

Performance & Final Submission Phase

Project Documentation

TEAM ID	NM2023TMID04400
PROJECT NAME	BIOMETRIC SECURITY SYSTEM FOR VOTING PLATFORM

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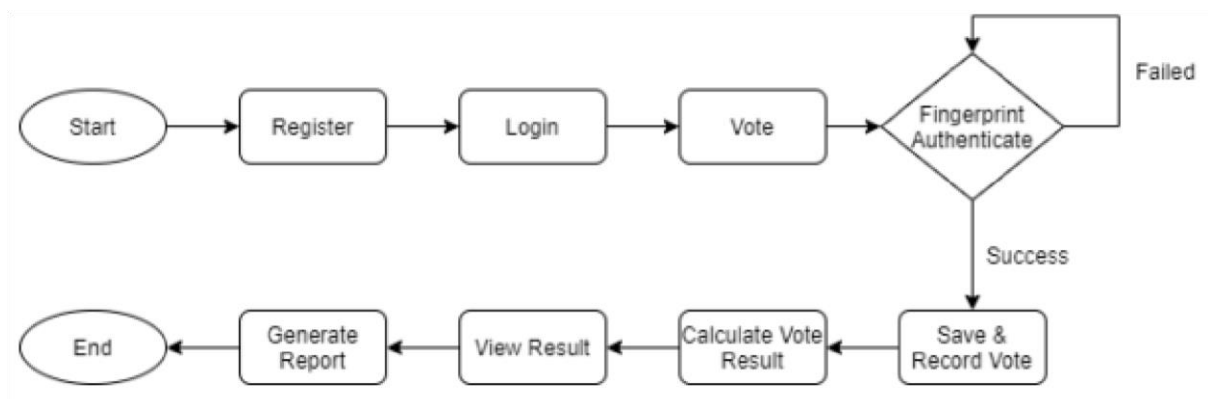
1. INTRODUCTION :

In this chapter, the information, problem, objective, and scope for voting system will be discuss. This is because, there are a lot of voting system, but there also having some limitation. Therefore, in this project, a new secured electronic voting system will be developed and introduced to overcome the limitation or weakness of voting process. This evoting system will be made in android and using fingerprint to authenticate which mean the system will run as a fingerprint mobile application.

1.1 Project Overview

The fingerprint e-voting system will be designed for this project. The system is planned and designed to developed as mobile android application. The design of the application will discuss in this sub-chapter

1.Overview Flow Chat



- ❖ The flow of the system should start on login or register of user. After that, a home page will be displayed, the user can select what to perform in this page.
- ❖ If user want to join a vote event, the user needs to perform a fingerprint authentication before submitting the vote.

- ❖ If the authentication is successful, the vote of user will be record and save into database. When the vote event closed, the system will calculate the vote result and generate a report.

Project Scope and Direction:

- ❖ E-voting system can save a lot of time and manpower for preparation period, user just only need to create a poll and invite voters to vote. When using e-voting system the voters no need to go anywhere to line up for voting, voter can use their smartphone to access the system for voting. Besides, the e-voting system also can get the accuracy result and statistics immediately after the voting end.
- ❖ In addition, some biometric identification can be adding into the system. For examples, fingerprint and face recognition is good method to ensure the identity of the voter. This is because biometric of everyone is different, therefore the fairness and security of voting result can be ensuring.
- ❖ In this project, the fingerprint recognition will be used for authentication. This is because the fingerprint recognition is having more wide acceptance. Since it is not costly but secure and accuracy.
- ❖ Besides, the fingerprint recognition is stable, it does not have too much requirement for input image. Therefore, the user can use it in most of the situation. Besides, the system will build as an android mobile application.
- ❖ This is because android is a mobile operating system which are open source and make developer able to build software for it. To perform the fingerprint recognition for our voting system, can easily use the function that most of the phone nowadays are having. Since the phone already having the fingerprint reader, then can use it to perform our biometric authentication.
- ❖ In conclusion, this project will be using the fingerprint recognition to ensure the voting system is secure, fairness, and frauds avoid.

1.2 Purpose

Voting is a formal decision-making process for a group. Voting is very common to use in our daily life. The decision can make by calculate voting result and follow the majority voting. Voting has existed for long time for any kind of situation. In this chapter, the detail of different voting system and biometric method will be discussed.

Type of Voting Systems

There are two type of voting system can be classified:

i.) Paper based Voting

ii.) Electronic Voting

- ❖ There are some countries that keep using paper-based voting from the beginning until now, they have not tried to change the voting system, such as Malaysia, Singapore, Indonesia.
- ❖ There are also some countries that after trying the e-voting system but reverted to paper-based voting (Lameez 2019).
- ❖ Such as Netherlands, Germany, Ireland. This is because a lot of experiments show the e-voting system is not secure and not transparent enough. But there are some countries that are still using the e-voting system.
- ❖ Such as India, Brazil, Philippines. This is because the system can help a lot on time and cost, since there are a huge number of voters, the voting process and counting process will be very difficult but can solve it easily by e-voting.

i.) Paper based Voting:

- ❖ This is a traditional voting system which has existed for a very long time. This method needs the voter to go to the voting place in specified time. During voting, the voters stand in the booth and write down their choice then put it into a ballot box.
- ❖ But a lot of disadvantages in this method (Bronack n.d.). The voter must go to the voting place and spend their time waiting in a queue for a vote.
- ❖ A lot of manpower is also needed for anytime of the voting, for preparation before voting, for identifying voters during voting, for calculating the result after voting.
- ❖ Besides, the result by this voting method will not be totally accurate for every time. This is because there are some chances of fraud and maybe some human mistakes will occur.
- ❖ In addition, the cost and the time spent is the most important problem.

ii.) Electronic Voting

- ❖ Electronic voting is also known as e-voting (Blanc 2007). E-voting is a voting method which allows voters to use electronic ways to submit their choice.
- ❖ Besides, the result of the voting can be calculated rapidly by the system. There are many types of e-voting systems. In common, there are two main types of e-voting systems that can be classified.
- ❖ First, an e-voting system which is required to go to the voting place to use the electronic device for a vote. Another one is remote e-voting through the internet which can allow voters to make their vote from any location.

2.LITERATURE SURVEY

- ❖ A literature survey or a literature review during a project report is that section that suggests the numerous analyses and studies made in the discipline of your interest and consequently the outcomes already published, thinking of the varied parameters of the project and additionally the extent of the project.
- ❖ A literature survey is the maximum substantial step in any reasonable study. Before beginning development, we need to test the preceding papers of our area in which we're operating and the idea of the look at what we're capable of expecting or generate the downside and start operating with the reference of preceding papers.
- ❖ During this phase, we briefly evaluate the associated work on the Biometric Voting System.
 1. In this paper, the writer attempted to discover the ability of biometric which can additionally increase the number of voters thereby in-corporating the problem of visiting the physical location for the purpose of voting. This system also can be audited through reducing the malfunction to trace the number of votes as the data gets stored in the database, thus making the system absolutely fair.
 2. In this paper, they considered the firebase database that allow maintaining crystal clear records of the data.
 3. This paper discusses the use of firebase for tracking data. When any elections are conducted, most often it seems to be fake and one of the main causes is corruption and the forcing of great politicians. So, if biometric is introduced here, it becomes easy to reduce the fake votes as every individual possess unique biometric i.e. fingerprint and at the same time it becomes easier to track the data stored where it is being utilised. This technology can also be utilised in the government sector and can have a major impact on the growth of a society.
 4. This system as mentioned makes use of the firebase technology helps to take care of each and every vote and action performed by the user thus helps to save the information in a very transparent way. Using this system a transparent elections can be performed by providing a complete secure, authentication and reliable system of casting and tracking of votes.
 5. In this paper, the system does verification at the every single stage till it reaches the page where the user is asked to select to party or community which they want to vote. It provides us with fingerprint authentication along with this it provides face detection which captures the individuals face and detects no face found if the face is not clear. The proposed framework thus helps in tackling all misinterpreted data and provides a secure voting system. This system will assist in

limiting the time that the individual face when they need to go to the actual place of vote.

6. In this paper, this system provides a decentralized application that provides functionalities of casting vote online. A transparent vote can be done as there would be no third-party interference.

2.1 Existing problem

The problems of the existing system include the following:

1. The biggest challenge with the technology is that no matter how much data it records but a single virus can destroy the entire data storage.
2. The highly humid area and those areas which receive frequent rainfall are not suitable for casting votes using electronic machines.
3. Fake display units could be installed in the electronic voting machines which would show manipulated numbers but originally fake votes could be generated from the back-end.
4. Electronic Voting Machines can be tampered during its manufacturing and in such case, it does not even require any hacker or malware to manipulate the actual voting.

2.2 References

- [1]. Alaguvel R., Gnanavel G., Jagadhambal K. – "Biometrics using Electronic Voting System with Embedded Security", pp. 1065, 2013.
- [2]. O.M. Olaniyan, T. Mapayi & S.A. Adejumo – "A Proposed Multiple Scan Biometric-Based System for Electronic Voting", African Journal Comp. & ICT Volume 4. No. 2. Issue 1pp. 12, 2011.
- [3]. Kashif H.M., Dileep Kumar and Syed Muhammad Usman, "Next Generation A Secure EVoting System Based On Biometric Fingerprint Method" 2011 International Conference on Information and Intelligent Computing IPCSIT vol.18 (2011) pp .26-27.
- [4]. OASIS Election & Voter Services Technical Committee – "Requirements for common data formats and standards for e-Voting", NIST Paper. 18 August 2009 (Retrieved October 10, 2014).

2.3 Problem Statement Definition

- ❖ The present voting system applicable in India is inefficient as the voters registration process is slow, the manual collection of results takes time and gives room for result manipulation, also the inaccessible nature of election venues which includes the long distances to be covered by voters to their registered location increases voters apathy towards the election process, and finally the issues of ballot snatching and damage also the other election violence and issues associated with the traditional voting all defiles the purpose of voting in election process.

- ❖ Voting is a way that make peoples nowadays to have the right for make decision. The decision of every participant will be collected, and the final decision will make through the result of the vote.
- ❖ Voting is very common in our real life from deciding the lunch with friend up to election for the leader of the country. But there is some problem and issue to the voting system, especially for the traditional voting system.

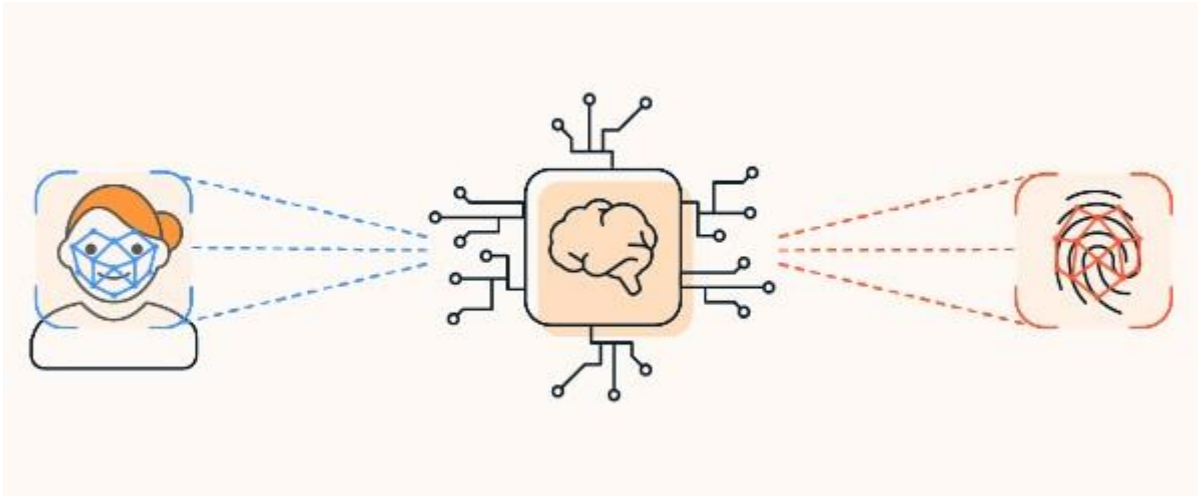
The problems of the traditional manual voting system are following:

1. **Mobility:** In traditional voting system, the voters are required go to specific location to make their vote.
 2. **Time consuming:** Besides from mobility, the voter also needs to spend the time on queueing at the vote station. In addition, a lot of time is needed to make the preparation and calculation result for voting.
 3. **Verifiability:** Voters do not know whether their votes have been counted in the result or not.
 4. **Uniqueness:** It cannot make sure that all voters only vote once in voting process.
 5. **Fairness:** Because there may have some errors will occur, such as the error when calculate the result, the error when identification the voter, some voter not able to vote, some fake voters able to vote and some voter may make multiple votes
- ❖ Besides, when these problems occur in government election for a country. That will make a big trouble to citizen and government.
 - ❖ This is because the citizen might not agree to the result which are loss of fairness and some citizens abandon to vote just because it is took a lot a time.
 - ❖ Government needs to spend a lot of time and manpower during every election. To overcome those problems, a biometric e-voting system can be solving it perfectly. The biometric identification is the most secure method to identity the voter.
 - ❖ On voting day, the voter can use the e-voting system to make their vote at anyplace and anytime. But biometric identification is required to checking the voter is qualified or not, if the voter is not qualified, the system will deny this vote.
 - ❖ Hence this system can solve those problem significantly, make the vote process become more accuracy, more secure and less time consume.

