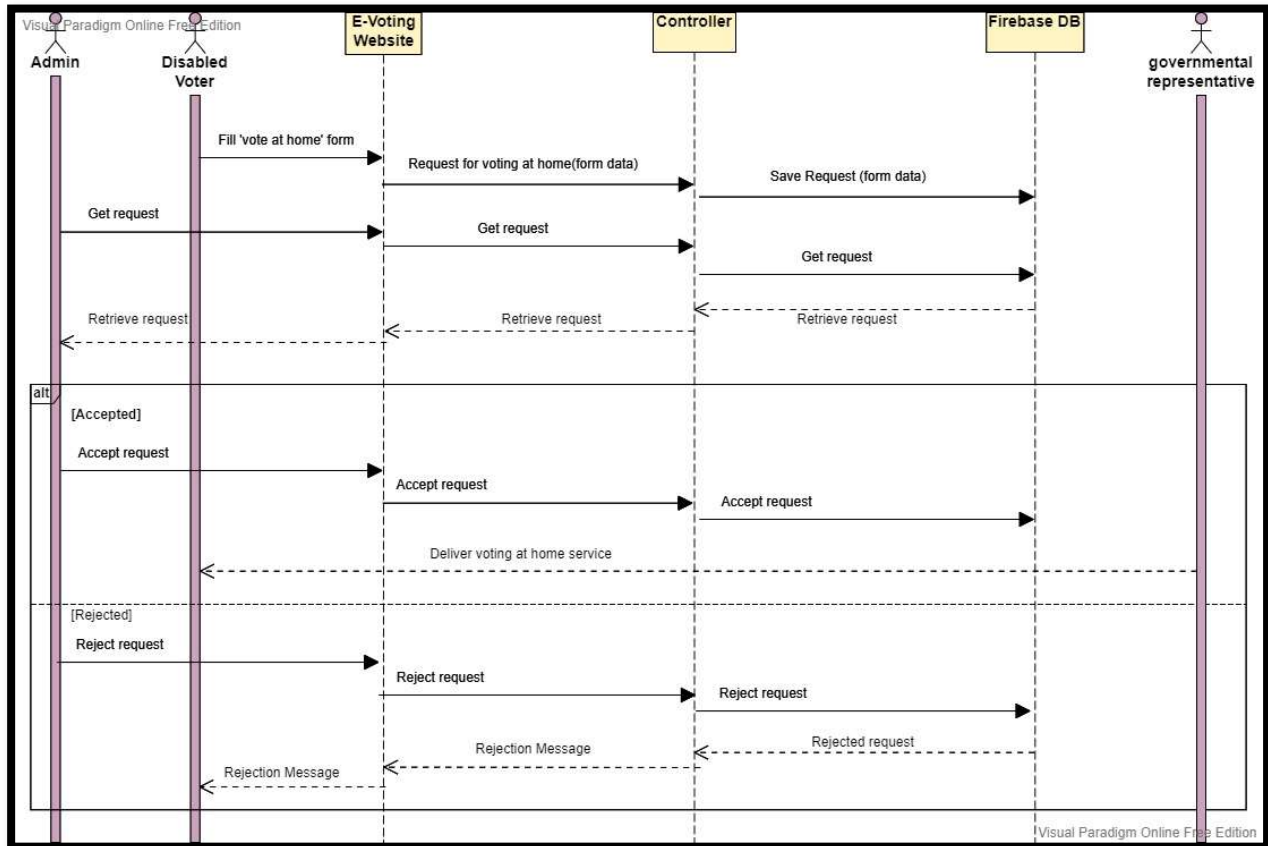
In this section, we will present sequence diagrams of the two main functions in the proposed project.

1. Voter's voting process using the voting machine where voter will authenticate with his/her fingerprint to vote and choose a candidate from available list.