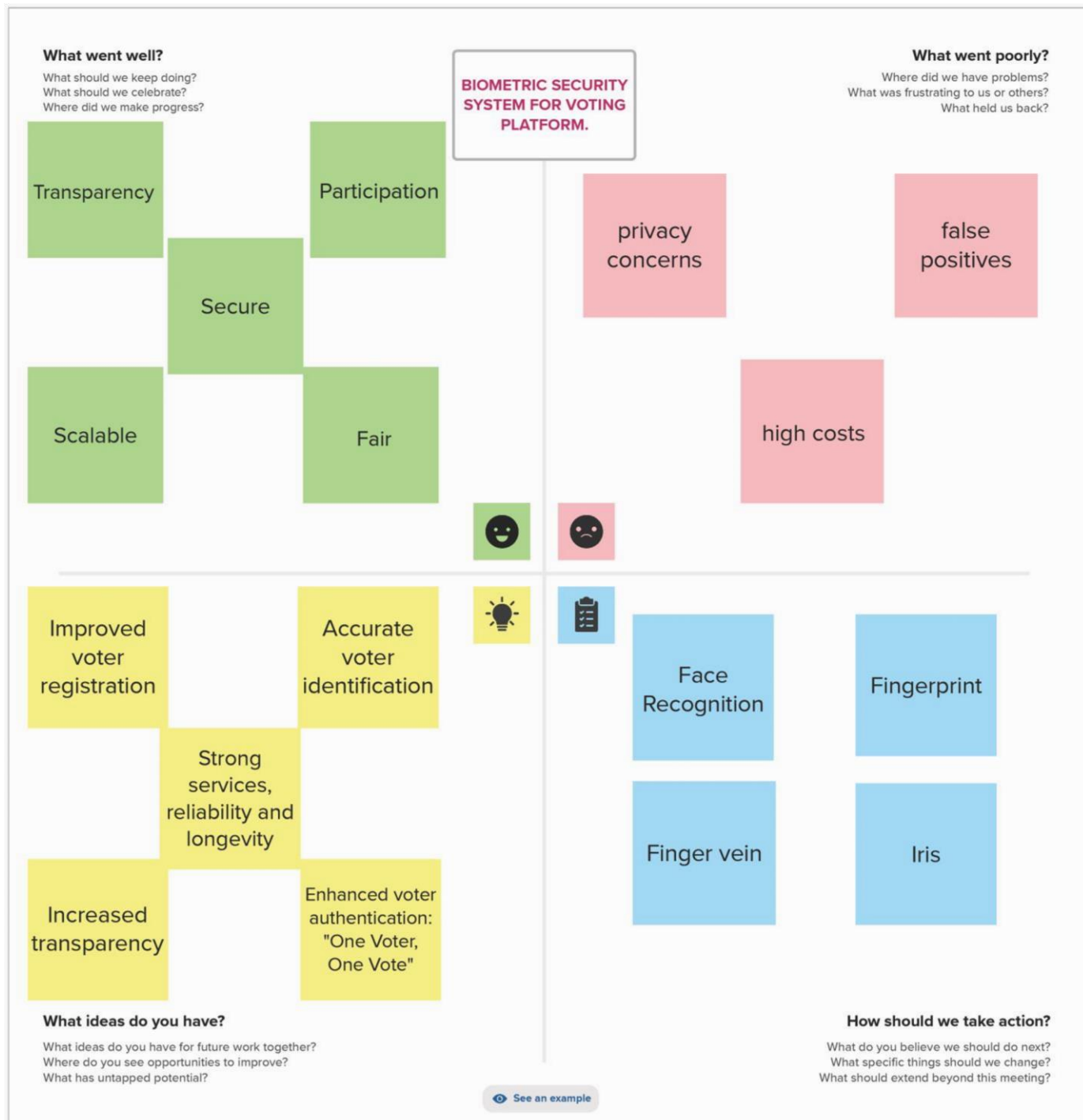
3. IDEATION & PROPOSED SOLUTION

- ❖ Biometric security is the use of biometric data for identification, access control, and authentication.

- ❖ Hardware components such as cameras or fingerprint readers collect biometric data, which is scanned and algorithmically compared to information held in a database.
- ❖ If the two sets of data match, identity is authenticated and access is granted.



3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



4. REQUIREMENT ANALYSIS

- ❖ Prior to e-Voting System design, a comprehensive and detailed set of requirements have been developed. These requirements are divided into two groups, namely, generic and system-specific. The generic requirements are those requirements that apply to any voting system [1]. The generic requirements, as shown in Figure 1, include:

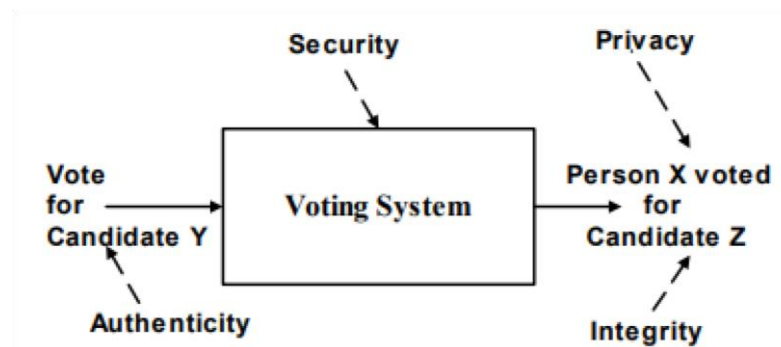


Figure : A generic set of requirements

Privacy: after casting a vote, no one should be able to link the voter to this vote;

Authenticity: only eligible voters can cast their votes;

Integrity/accuracy: once a voter cast a vote, no alternation to this vote is permitted.

Moreover, all valid votes must be counted, whereas all invalid votes must not be counted;

Security: throughout the voting process, a vote can't be tampered with;

Democracy: all eligible voters must be able to vote, one person - one vote and no one can vote more than once or vote for others.

The system-specific requirements, on the other hand, are those requirements that are specific to the electronic-voting systems. The system-specific requirements include:

Multi-user: a number of voters can vote simultaneously;

Multi-campaign: a number of elections can be running simultaneously;

Accessibility: the system can be accessed by voters from any location using secure Internet and/or mobile devices;

Availability: the system must have high-availability during an election campaign.

4.1 Functional Requirements

- ❖ **Mobility:** The voter should not be restricted to cast his ballot at a single poll-site at his home precinct.
 - **Realistic:** He shall be able to vote from any poll-site within the nation.
 - **Unrealistic/Expensive:** He shall be able to vote from any county-controlled kiosk (situated at public places such as banks, shopping malls, etc.) within the nation. (Unrealistic because of logistical and cost issues).
 - **Infeasible:** He shall be able to vote from virtually anywhere using an Internet connection. (Infeasible both for technical security issues as well as social science issues).
- ❖ **Convenience:** The system shall allow the voters to cast their votes quickly, in one session, and should not require many special skills or intimidate the voter (to ensure Equality of Access to Voters).
- ❖ **User-Interface:** The system shall provide an easy-to-use user-interface. Also, it shall not disadvantage any candidate while displaying the choices (e.g., by requiring the user to scroll down to see the last few choices).
- ❖ **Transparency:** Voters should be able to possess a general knowledge and understanding of the voting process.
- ❖ **Flexibility:** The system shall be flexible in that it allows a variety of ballot question formats including open-ended questions (e.g. Write-in candidates and survey questions).
- ❖ **Support for Disabled Voters:** The system shall cater to the needs of physically challenged voters (e.g. blind voters).
- ❖ **Accuracy:** The system shall record and count all the votes and shall do so correctly.
- ❖ **Eligibility:** Only authorized voters, who are registered, should be able to vote.
- ❖ **Uniqueness:** No voter should be able to vote more than once.
- ❖ **Auditability:** It should be possible to verify that all votes have been correctly accounted for in the final election tally, and there should be reliable and demonstrably authentic

election records, in terms of physical, permanent audit trail (which should not reveal the user's identity in any manner).

- ❖ **Voter Confirmation:** The voter shall be able to confirm clearly how his vote is being cast, and shall be given a chance to modify his vote before he commits it.
- ❖ **To issue Receipt or not?**
- ❖ The system may issue a receipt to the voter if and only if it can be ensured that vote coercion and vote-selling are prevented, so that he may verify his vote at any time and also contend, if necessary.
- ❖ **No Over-voting:** The voter shall be prevented from choosing more than one candidate / answer.
- ❖ **Under-voting:** The voter may receive a warning of not voting, but the system must not prevent undervoting.
- ❖ **Provisional Ballots:** The voter shall be able to vote with a provisional (electronic) ballot if he has some registration problems, which could be counted if verified by the authorities later.
- ❖ **Documentation and Assurance:** The design, implementation, and testing procedures must be well documented so that the voter-confidence in the election process is ensured.
- ❖ **Cost-effectiveness:** Election systems should be affordable and efficient.

4.2 Non-Functional requirements

This model categorises system and software product quality properties into eight characteristics:

❖ **Functional suitability**

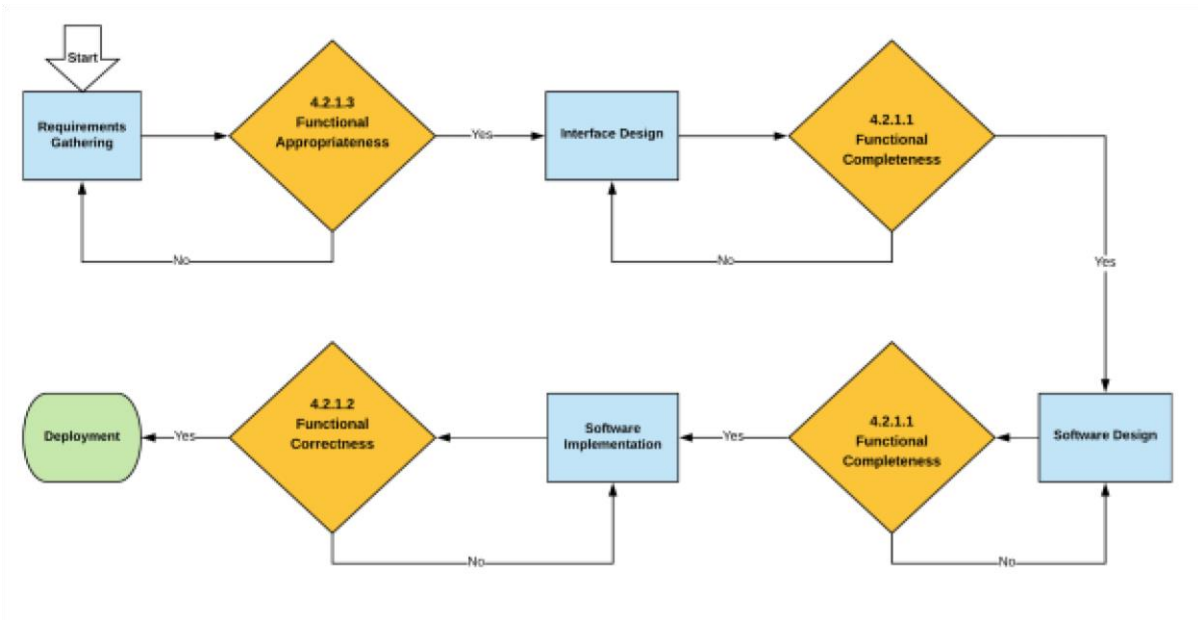
Two distinct interface types against which to assess functional suitability:

- APIs
- GUIs

In both instances functional completeness should be established following an appropriate requirements gathering exercise.

The requirements gathering phase should consider:
For APIs, the services required of the component implementing the API by other components in the system.

- For APIs, the requirements of potential external users (grouped by those who share user stories e.g. system integration) who may have interest in integrating with the system and engaging them in discussion to elicit their requirements
- For GUIs, a cohort representing a broad range of potential users should be identified and their common requirements established.



❖ Performance efficiency

The environment in which the IATI Core Software operates offers a set of performance challenges which, if not unique, are very different from other fields; eCommerce, for example, or high-traffic media. We will not be numbering our users in the millions per month, nor hundreds nor even tens of thousands. However, each IATI user is of high importance, and many will be reliant on a robust and consistent performance from the core technologies.

I. Time Behaviour

II. Resource Utilisation

III. Capacity

❖ Compatibility

Compatibility between components is a key predicate of the microservices architecture as proposed in the IATI Technical Stocktake. Each component must provide interfaces allowing the full range of functionality required of it by all other components in the system

I. Co-existence

II. Interoperability

❖ Usability

This defines the degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. This should be adapted per component and the definitions here used as a guide to aid development when functional requirements have been established. Usability should be assessed at the Interface Design stage.

- I. Appropriateness Recognisability
- II. Learnability III. Operability
- IV. User Error Protection
- V. User Interface Aesthetics
- VI. Accessibility

❖ Reliability

Reliability is the degree to which a system or component performs its specified functions under specified conditions for a specified period of time.

- I. Maturity
- II. Availability
- III. Fault Tolerance
- IV. Recoverability

❖ Security

Security concerns the degree to which a component or system protects information and data so that persons or other components or systems have the degree of data access appropriate to their types and levels of authorisation.

- I. Confidentiality
- II. Integrity

- III. Non-repudiation
- IV. Accountability
- V. Authenticity

❖ **Maintainability**

It should be assumed that any given component in the IATI Core Software will have a long period of service. Every effort should be made to ensure the ease of maintainability of each component, considering both potential changes in the environment in which it operates and potential changes in the requirements of the functionality it offers.

- I. Modularity
- II. Reusability
- III. Analysability
- IV. Modifiability
- V. Testability

❖ **Portability**

Portability concerns the degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another.

- I. Adaptability
- II. Installability
- III. Replaceability

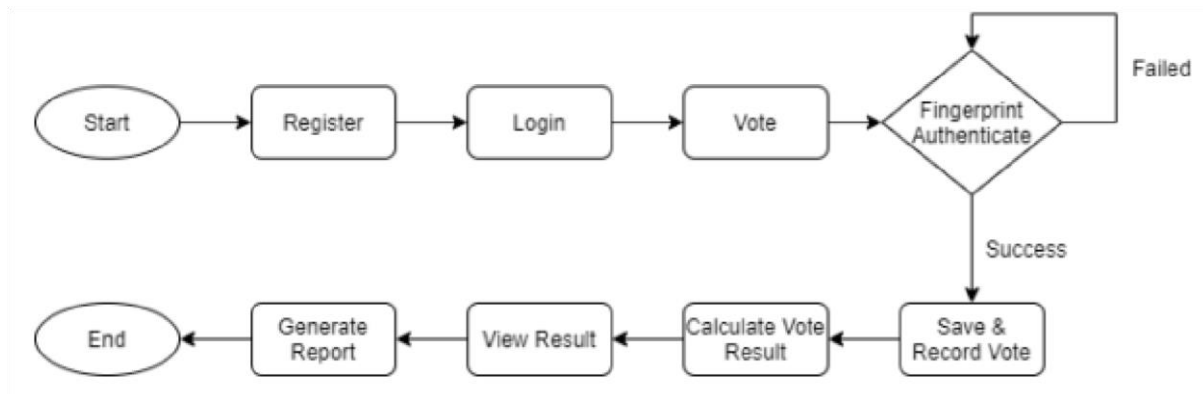
5. PROJECT DESIGN

The fingerprint e-voting system will be designed for this project. The system is planned and designed to developed as mobile android application. The design of the application will discuss in this sub-chapter.

5.1 Data Flow Diagrams & User Stories

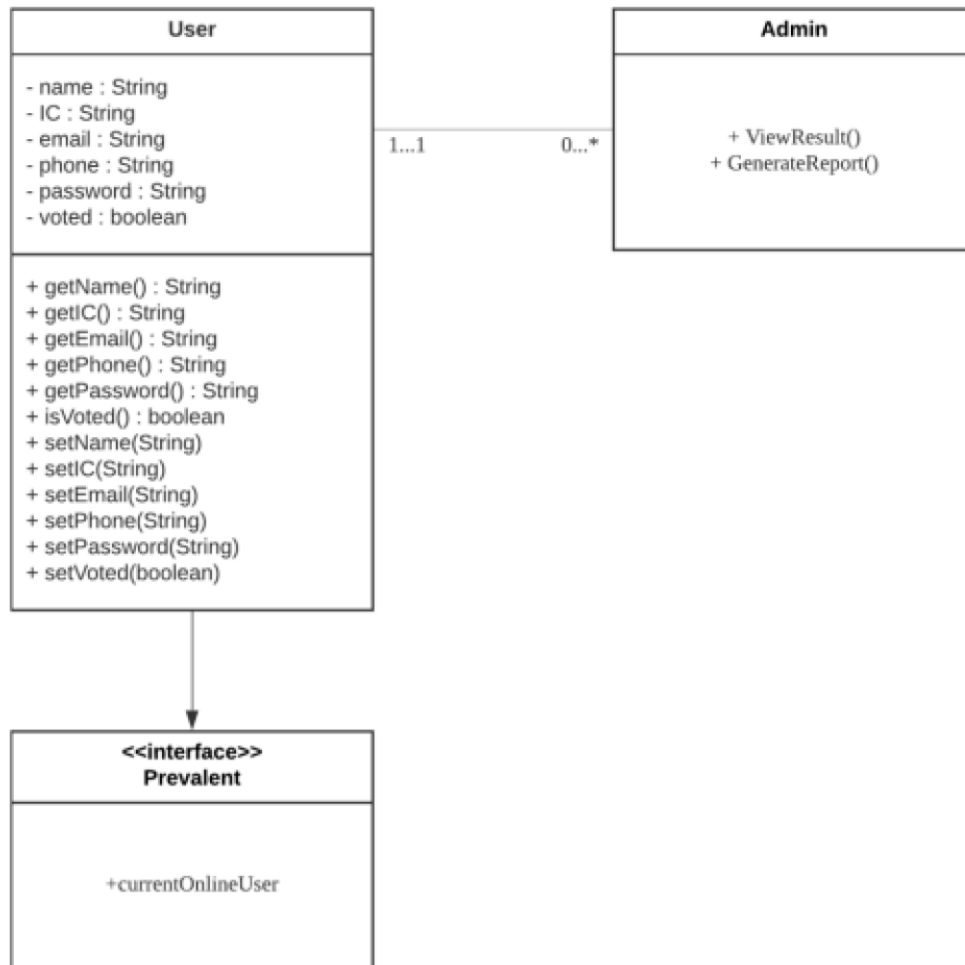
The flow of the system should start on login or register of user. After that, a home page will be displayed, the user can select what to perform in this page. If user want to join a vote event, the user needs to perform a fingerprint authentication before submitting the vote. If the authentication is successful, the vote of user will be record and save into database. When the vote event closed, the system will calculate the vote result and generate a report.

Project Overview Flowchat :

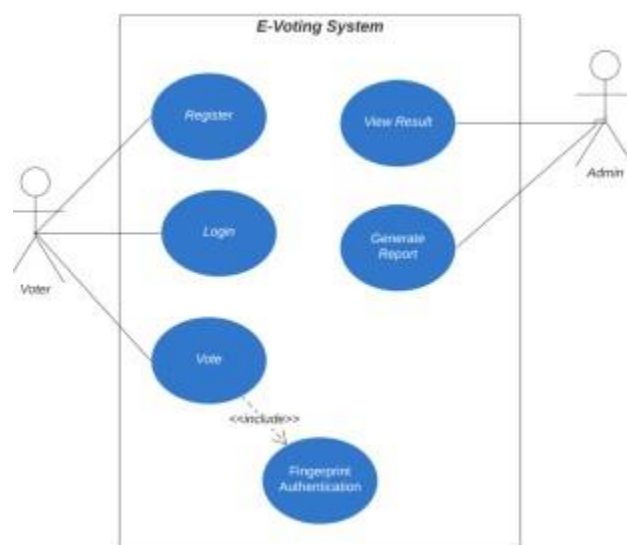


Class Diagram :

The main class of this system is User class, it has all important information of user. The database will store that information such as user data and vote result.

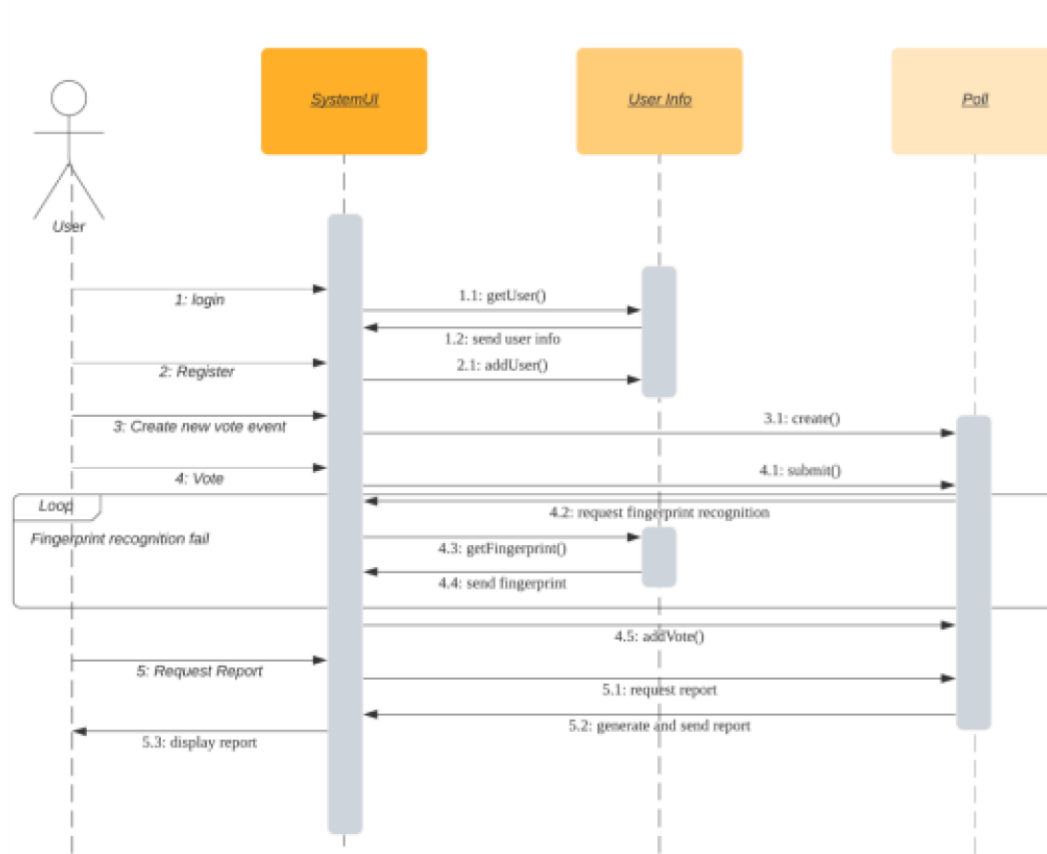


Use Case Diagram :



There are some functions and modules which are designed for this system. The user is able to perform all of the function, but there is some perform are need fingerprint recognition.