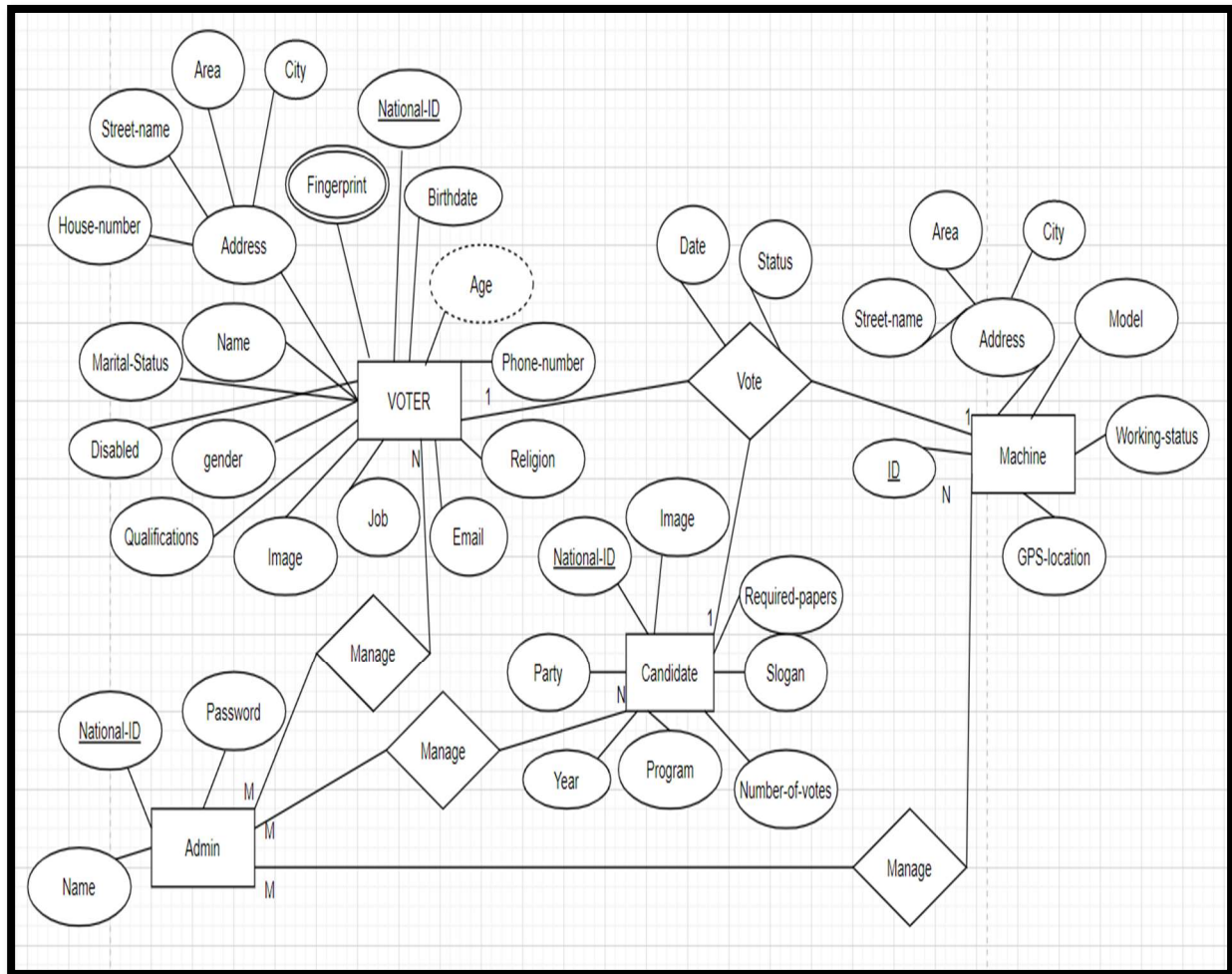
**Figure 4: Sequence Diagram 1: Voter votes at voting machine.**

2. Disabled voter's process to have "voting at home" service where disabled voter will fill a form to request to vote from home and admin will manage his request to follow the election process.



**Figure 5: Sequence Diagram 2: Disabled Voter request 'voting at home' service.**

### 3.5 Database Diagram



**Figure 6: Database Diagram.**

## Chapter 5

# Implementation

## Chapter 5

### Implementation

In this chapter, we will explain how the system is built, how all its modules are structured and how it is operated and used to achieve the intended goal.

#### 4.1 Description of all the functions in the system

##### A. Functions in the Website part

###### 1) Check the ability to vote using national ID:

The citizen enters his/her national ID to find out if he/she can have the right to vote or not.

```
1 reference
public async Task<string> Allow_To_Vote(string National_id)
{
    string allow_vote = "يحق له";
    string not_allow_to_vote = "لا يحق له";
    Query Q = db.Collection("Voters").WhereEqualTo("National_ID", National_id);
    QuerySnapshot snap = await Q.GetSnapshotAsync();
    foreach (DocumentSnapshot docsnap in snap)
    {
        Voter voter = new Voter();
        if (docsnap.Exists)
        {
            voter.Age = int.Parse(docsnap.GetValue<string>("Age"));
            if (voter.Age > 18) return allow_vote;
            else return not_allow_to_vote;
        }
    }
    return null;
}
```

Figure 7: Allow to vote.



2) Check the status of voting using national ID:

After the election the voter has the ability of checking his voting status reflected on the system or not.

```
1 reference
public async Task<bool> AreVotingOrNot(string National_id)
{
    Query Q = db.Collection("Vote_Records");
    QuerySnapshot snap = await Q.GetSnapshotAsync();
    foreach (DocumentSnapshot docsnap in snap)
    {
        Vote vt = new Vote();
        if (docsnap.Exists)
        {
            vt.voter_n_id = docsnap.GetValue<string>("voter_n_id");
            if (vt.voter_n_id.Equals(National_id)) return true;
            else return false;
        }
    }
    return false;
}
```

**Figure 8: Voting or not.**

3) View candidates' election programs:

The citizen has the ability to browse among the candidates and see their programs to know which one will give his/her vote to him.

```
1 reference
public async Task<List<Official_Candidates>> Retrieve_Official_Candidates()
{
    List<Official_Candidates> lst_official = new List<Official_Candidates>();
    Query Q = db.Collection("Official_Candidates");
    QuerySnapshot snap = await Q.GetSnapshotAsync();
    foreach (DocumentSnapshot docsnap in snap)
    {
        Official_Candidates off = new Official_Candidates();
        if (docsnap.Exists)
        {
            off.Fb_id = docsnap.Id;
            off.image_link = docsnap.GetValue<string>("Image_Link");
            off.candidate_name = docsnap.GetValue<string>("Name");
            off.pdf_link = docsnap.GetValue<string>("PDF_Link");
            lst_official.Add(off);
        }
    }
    return lst_official;
}
```