Sequence Diagram :



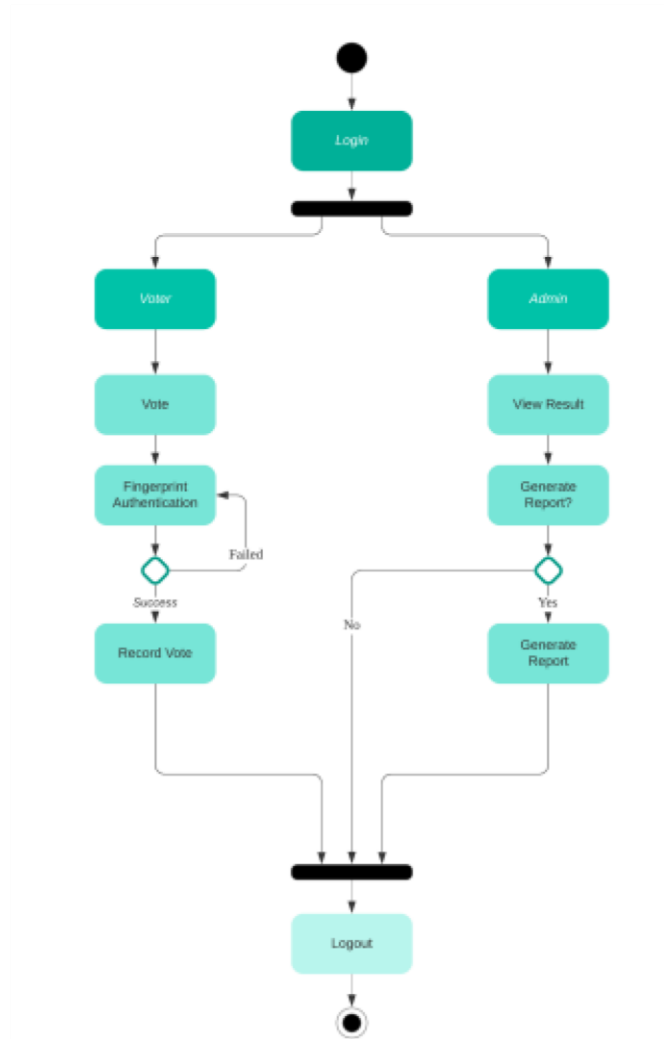
The user interacts with the system UI, then the system UI will interact with database to get or update the database information. After that, report back or display to the user.

Activity Diagram :

After login, system will detect it is voter or admin.

The voter able to make their vote and verify by fingerprint authentication, the vote only recorded when fingerprint authentication is successful.

The admin able to view the vote result and can choose either generate report or not.

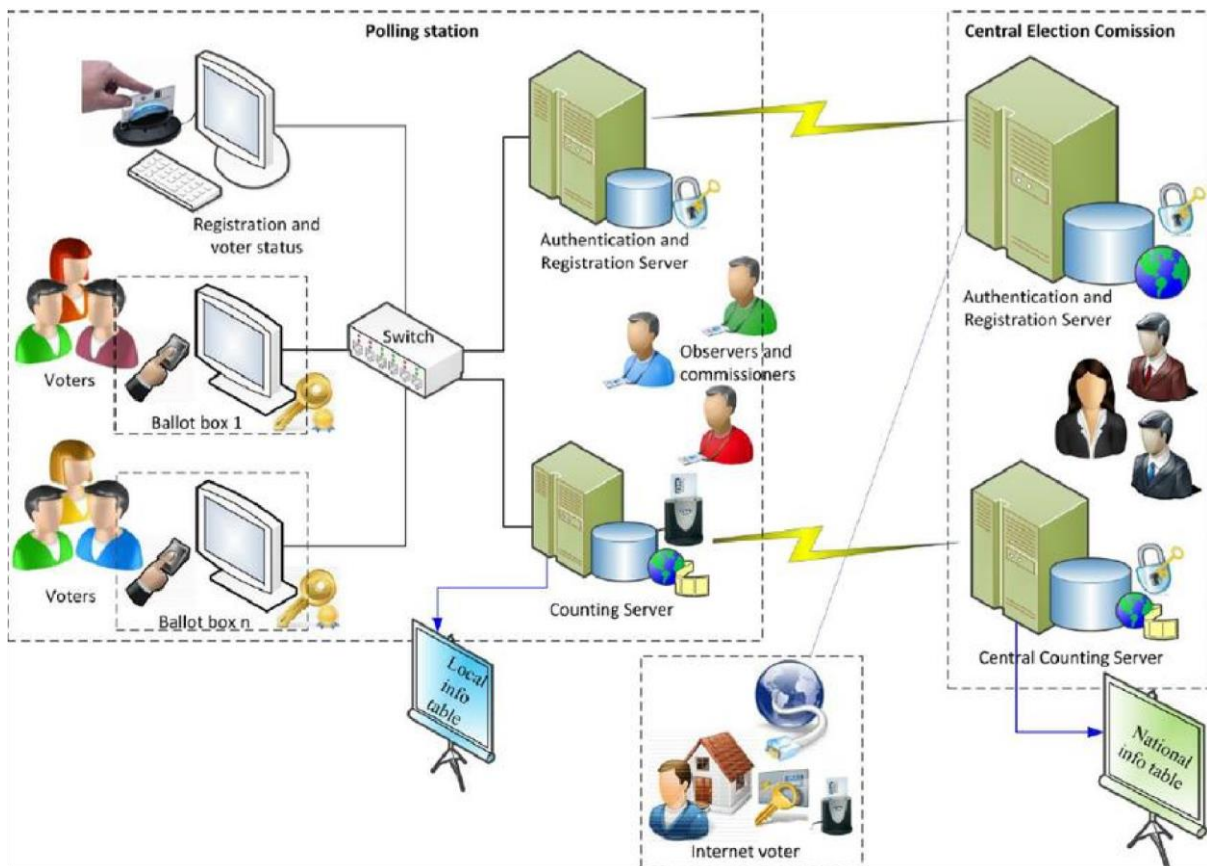


Uses Stories :

- User shall read and understand the vote title and option.
- User shall make a choice for the vote.
- User shall use fingerprint to authenticate.
- ❖ The functional requirement of this project will be the system need to provide basic function of voting system such as create voting event, vote, calculate result, show result.
- ❖ Moreover, the system shall be able to authenticate the user identity when user try to login and fingerprint biometric authentication when submitting vote.
- ❖ In addition, the user's phone number is required when register, after that the system should send a one-time code to user's phone by SMS message.

- ❖ The non-functional requirement of this system will be the security of the system and the fairness of voting should be secure.
- ❖ The system of this project will be using biometric to achieve it. Besides, the mobility is also one of the non-functional requirements of this project.
- ❖ This is because the system needs to provide user to use it anywhere and anytime. Not only that, but the system should also have good performance to perform any function with only using low usage.
- ❖ This can make the application can run on more devices.

5.2 Solution Architecture



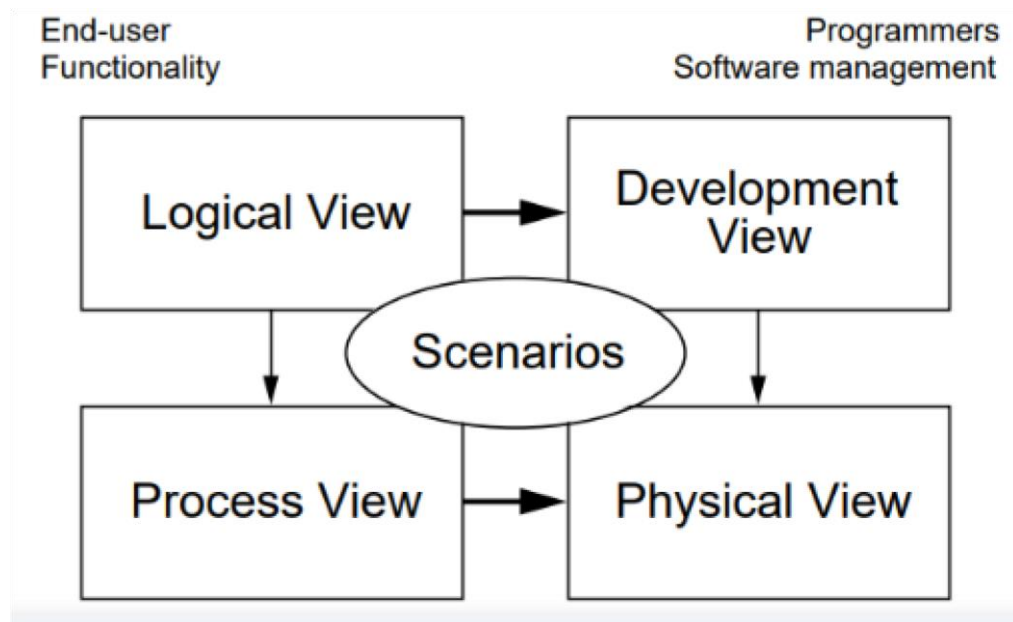
6. PROJECT PLANNING & SCHEDULING

- ❖ System planning is a very important part to start every project, especially development a new software system. In the planning phase of a project, the project will be evaluated. The goal, outcome and requirements of the system will be identified. This can make the project member have a basic understanding about system and user requirements.
- ❖ Besides, the project management also a part of planning phase. The work plan and project schedule will be decided. To ensure project member can work effectively with

the plan. Therefore, system planning should clearly define the scope and purpose of the project to make sure the project can work smoothly.

- ❖ In this project, a new fingerprint e-voting system is planned to be developed. For the system, it should be able to perform basic voting function with biometric authentication. In addition, the system will develop as a mobile android application to make user can use it anytime and anywhere.

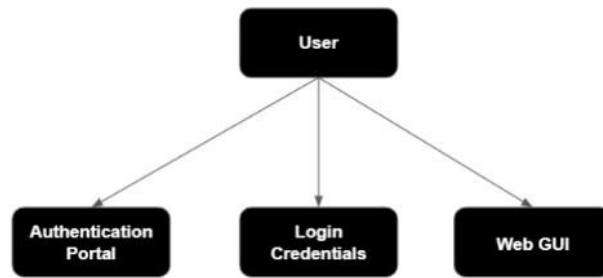
6.1 Technical Architecture



- ❖ It describes the system from different viewpoints like developers, engineers, project managers or stakeholders.
- ❖ These 4 views are logical, process, development and physical. The +1 view represents the scenarios view, which is the model's centre.

Logical View: The logical view is concerned with the system's functionality to end-users.

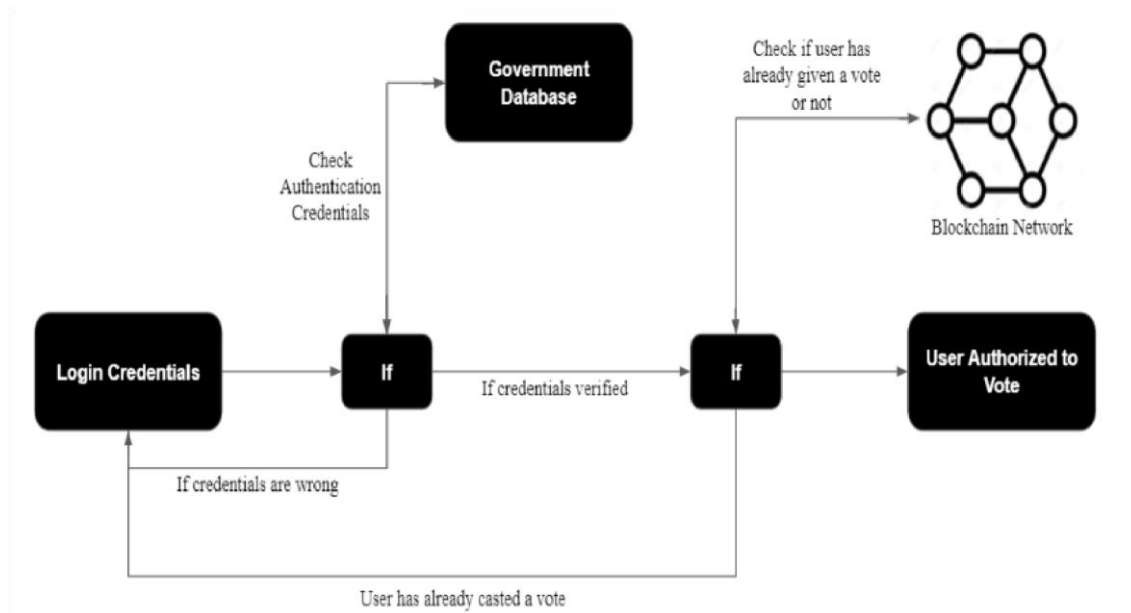
Logical View



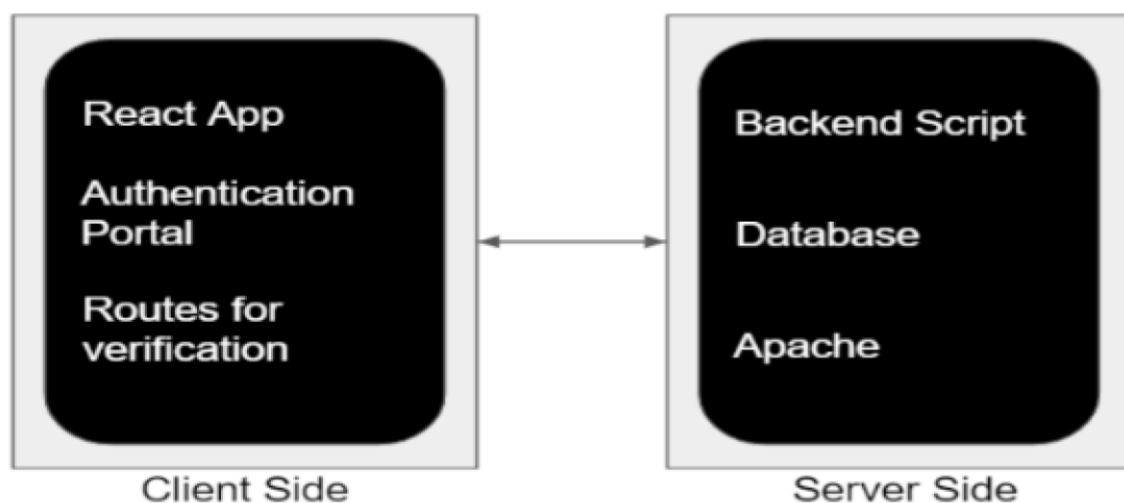
Development View: The process perspective is concerned with the dynamic features of the system, describes the system processes and how they communicate, and focuses on the system's run-time behaviour. Concurrency, distribution, integrator, performance, scalability, and other issues are addressed from the process perspective.

Teams	1st Week	2nd Week	3rd Week	4th Week
Front End Designers	Design the UI of Authentication Panel	Write the code for to take the login credentials input from the user	Fix the bugs	Try to update
Database Managers	Design the Schema	Code the schema	Try to fixing the bugs	Do the required updates
Backend Designers	Design the logic of authentication.	Code the logic of the backend	Secure the routes	Work on updates
Testers	NIL	NIL	Test the code	Suggest updates/bugs to the other team

Process View: The development view depicts a system from a programmer's standpoint and is concerned with software management. It is often referred to as the implementation perspective.



Physical View: The physical view (also known as the deployment view) illustrates the system from the perspective of a system engineer. It is concerned with the physical layer structure of software components and the physical connections between these components.



Scenario View: A limited selection of use cases, or scenarios, are used to explain the architecture description, which becomes the fifth view. The scenarios represent interaction sequences between objects and processes. They are used to identify architectural aspects and depict and assess architectural designs. They also serve as a starting point.

6.2 Sprint Planning & Estimation

Register/ Login :

All user needs to register an account with real information, a validation will be done to confirm the identity of user and OTP code is required. After this, the system will store the user information. Every user needs to login with own account. Besides, the fingerprint of user also needs to register into the system.

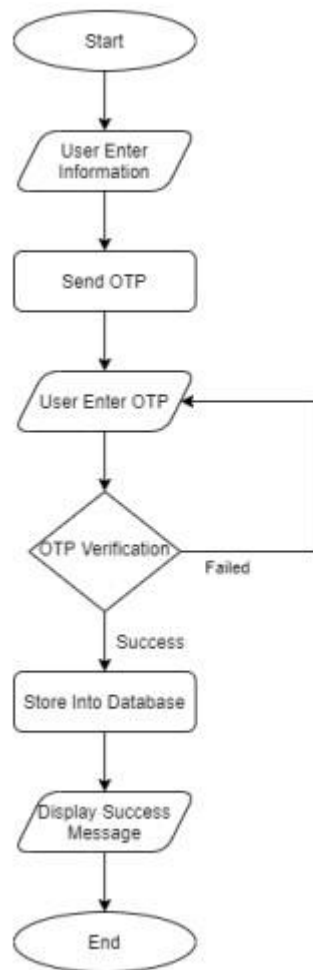


Figure : Register Flowchart

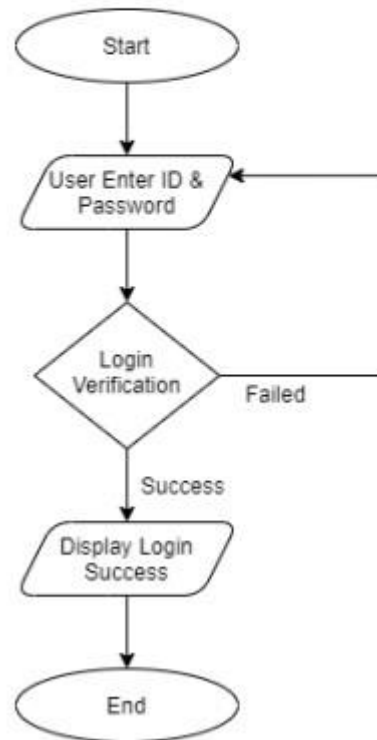


Figure : Login Flowchart

Vote :

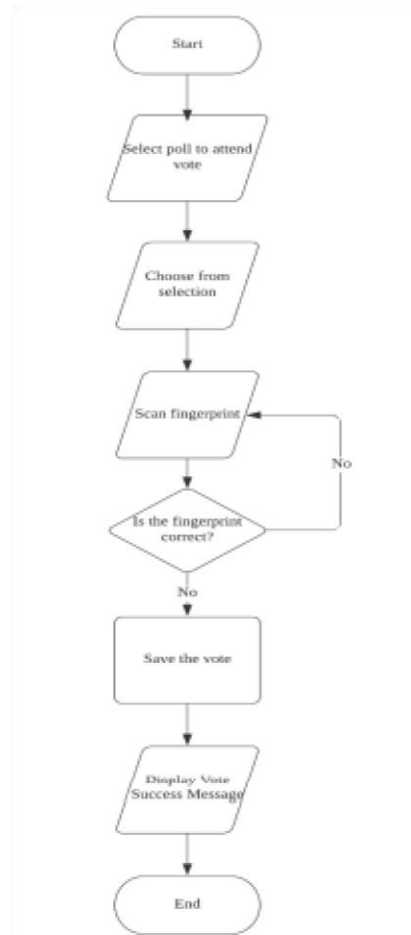


Figure : Vote Flowchart

For the user to join vote, user need to select their choice and submit the vote. Afterward, the system will ask for fingerprint verification.

Authenticate :

- ❖ The system will request user fingerprint to perform a fingerprint recognition for authenticate the identity of the user.
- ❖ This can make sure no fraud occurs. If user fail the fingerprint recognition, the system will loop back and ask user to scan fingerprint again.

Paper Title	Author's Name, Years	Technique Used	Advantage	Disadvantage
Mobile Voting Using Finger Print Authentication	Jumb, Martin, Figer & Rebello 2015	OTP, Minutiae Algorithm	Inexpensive, Less time consuming, Wide acceptance, Better secure	Cannot recognize poor quality fingerprint images
Secured E-voting System Using Two-factor Biometric Authentication	Komatineni & Lingala n.d.	Eigen face recognition algorithm, Minutiae algorithm	Two choices for authentication, Less time consuming	High cost, more data to store
E-Voting System Using Visual Cryptography & Secure Multi-party Computation	Naidu, Kharat, Teckade, Mendhe & Magade n.d.	Secret sharing algorithm, Minutia extraction	More secure	Unavailable when one share of data lost.



Figure : Fingerprint Verification

6.3 Sprint Delivery Schedule

Calculate Vote Result :

After the voting process is closed, the system will calculate the result of the vote. System will only calculate those votes which are record and save into database.

View Result :

After user select which poll to view the result, the system will get the result from real time database and display to user.

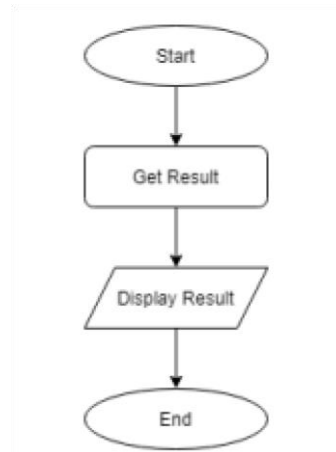


Figure : View Result Flowchart

7.CODING & SOLUTIONING

7.1 Feature 1

Step-1 : Open views.py file and write down the code given below.

```
from django.template import loader from django.http import
HttpResponse, HttpResponseRedirect from django.shortcuts
import get_object_or_404, render from django.urls import
reverse from .models import Question, Choice

# Get questions and display them def
index(request):

latest_question_list =
Question.objects.order_by('pub_date
')[ :5]
```

```

        context = {'latest_question_list': latest_question_list}

        return render(request, 'polls / index.html', context)

# Show specific question and choices
def detail(request, question_id):
    try:

        question = Question.objects.get(pk = question_id)

    except Question.DoesNotExist:

        raise Http404("Question does not exist")    return
render(request, 'polls / detail.html', {'question':
question})

# Get question and display results def results(request,
question_id):    question = get_object_or_404(Question, pk =
question_id)    return render(request, 'polls / results.html',
{'question':
question})

# Vote for a question choice def
vote(request, question_id): #
print(request.POST['choice'])

    question = get_object_or_404(Question, pk = question_id)

    try:        selected_choice =
question.choice_set.get(pk = request.POST['choice'])

    except (KeyError, Choice.DoesNotExist):
        # Redisplay the question voting form.

        return render(request, 'polls / detail.html', {

```

```

        'question': question,

        'error_message': "You didn't select a choice.",

    })

    else:

        selected_choice.votes += 1

        selected_choice.save()

        # Always return an HttpResponseRedirect after successfully
        # dealing
        # with POST data. This prevents data from being posted twice
        if a

        # user hits the Back button.

        return

    HttpResponseRedirect(reverse('polls:results', args
    =(question.id, )))

```

Step-2: Create a file `urls.py` inside the `pollster->polls` folder to define the routing for all the methods we have implemented in `views.py` file (don't get confused with the file inside the `pollster->pollster->urls.py` file). Below is the code of `urls.py` file.

```

from django.urls import path
from . import views

app_name = 'polls'
urlpatterns = [
    path('', views.index, name='index'),
    path('<int:question_id>/', views.detail, name='detail'),
    path('<int:question_id>/results/', views.results, name='results'),
    path('<int:question_id>/vote/', views.vote, name='vote'),
]

```

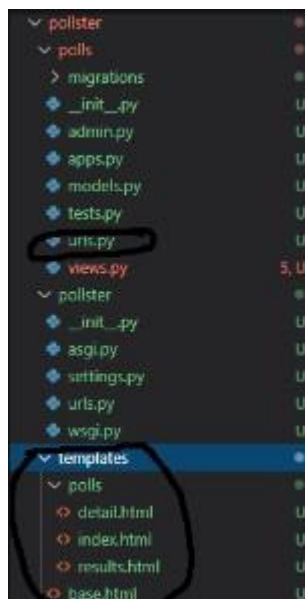
7.2 Feature 2

Create Templates

Step-1: Follow the steps given below to create the front layout of the page.