**Figure 8: Official Data.**

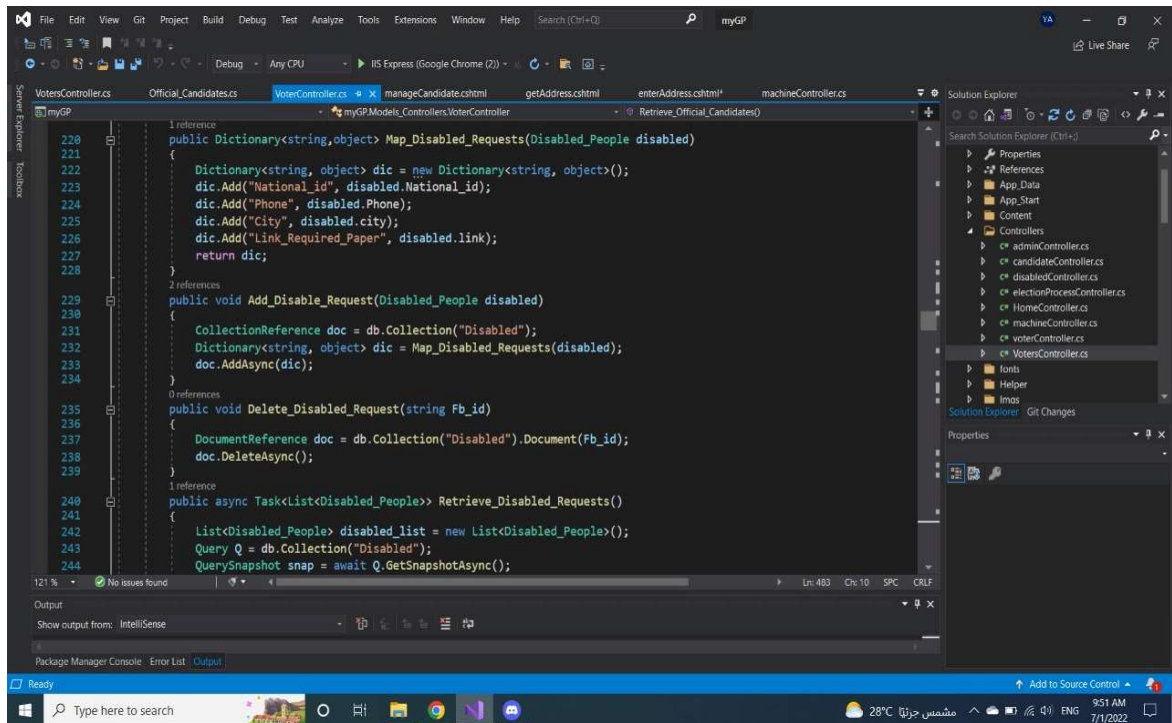
- 4) Get nearest voting machine using address: Whoever wants to vote at anywhere that takes place in the whole country, and this done by entering the address that wants to vote nearby and the website will give him nearest machine to vote on it.

```
1 reference
public async Task<string> GetNearestMachine(string City, string Area, string Street)
{
    Query Q = db.Collection("Machines");
    QuerySnapshot snap2 = await Q.GetSnapshotAsync();
    foreach (DocumentSnapshot docsnap in snap2)
    {
        if (docsnap.Exists)
        {
            Dictionary<string, object> dic = docsnap.ToDictionary();
            foreach (var item in dic)
            {
                if (item.Key.Equals("Address"))
                {
                    foreach (var add in (Dictionary<string, object>)item.Value)
                    {
                        if (add.Key.Equals("City"))
                        {
                            foreach (var area in (Dictionary<string, object>)item.Value)
                            {
                                if (area.Key.Equals("Area"))
                                {
                                    foreach (var street in (Dictionary<string, object>)item.Value)
                                    {
                                        if (street.Key.Equals("Streert"))
                                        {
                                            if (add.Value.Equals(City) && area.Value.Equals(Area) && street.Value.Equals(Street))
                                            {
                                                return add.Value + "," + area.Value + "," + street.Value;
                                            }
                                        }
                                    }
                                }
                            }
                        }
                    }
                }
            }
        }
    }
    return null;
}
```

**Figure 9: Nearest Machine.**

5) Fill a form to request a representative for voting at home “for disabled people”:

This is special for disabled people to facilitate to them voting process instead of going to nearest machine, someone from a government agency will go to him with machine.



**Figure 8: Form for Disabled Voter.**

6) Search for a specific candidate using his name:

People can search about specific candidate with his name to see his program.

```
1 reference
public async Task<bool> SearchForSpecificCandidate(string Candidate_Name)
{
    Query Q = db.Collection("Official Candidates").WhereEqualTo("Name",Candidate_Name);
    QuerySnapshot snap = await Q.GetSnapshotAsync();
    foreach (DocumentSnapshot docsnap in snap)
    {
        if (docsnap.Exists)
        {
            Candidate c = new Candidate();
            c.Name = docsnap.GetValue<string>("Name");
            if (c.Name.Equals(Candidate_Name)) return true;
            else return false;
        }
    }
    return false;
}
```

**Figure 10: Search Candidate.**

- 7) Follow-up number of votes of each candidate, who tops the ranking:  
During the voting process people can follow the initial result and ranking between candidates.

```
1 reference
public async Task<List<Official_Candidates>> Retrieve_Official_Candidates_Ranked()
{
    List<Official_Candidates> lst_official = new List<Official_Candidates>();
    Query Q = db.Collection("Official_Candidates").OrderByDescending("Num_Of_Votes");
    QuerySnapshot snap = await Q.GetSnapshotAsync();
    foreach (DocumentSnapshot docsnap in snap)
    {
        Official_Candidates off = new Official_Candidates();
        if (docsnap.Exists)
        {
            off.Fb_id = docsnap.Id;
            off.image_link = docsnap.GetValue<string>("Image_Link");
            off.candidate_name = docsnap.GetValue<string>("Name");
            off.pdf_link = docsnap.GetValue<string>("PDF_Link");
            lst_official.Add(off);
        }
    }
    return lst_official;
}
```

**Figure 11: Ranked Candidates.**

## **B. Functions in the Machine part**

- 1) Authenticate the voter using his/her fingerprint to vote:

This step will be done by putting the voter's finger on the fingerprint scanner and the scanner processes it to validate if this user has the right to vote or not. "by comparing the entered fingerprint with saved finger print for this citizen"

## 1. Taking voter's fingerprint:

```
public int Getdetected_Finger() {
    int tu=0;
    String s=null;
    InputStream inputStream;
    if (btSocket != null) {
        int r=0;
        InputStream tmp = null;
        try {
            tmp = btSocket.getInputStream();
        } catch (IOException t) {
        }

        inputStream = tmp;
        while (true) {
            try {
                byte buffer = (byte) inputStream.read();
                s = new String(String.valueOf(buffer));
                r = Integer.parseInt(s);
            }
            |
            break;
        } catch (IOException e) {
            break;
        }
    }
}
```

**Figure 12: Fingerprint Recognition.**

## 2. Validate fingerprint:

```
try{
    FirebaseFirestore db=FirebaseFirestore.getInstance();
    db.collection( collectionPath: "Voters").whereEqualTo( field: "Finger ID", value: 1).get()
    .addOnSuccessListener(new OnSuccessListener<QuerySnapshot>() {
        @RequiresApi(api = Build.VERSION_CODES.O)
        @Override
        public void onSuccess(QuerySnapshot queryDocumentSnapshots) {
            if(!queryDocumentSnapshots.isEmpty()){
                for(DocumentSnapshot doc:queryDocumentSnapshots){
                    voters[0] =set_in_voter(doc);
                    name.setText(voters[0].name);
                    id.setText(voters[0].national_id);
                    phone.setText(voters[0].phone_number);

                    break;
                }
            }
        }
    })
}
```



2) Choose a candidate from the list & vote for him:

Through our reliable UI design, voter can scroll between candidates and choose one of them easily.

```
chosen_name=getIntent().getStringExtra( name: "Chosen_Name");
String tmp=name_txt.getText().toString();
name_txt.setText(tmp+chosen_name+"");

Yes_btn.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Toast.makeText( context: ChosenCandidate.this, text: "تمت عملية التصويت بنجاح", Toast.LENGTH_SHORT).show();
        Intent intent =new Intent( packageContext: ChosenCandidate.this,MainActivity.class);
        startActivity(intent);
    }
});
No_btn.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Intent intent =new Intent( packageContext: ChosenCandidate.this,Candidates.class);
        startActivity(intent);
    }
});
}
```

**Figure 13: Select Candidate.**

## 4.2 Description of Algorithms and Techniques used

### 1) Auto-Complete algorithm using Trie

We used this algorithm to speed up searching for a certain candidate when entering the first character of his name, his full name will appear.

#### Trie Node:

```
class trieNode:
    def __init__(self):
        self.next={}
        self.leaf=False # Indicates no other Leaf Node
```

**Figure 14: Trie Node Diagram.**

#### Insertion of a Node:

```
// Insertion of a Node

void insertionOfaString(String word)
{
    for(Every Character in String word)
    {
        if(Child Node for Character is NULL)
        {
            Child_Node=new Node();
        }
        Current_Node=Child_Node;
    }
}
```

**Figure 15: Node Insertion Diagram.**



### Search for a Node:

```
// Searching of a Node

boolean searchingOfaNode(String word)
{
    for(Every Character in String word)
    {
        if(Child Node for Character is NULL)
        {
            return false;
        }
    }
    return true;
}
```