- Create a folder 'templates' in top-level pollster folder (alongside of polls and pollster) i.e. pollster-> templates.
- Create 'base.html' file inside the template folder. We will define the head, body and navigation bar of our application in this file.
- In the 'templates' folder create another folder 'polls'. In 'polls' folder create three files 'index.html', 'results.html' and 'detail.html'.

The folder structure will look like the image given below (we have highlighted the files which we have created in 'create views i.e urls.py' and 'create template' section)...



Step-2: By default Django will search the 'template' inside the 'polls' app but we have created a global 'template' folder which is outside the polls app. So in order to make it work, we need to define the 'template' folder path inside the settings.py file. Open **settings.py** file and add the code given below in the list 'TEMPLATES'. In order to make the given code work add

"import os" in settings.py.

```

TEMPLATES = [
    {
        # make changes in DIRS[0].
        'BACKEND': 'django.template.backends.django.DjangoTemplates',
        'DIRS': [os.path.join(BASE_DIR, 'templates')],
        'APP_DIRS': True,
        'OPTIONS': {
            'context_processors': [
                'django.template.context_processors.debug',
                'django.template.context_processors.request',
                'django.contrib.auth.context_processors.auth',
                'django.contrib.messages.context_processors.messages',
            ],
        },
    },
]

```

Step-3: Open index.html file and write the code given below. This file will display the list of questions which are stored in our database. Also, two buttons will be displayed to the user. One for the voting (we will create a detail.html file for voting) and the other one is to check the results (we will create results.html file for results).

```
{% extends 'base.html' %}
```

```
{% block content %}
```

```
<h1 class="text-center mb-3">Poll Questions</h1>
```

```
{% if latest_question_list %}
```

```
{% for question in latest_question_list %}
```

```
<div class="card-mb-3">
```

```
    <div class="card-body">
```

```
        <p class="lead">{{ question.question_text }}</p>
```

```
        <a href="{% url 'polls:detail' question.id %}" class="btn btn-primary btn-sm">Vote Now</a>
```



```

        <a href="{% url 'polls:results' question.id %}" class="btn btnsecondary
btn-sm">Results</a>

    </div>

</div>

{% endfor %}

{% else %}

<p>No polls available</p>

{% endif %}

{% endblock %}

```

Step-4: Open detail.html file and write the code given below. This file will be responsible for voting on specific questions. Whatever question a user will select for voting from the list of the question (index.html file), that specific question and the choices for the question will be displayed on this page. A user will be allowed to select one choice and give voting by clicking

on the vote button.

```

{% extends 'base.html' %}

{% block content %}

<a class="btn btn-secondary btn-sm mb-3" href="{% url 'polls:index' %}">Back To Polls</a>

<h1 class="text-center mb-3">{{ question.question_text }}</h1>

{% if error_message %}

<p class="alert alert-danger">

    <strong>{{ error_message }}</strong>

</p>

```

```

{% endif %}

<form action="{% url 'polls:vote' question.id %}" method="post">

    {% csrf_token %}
    {% for choice in question.choice_set.all %}

        <div class="form-check">

            <input type="radio" name="choice" class="form-check-input" id="choice{{
forloop.counter }}"

                value="{{ choice.id }}" />

            <label for="choice{{ forloop.counter }}">{{ choice.choice_text }}</label>

        </div>

    {% endfor %}

    <input type="submit" value="Vote" class="btn btn-success btn-lg btn-block mt-4" />

</form>

{% endblock %}

```

Step-5: Open **results.html** file and write the code given below. This file will display the result of total votes on a specific question whatever question the user will select (from the index.html file) to check the result.

```

{% extends 'base.html' %}

{% block content %}

<h1 class="mb-5 text-center">{{ question.question_text }}</h1>

<ul class="list-group mb-5">

    {% for choice in question.choice_set.all %}

```

```

<li class="list-group-item">

    {{ choice.choice_text }} <span class="badge badge-success float-right">{{
choice.votes }}

    vote{{ choice.votes | pluralize }}</span>

</li>
{% endfor %}

</ul>

<a class="btn btn-secondary" href="{% url 'polls:index' %}">Back To Polls</a>

<a class="btn btn-dark" href="{% url 'polls:detail' question.id %}">Vote again?</a>

{% endblock %}

```

Step-6: Let's create the navigation bar for our application. Create a folder 'partials' inside the folder 'templates' and then create a file '_navbar.html' inside the 'partial' folder. File structure will be templates->partials->_navbar.html. Write the code given below in this file.

```

<nav class="navbar navbar-dark bg-primary mb-4">
  <div class="container">
    <a class="navbar-brand" href="/">Pollster</a>
  </div>
</nav>

```

Step-7: We haven't included the head and body tag in every single HTML file we have created till now. We can write these codes in just one single file base.html and we can give the layout to our page. We will also bring our navigation bar(_navbar.html file) on this page.

So open base.html file inside the 'template' folder and write down the code given below.

```

<!DOCTYPE html>

<html lang="en">

<head>

```

```

<link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.4.1/css/bootstrap.min.css"

integrity="sha384-
Vkoo8x4CGsO3+Hhvx8T/Q5PaXtkKtu6ug5TOeNV6gBiFeWPGFN9MuhOf23Q9Ifjh"
crossorigin="anonymous">

<title>Pollster {% block title %}{% endblock %}</title>

</head>
<body>

<!--NavBar-->

{% include 'partials/_navbar.html'%}

<div class="container">

    <div class="row">

        <div class=".col-md-6 m-auto">

            {% block content %}{% endblock %}

        </div>

    </div>

</div>

</body>

</html>

```

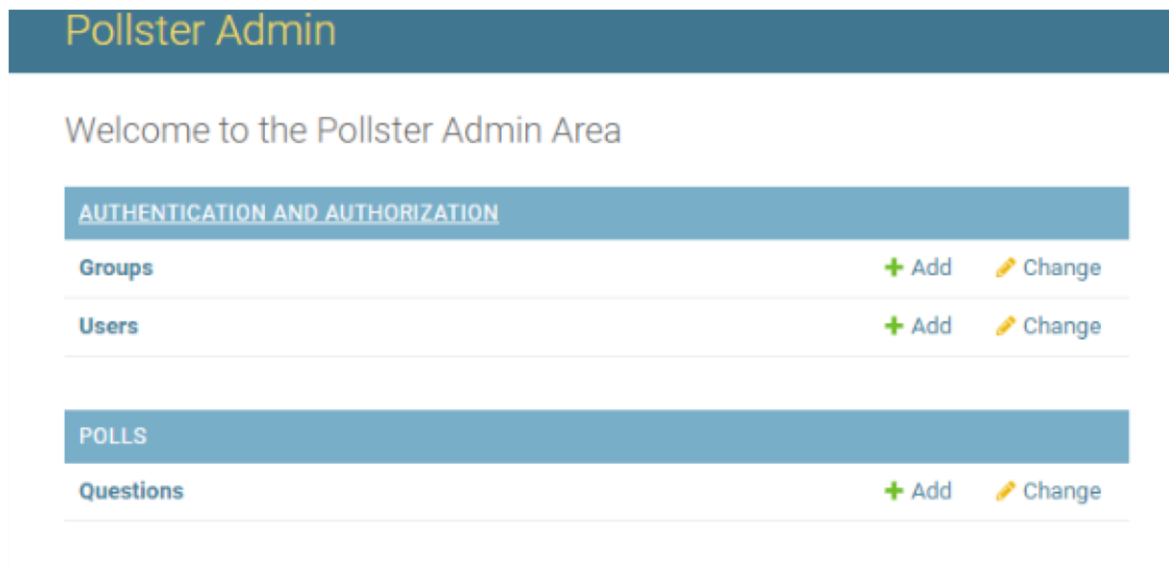
7.3 Database Schema (if Applicable)

Admin Frontend

Step-1: Run the server using the command `python manage.py runserver` and browse the URL `http://127.0.0.1:8000/admin/`. Now enter the username and password to login into the system.

A screenshot of the Pollster Admin login interface. It features a dark blue header with the text 'Pollster Admin'. Below the header, there are two input fields: 'Username:' with the value 'geeks123' and 'Password:' with masked characters '.....'. A blue 'Log in' button is positioned below the password field.

Step-2: Click on 'add' button next to the 'Questions'.

A screenshot of the Pollster Admin dashboard. The header is dark blue with 'Pollster Admin' in yellow. Below the header, it says 'Welcome to the Pollster Admin Area'. There are two main sections: 'AUTHENTICATION AND AUTHORIZATION' and 'POLLS'. The 'AUTHENTICATION AND AUTHORIZATION' section has two rows: 'Groups' and 'Users', each with a green '+ Add' button and a yellow pencil 'Change' button. The 'POLLS' section has one row: 'Questions', also with a green '+ Add' button and a yellow pencil 'Change' button.

Step-3: Now add question and choices for those questions. Also, mention the date and time and then click on the 'save' button. You can add as many questions as you want. You will see a list of questions added in the database.

Home | Polls | Questions | Add question

Add question

Question text:

Date information (Show)

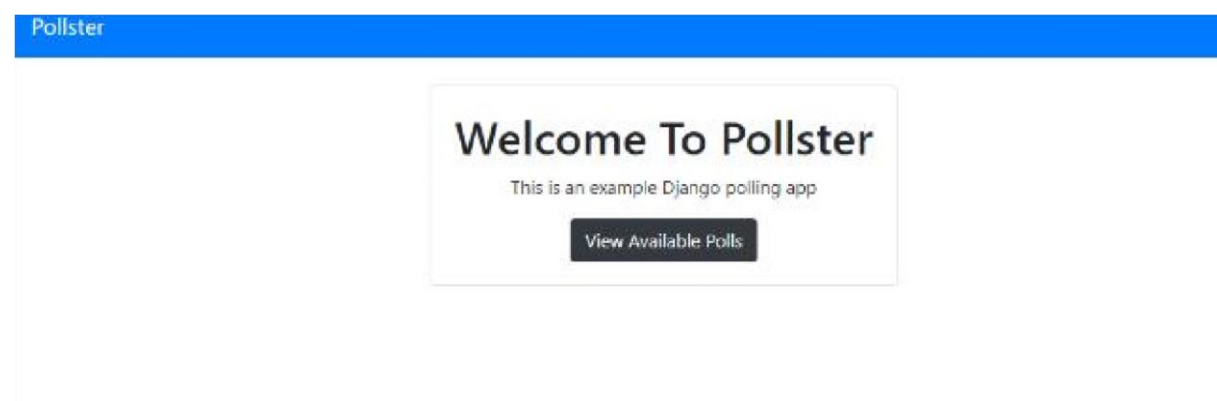
CHOICES		
CHOICE TEXT	VOTES	DELETE?
<input type="text" value="React"/>	<input type="text" value="0"/>	
<input type="text" value="Angular"/>	<input type="text" value="0"/>	
<input type="text" value="Vue"/>	<input type="text" value="0"/>	
<input type="text" value="Meteor"/>	<input type="text" value="0"/>	

[+ Add another Choice](#)

[Save and add another](#) [Save and continue editing](#) [SAVE](#)

User Frontend

Step-1: Browse the URL <http://127.0.0.1:8000/> and you will see the landing page of the application. Click on the “View Available Polls”.



Step-2: You will see list of questions with two options ‘Vote Now’ and ‘Results’. From here you need to select one question and click on the ‘Vote Now’ button.

Poll Questions

What is Your Favourite Python Framework?

[Vote Now](#)[Results](#)

What is Your Favourite JavaScript Framework or Library?

[Vote Now](#)[Results](#)

Step-3: Once this is done select any one choice and click on 'Vote' button. You can also go to the previous menu using the 'Back to Polls' button on the top.

[Back to Polls](#)

What is Your Favourite JavaScript Framework or Library?

- ☐ React
- ☒ Angular
- ☐ Vue
- ☐ Meteor

[Vote](#)

- You will see the total voting result for the question you have selected.

What is Your Favourite JavaScript Framework or Library?

React	0 votes
Angular	1 vote
Vue	0 votes
Meteor	0 votes

[Back to Polls](#)[Vote again?](#)

- You can also check the total votes for any question using the option 'Results' from the 'Poll Questions' page.

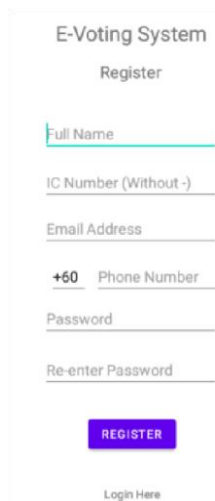
8. PERFORMANCE TESTING

User :

i. Register

- This is the first step to do when the user wants to register as a voter. The user needs to provide real information, the admin will make a validation for the information of voter. Only validated voter is able to vote. Besides, the system will be based on the IC number to prevent duplicate register of the user.

Figure : **Register Page**



The screenshot shows a web form titled "E-Voting System" with a subtitle "Register". The form contains several input fields: "Full Name", "IC Number (Without -)", "Email Address", a phone number field with a "+60" prefix and "Phone Number" label, "Password", and "Re-enter Password". Below these fields is a blue "REGISTER" button. At the bottom of the form, there is a link that says "Login Here".

ii. OTP :

- After key in all information and click the register button, the system will come to this page. The system will send an OTP verification code to user phone, to make sure the phone number is correct, and the person register is really own the phone number.

Phone Verification

+60197310489

SUBMIT

Figure : OTP Page

iii. Upload Image :

- User needs to upload their IC picture and a selfie picture with taking IC.

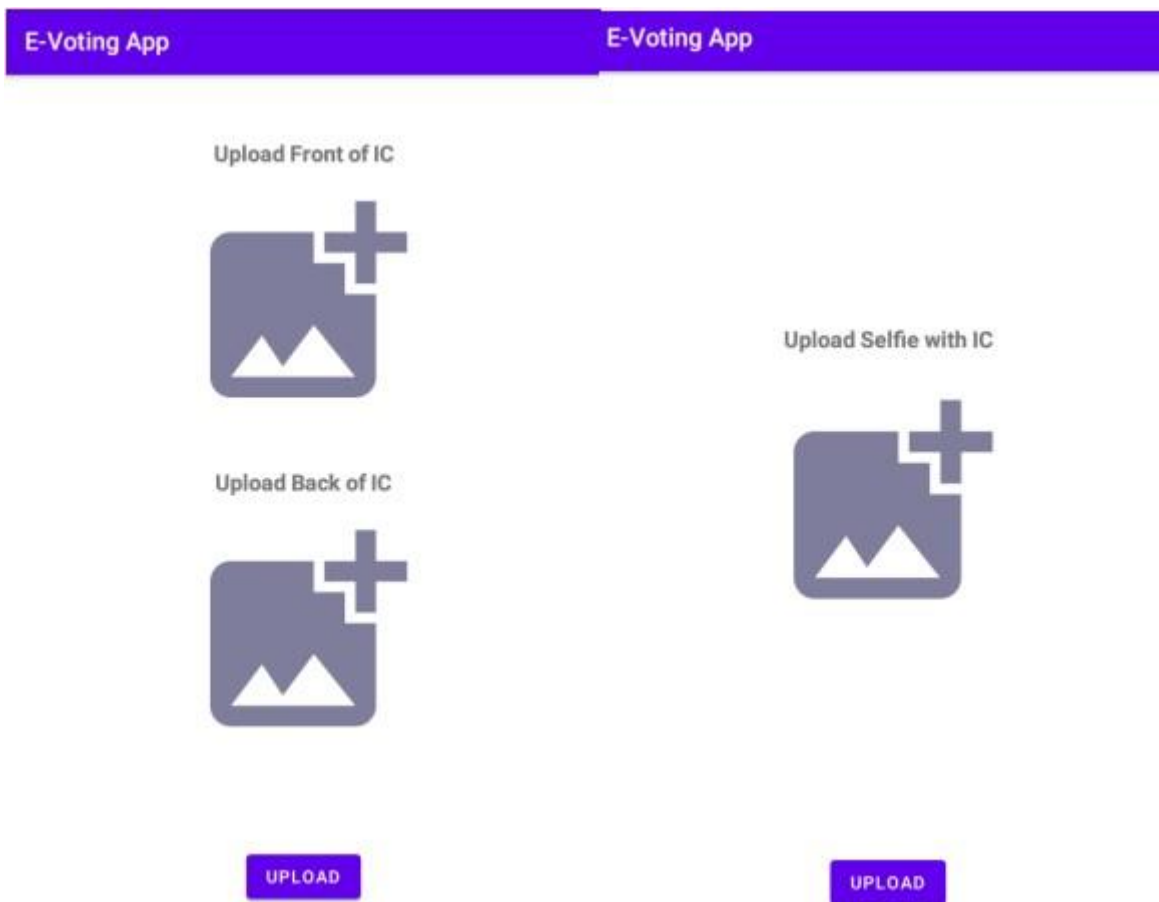


Figure : Upload IC Page

Figure : Upload Selfie Page

iv. Token :

- After the user key in the correct OTP verification code. The system will generate a random string Token for user.
- Users need to remember the token and record down.
- After user click confirm, the system will ask user to re-enter the token to make sure the user is memories correctly.

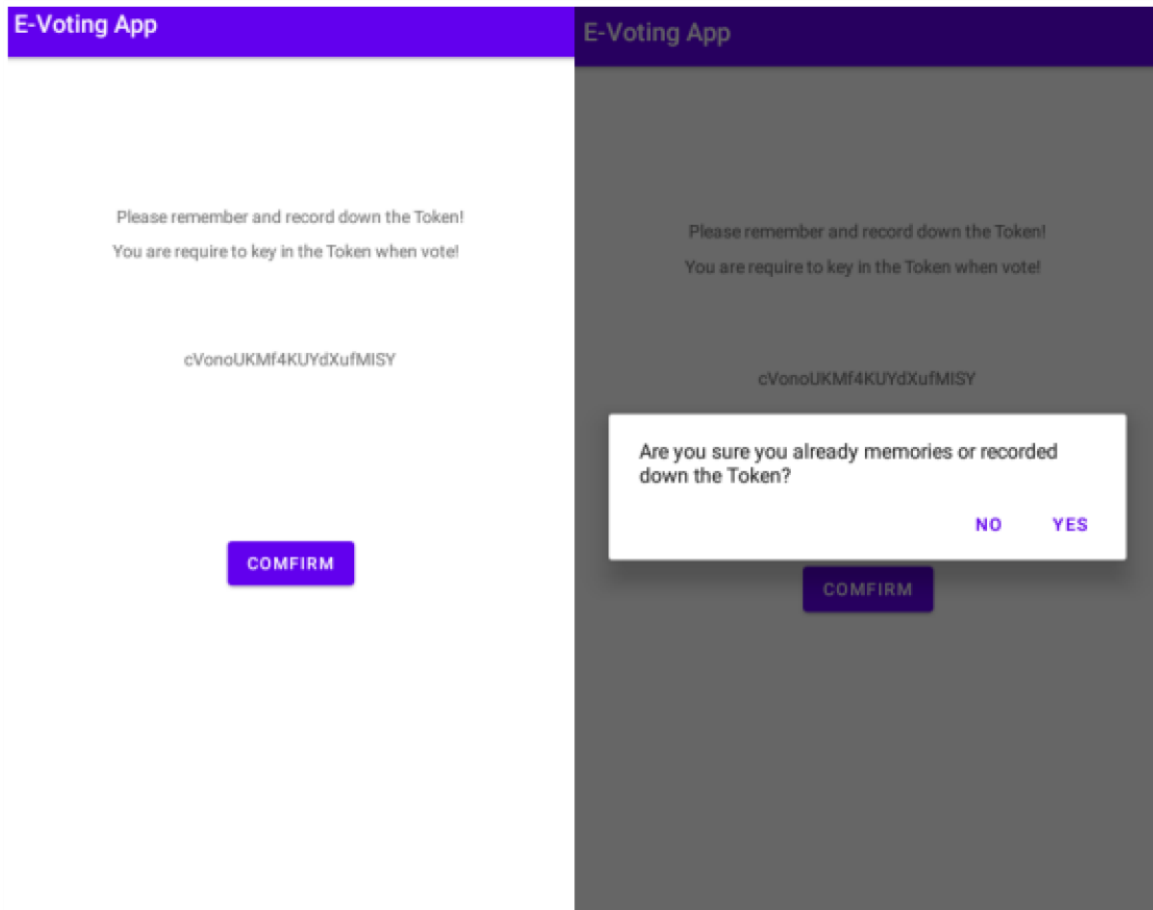


Figure : Display Token

Figure : Confirmation

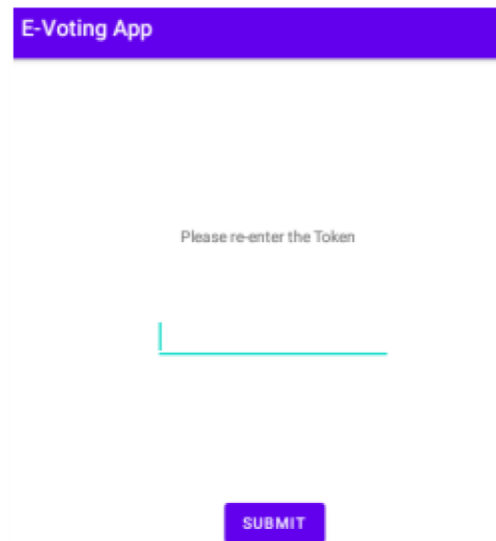
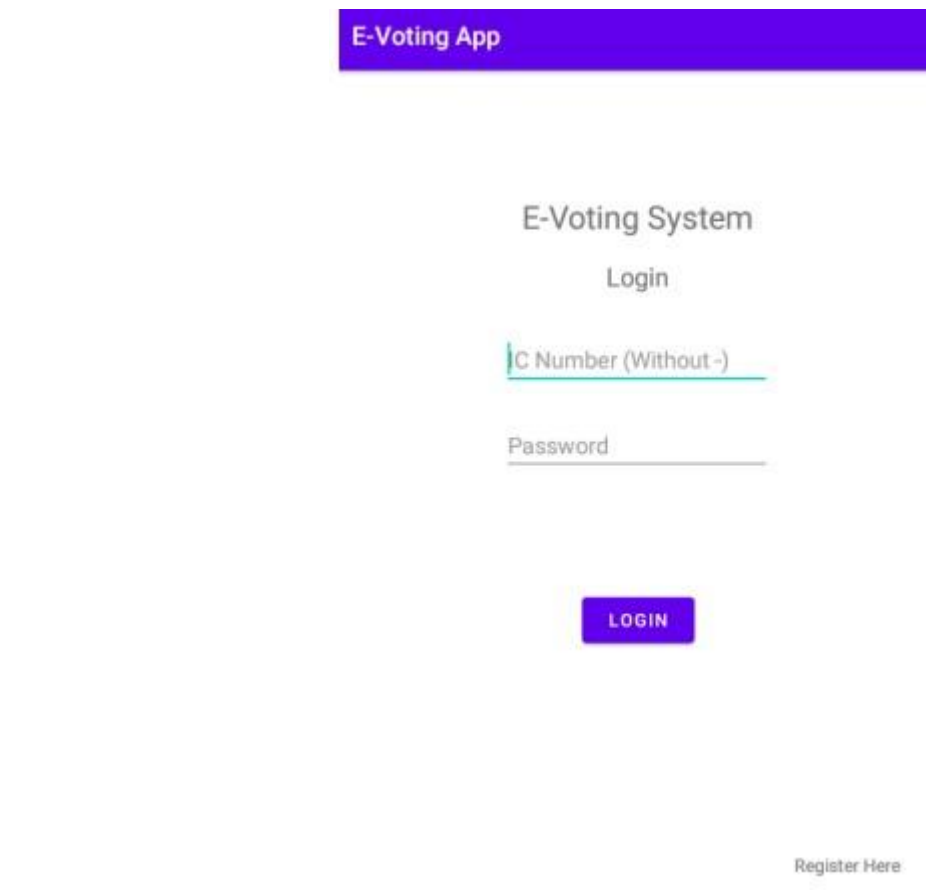


Figure : Re-Enter Token

8.1 Performance Metrics

Login :

- This is login page; the user needs to enter their IC number and password to login. If the vote is haven't start and open to vote, the system will forward the user to check eligible status page. When vote is open, the system will forward to Login Token page. Besides, if the user already makes their vote before, the system will show "you already voted before"



E-Voting App

E-Voting System

Login

IC Number (Without -)

Password

LOGIN

Register Here

Figure : Login page

I. Check Eligible Status

- The system will show the voter is eligible to vote or not.