**Figure 16: Node Search Diagram.**

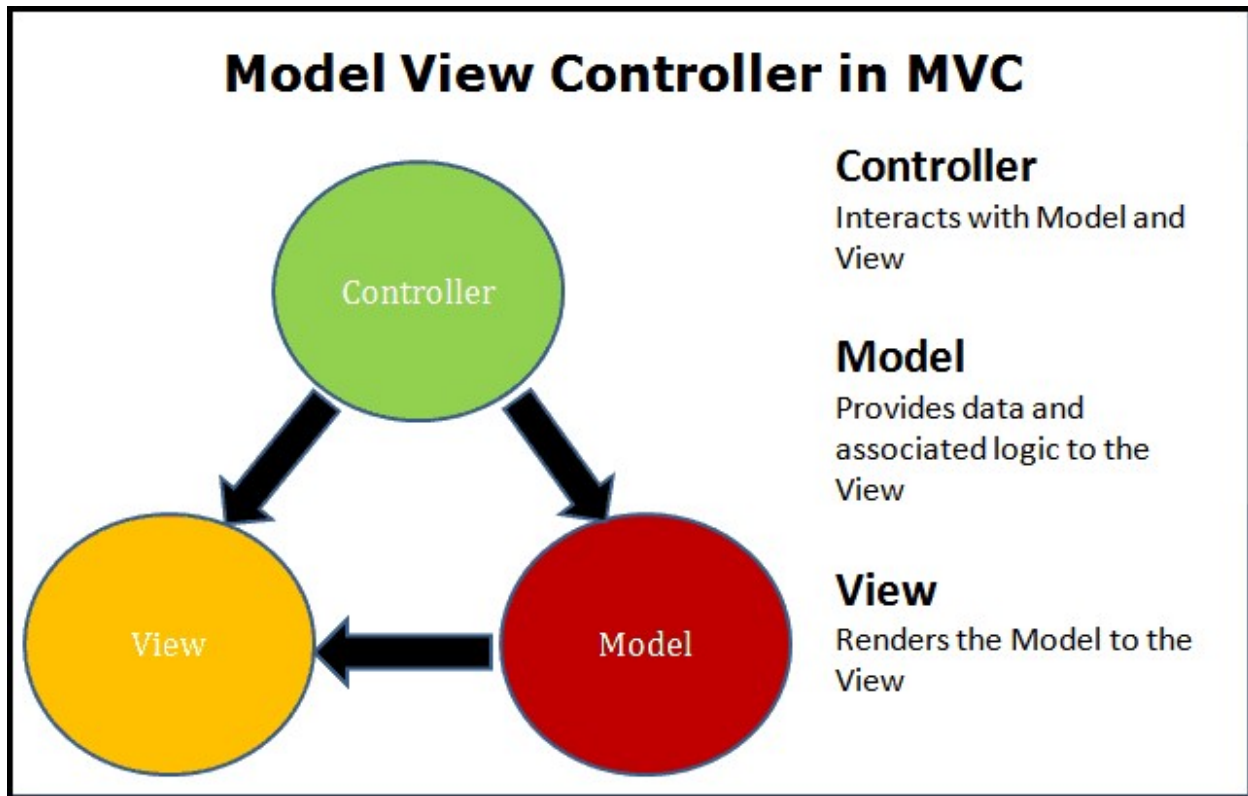
### Auto-Complete Algorithm:

```
def traversal(self, item):
    if self.leaf:
        print (item)
    for i in self.next:
        s = item + i
        self.next[i].traversal(s)

# actual autocomplete feature
def autocomplete(self, item):
    i = 0
    s = ''
    while i < len(item):
        k = item[i]
        s += k
        if k in self.next:
            self = self.next[k]
        else:
            return 'NOT FOUND'
        i += 1
    self.traversal(s)
    return 'END'
```

Figure 17: Auto-Complete Algorithm Diagram.

## 2) MVC Technique



**Figure 18: MVC model Diagram.**

MVC (Model-View-Controller) is a pattern in software design commonly used to implement user interfaces, data, and controlling logic.

It emphasizes a separation between the software's business logic and display. This "separation of concerns" provides for a better division of labor and improved maintenance.

We use this technique to organize our code, It is known about MVC that split code for 3 tiers.

### **1-Model**

The model defines what data the app should contain. If the state of this data changes, then the model will usually notify the view (so the display can change as needed) and sometimes the controller (if different logic is needed to control the updated view).

### **2-View**

The view defines how the app's data should be displayed

### **3-Controller**

The controller contains logic that updates the model and/or view in response to input from the users of the app.

**And we used this technique in both the website and application.**

# Chapter 6

# User Manual

## Chapter 6

### User Manual

In this chapter we will describe in details how to operate the project along with screen shots of the project representing all steps.

A) In Website user can:

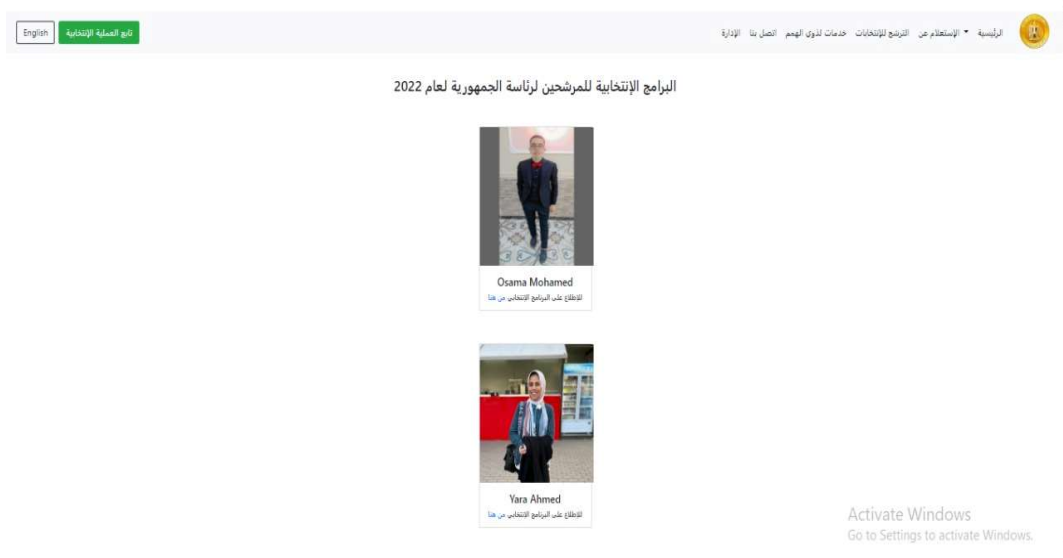
1)Open the home page



**Figure 19: Home Page.**

2)Inquire about:

- Electoral programs by clicking on any candidate you will see his electrical program.



**Figure 20: Candidate Programs.**

- Nearest voting machine
- Voting right to know if this voter can vote or not and his/her voting status “Has he/she ever been voted?”



**Figure 21: Voter Data.**

- Personal Information by entering national ID and showing rest of his/her information.

English تابع العملية الانتخابية الرئيسية الإستعلام عن الترشح للإنتخابات خدمات لذوي الهمم اتصل بنا الإدارة

يمكنك الإستعلام عن: بياناتك الشخصية، حق الإنتخاب .. إلخ

ادخل الرقم القومي

يبحث

جميع الحقوق محفوظة لطلاب كلية حاسبات ومعلومات جامعة عين شمس - 2022 ©

Activate Windows  
Go to Settings to activate Windows.

**Figure 22: National Id Entry.**

- Search for specific candidate by entering candidate's name then appearing all information that related to him.

English تابع العملية الانتخابية الرئيسية الإستعلام عن الترشح للإنتخابات خدمات لذوي الهمم اتصل بنا الإدارة

ابحث عن مرشح

ادخل اسم المرشح

يبحث

Activate Windows  
Go to Settings to activate Windows.

**Figure 23: Search for candidate.**



3) Request vote in the home for disabled people to facilitate the electoral process for them by providing form and asking them to fill it .



The screenshot shows the 'طلب خدمة التصويت في المنزل لذوي الهمم' (Request home voting for disabled people) form. The header includes a language switcher (English/العربية) and navigation links. The form contains several input fields: 'الرقم القومي' (National ID Number), 'رقم الموبايل' (Mobile Number), 'العنوان الحالي' (Current Address), and 'رقم الموبايل' (Mobile Number). There are also checkboxes for 'رابط الوثائق المطلوبة للتصويت' (Link to required documents for voting) and 'رابط الوثائق المطلوبة للتصويت' (Link to required documents for voting). A green 'تقديم الطلب' (Submit Request) button is at the bottom right. An 'Activate Windows' watermark is visible in the bottom right corner.

**Figure 24: Disabled Form.**

Admin can:

1) Login to website and identify himself to allow to make the role of admin.



The screenshot shows the 'تسجيل الدخول لإدارة الموقع' (Admin Login) form. The header includes a language switcher (English/العربية) and navigation links. The form contains input fields for 'اسم المستخدم' (Username), 'ادخل اسم المستخدم' (Enter Username), 'كلمة السر' (Password), and 'ادخل كلمة السر' (Enter Password). A green 'الدخول' (Login) button is at the bottom right. An 'Activate Windows' watermark is visible in the bottom right corner.

**Figure 25: Admin Port.**

## 2)Manage:

- Candidates and decide which of them accepted to enter the electoral process or not according to his qualifications.



**Figure 26: Manage Request Candidates.**

- Voting Machine to inform citizens which machines are working and which ones are off ?



**Figure 27: Manage Machines.**

- 
- خدمات لذوي الهمم
- Activate Windows  
Go to Settings to activate Windows.

**Figure 28: Form Disabled.**

### 3) Candidate can request online to candidacy for the presidency.

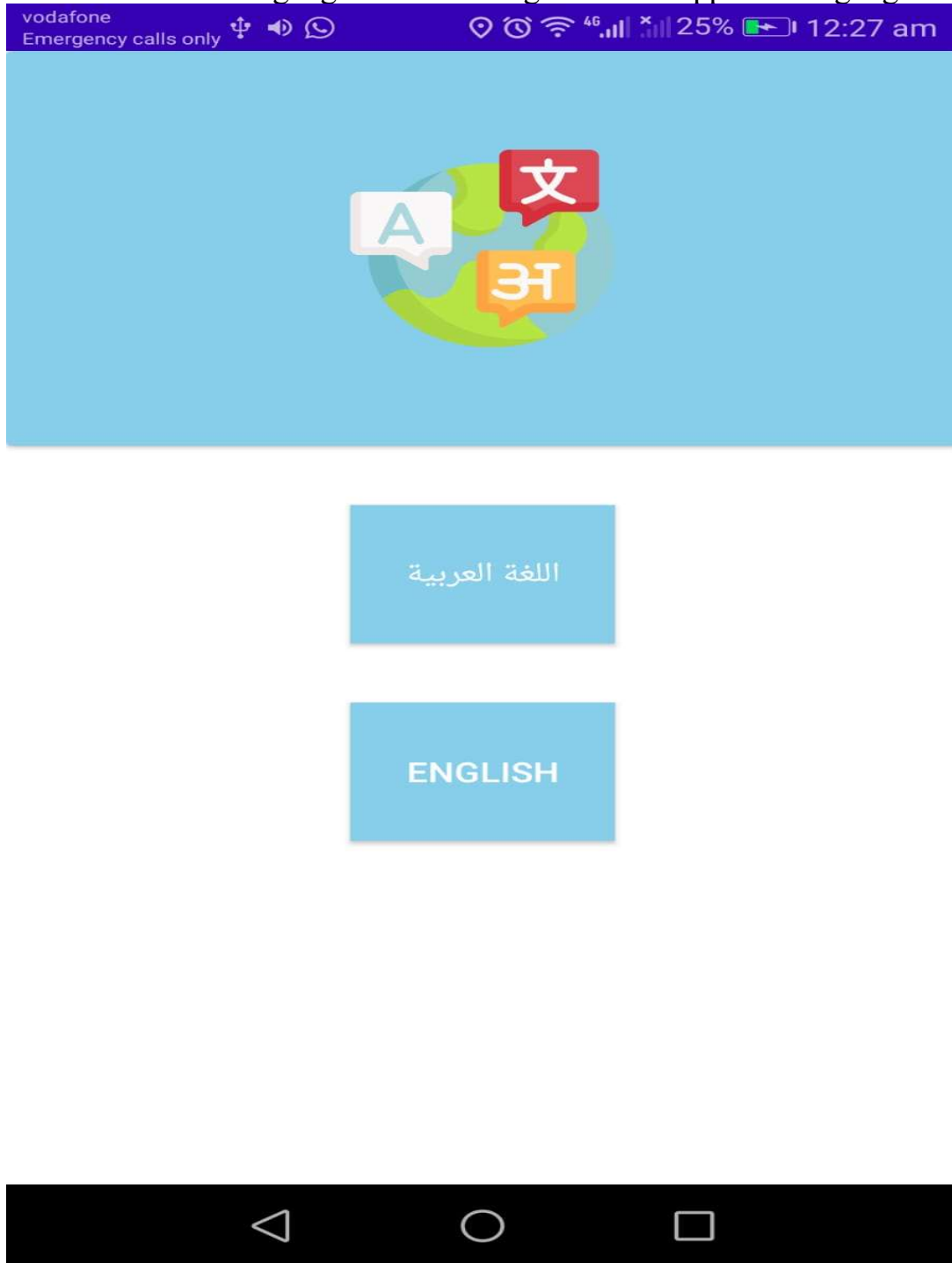
The screenshot displays the official website for the Egyptian Presidential Election. At the top, there is a navigation bar with links in Arabic and English, including 'الرئيسية' (Home), 'الإستعلام عن الترشح للإنتخابات' (Information about the election), 'خدمات لذوي الهمم' (Services for persons with disabilities), 'اتصل بنا' (Contact us), and 'الإدارة' (Administration). A language toggle shows 'English' and 'تابع العملية الإنتخابية' (Follow the election process). The main header features the coat of arms of the Arab Republic of Egypt and the text 'جمهورية مصر العربية' (Arab Republic of Egypt) and 'رئاسة الجمهورية' (Presidency of the Republic).

The central heading is 'التقدم الإلكتروني للترشح لرئاسة جمهورية مصر العربية' (Online application for the presidency of the Arab Republic of Egypt). Below this, a sub-heading reads 'من فضلك، تعرّف على الوثائق المطلوبة للترشح لرئاسة الجمهورية من هنا' (Please, get to know the required documents for the presidency of the Republic from here). The form includes several input fields: 'البريد الإلكتروني' (Email), 'رقم الموبايل' (Mobile number), 'البريد الإلكتروني' (Email), 'رقم الموبايل' (Mobile number), 'الرقم القومي' (National ID number), and 'الرقم القومي' (National ID number). There are also links for 'رابط الوثائق المطلوبة للترشح' (Link to the required documents for the election) and 'رابط الوثائق المطلوبة للترشح' (Link to the required documents for the election). A section for 'الصورة الرسمية' (Official photo) includes a 'Choose File' button and a 'No file chosen' status. A green 'تقديم الطلب' (Submit application) button is at the bottom right. A Windows watermark is visible in the bottom right corner.

**Figure 29: Form Request Candidates.**

B)In Machine voter can:

1)Choose between 2 languages Arabic&English “We support 2 languages”



**Figure 30: Choose Language.**

2)Connecting to bluetooth device to enter his/her finger print



Figure 31:Welcome Page.

3) Voter put his/her finger in finger print scanner to authenticate himself.



**Figure 32: Authenticate Fingerprint.**

4) Will appear personal information of entered finger to ensure that the data is matched with voter



Figure 33: Voter Data.



5)Vote for one of candidates



## اسماء المرشحين

من فضلك اضغط علي المرشح الذي تود انتخابه



أ



أسامة محمد



Figure 34: List of Candidates.

5) If you enter vote on any candidate, this dialog will appear and there are 2 options. First “نعم” this will record your vote and return you to main activity. Second “لا” this will remain you in same activity to choose candidate.

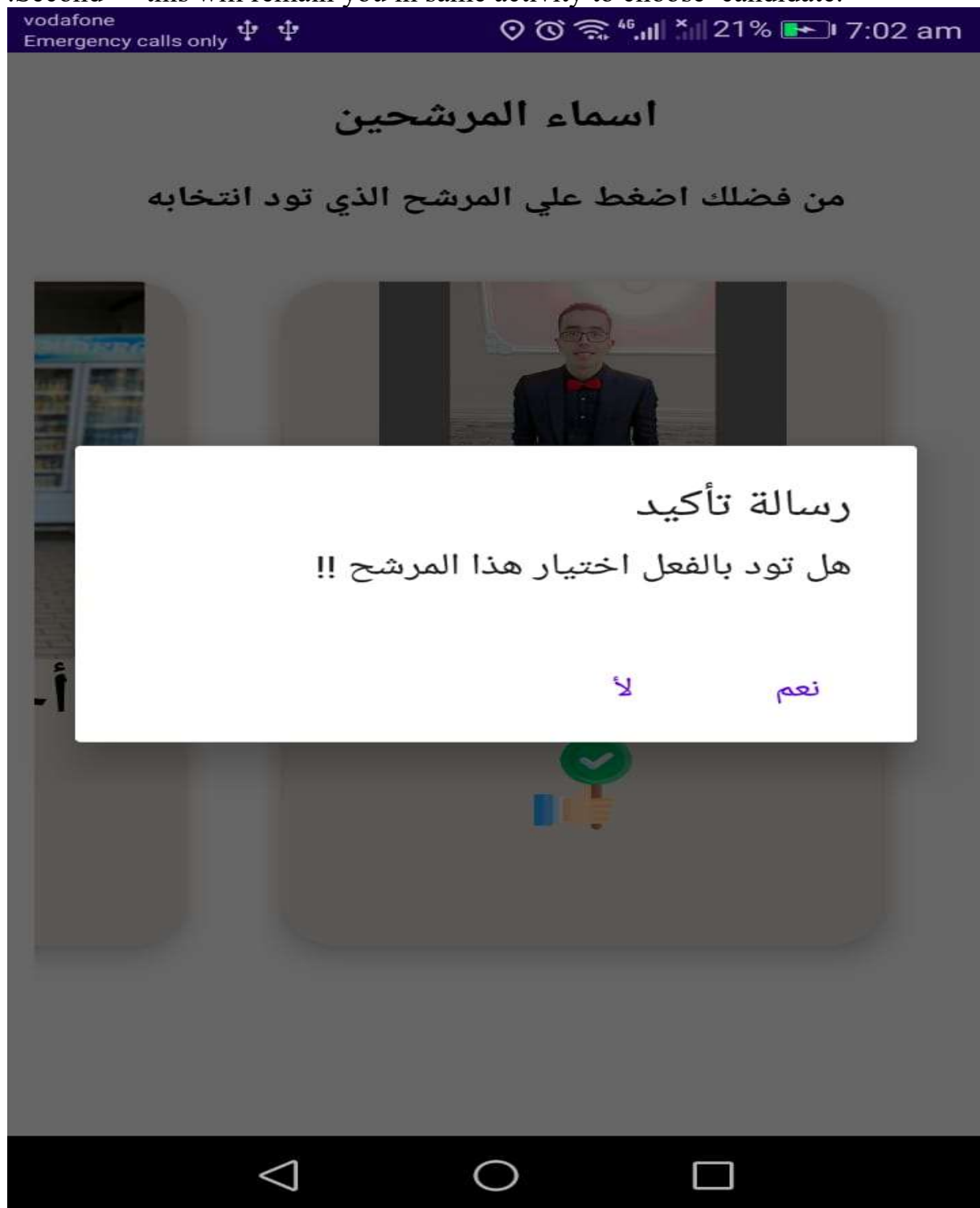


Figure 35 : Vote Insurance.

## Chapter 7

# Conclusions and Future Work

## **Chapter 7**

### **Conclusions and Future Work**

In this chapter, we will present the conclusion and the future work.

#### **6.1 Conclusions**

This project aims to automate the E-voting process with the least amount of effort, time and money. This project is a serious step towards the digital transformation and it will transform this huge process into an easy and more organized electronic process.

The Voting Machine helps in the real process of voting, it represents the main functionality in the election process. Also, the authentication with fingerprint guarantees us a safe, secure and private process of voting.

The website helps in following-up the election process moment by moment which guarantees us fair results with no forgery or manipulation with the number of votes for any candidate. Also, it facilitates organizing the election process by helping voters to see the candidates' programs in a user-friendly interface and to know the nearest machine to their current position, helping disabled to request for voting at home and many other options that make the election process more organized and clearer.

#### **6.2 Future Work**

As the population rises and many election processes (other than the presidential election process) are held. The E-Voting systems became an indispensable system nowadays. So, we need to add some features to improve the system. So, we will present the future work to be done to make this system more efficient:

- We will make the system helps in any election process (other than the presidential election process) like the parliament elections, this will require to adjust the voting machines according to the area it's placed at.

- We will make finding the nearest machine more accurate by using GPS to give the user the shortest path and a detailed path between his current location and the voting machine
- We will modify the system to help blind people to vote without a need from other people.
- We will improve the security of the login function for the admin who's responsible for adding the candidates to the system and managing the incoming requests by making the admin login by his face identity using image processing technique.
- We will make the voting process be done at home using the mobile phones instead of going to the machine at a specific place.
- We will create a prediction function to predict who will get the position depending on his past nominations and number of votes he earns in each process.

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