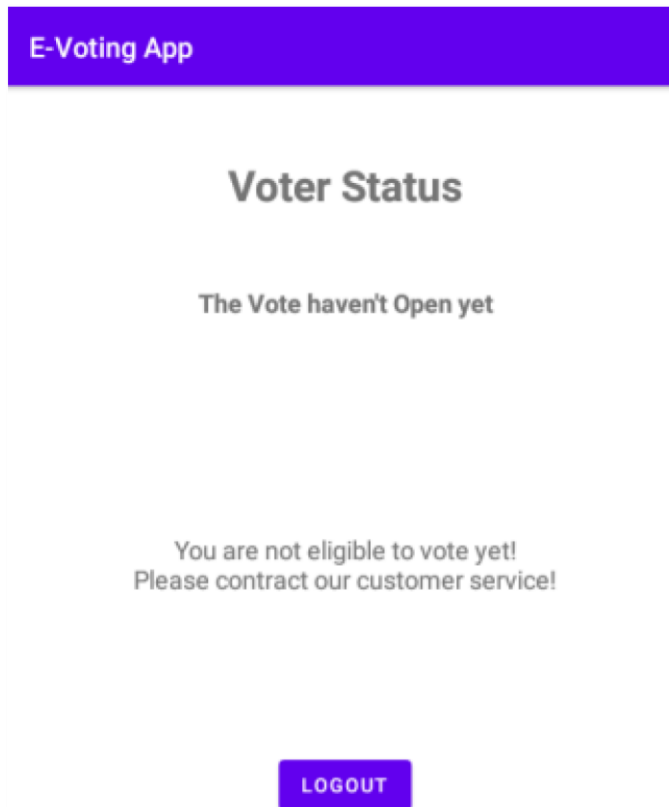


Figure : Check Eligible Status

II. Token

- The user needs to enter the Token that given during register. The user only can login successful and process to vote when the Token is correct.

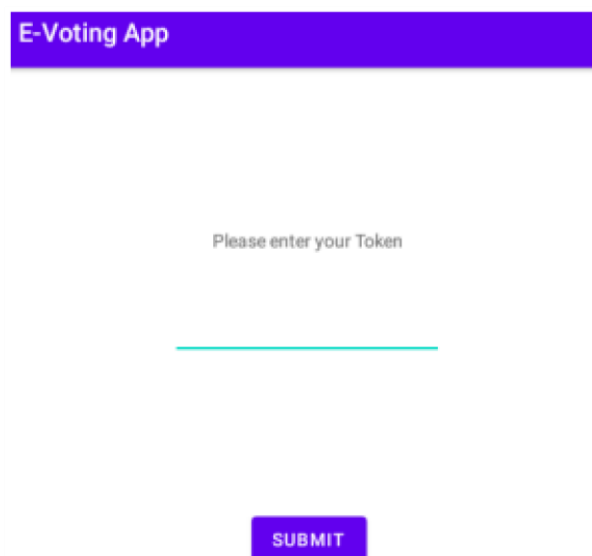


Figure : Login Token

9. RESULTS

Realtime Result :

- After admin click on the button “Realtime Result”, the application will come to this page.
- This page will show the real-time result from Firebase Realtime Database. It will show the total vote amount, vote amount of option1 and option2.

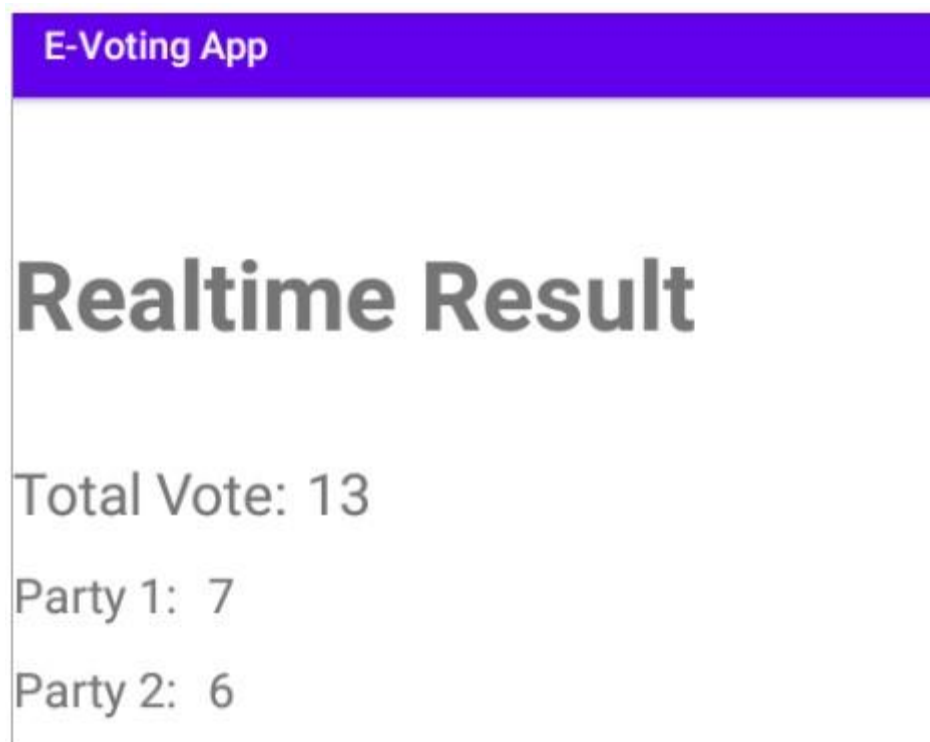


Figure : Realtime Result

9.1 Output Screenshots

- This page shows the statistic of the vote result. A pie chart is showed, the amount and percent value of each option.

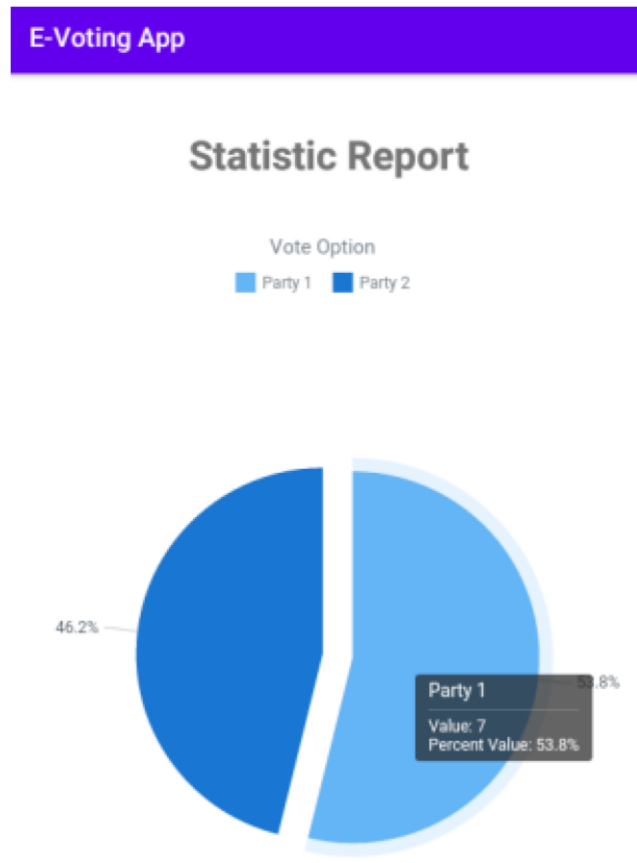


Figure : Statistic Report

10. ADVANTAGES & DISADVANTAGES

Advantages :

So, there has to be a reason why the use of biometric access and authentication is becoming more widespread. There are, in fact, lots of reasons.

1. Good security

- The fundamental requirement of a property protection system is that it gives good security, and this is true of biometrics. Whereas passwords and PINs are eminently stealable by hackers, biometric information is unique to the person concerned and cannot be accessed and used illegitimately.

2. User experience

- This is such a benefit it almost makes you want to sing out loud with joy. The onus of having a different password for every device and every system you need to access makes life miserable for many. No wonder “123456” is the most popular password right now. It’s almost like some of us have pretty much given up.

3. Non-transferable

- Unless you’re in the habit of giving other people various of your body parts, it’s unlikely that someone else will have your particular biometric characteristics. The characteristics we possess are ours and ours alone.

4. Imitation-proof

- So, those characteristics are unique to an individual, which means, in turn, that it’s all but impossible to synthesise them. Of course, the rapid development of technology means that you can never say never, but, at present, at least, a robot can’t fake your DNA.

5. Time and attendance

- A lot of biometric access systems include reasonably sophisticated time and attendance features, making it easy to track work patterns and entry activity, both in terms of the whole team and for specific individuals.

Disadvantages :

- Well, there’s no such thing as a perfect system. These are the most commonly cited problems with biometric methods.

Initial cost

- The kit that an organisation needs to invest in can be extensive. It will include readers—biometric terminal hardware that contains the optical sensor device or other information gatherers.

Entire system failures

- When biometric access control systems fail, no access can occur, and huge costs can result.

11. CONCLUTION

- ❖ The project review, future work will be discussing. Besides, the limitation to the currently program also will be mention. To overcome the limitation of current program, some methodology and technique might be the solution for the limitation.

Project Review and Discussion

- ❖ As conclusion, the project is going well can completed with the project objective and the project plan.
- ❖ Since, this project is developed by AGILE development method. The application is slightly different with the early planning, the application is become better in functionality and performance.
- ❖ The system is able to perform the voting process completely, even for the pre-process and post-process, such as register, login, authentication, vote, check result and generate report.
- ❖ The vote is real time record into the database and also the result is showing the real time result.
- ❖ There are a lot of authenticate method in the system. For register, there are real information needed, OTP code send to user phone, Token provide by system.
- ❖ For login, the voter only can vote one time, the voter only can login after verified by admin, the voter need to enter the Token to login.

- ❖ For vote, the voter need to authenticate their fingerprint to vote successful.

Novelties and contributions

- ❖ Since in this era, most of the people have a smartphone, a phone e-voting system application can be designed.
- ❖ If the e-voting system can be use by government, the election for the government can be save a lot of cost and manpower for the country.

- ❖ Besides, people also can have their right to be an important role as a citizen for democracy.
- ❖ Moreover, a lot of company especially big company which having a lot of employees, the employee can easily know the things organization doing and vote for their choice and opinion.
- ❖ Admin also can get result of vote instantly to know the opinion of all employees. But due to the COVID 19 and others sickness, this makes a lot of impact to our social life.
- ❖ To minimum the risk of getting sick, people need to keep a good social distance. But in traditional voting method, people need to gather and queue up to make their vote, this makes a lot of physical contacts within voters.

Limitation

- ❖ Even the system has so many authentications method during the voting process, but there is not fully ensure for the security due to it is an electronic voting system.
- ❖ As all we know, there are no such totally bug free or totally secure system. The system might face someone to find a lot of ways to fraud the authenticates and break the security.



State voting policies

All voters can vote by mail, ballots mailed to all	All voters can vote by mail, applications mailed to all	All voters can vote by mail by request	Only voters with an excuse can vote by mail
California	Connecticut	Alaska	Alabama
Colorado	Delaware	Arizona	Arkansas
District of Columbia	Illinois	Florida	Indiana
Hawaii	Iowa	Georgia	Kentucky
Montana*	Maryland	Idaho	Louisiana
Nevada	Massachusetts	Kansas	Mississippi
New Jersey	Michigan	Maine	Missouri
Oregon	Nebraska	Minnesota	New Hampshire
Utah	New Mexico*	North Carolina	New York
Vermont	Ohio	North Dakota	South Carolina
Washington	Rhode Island	Oklahoma	Tennessee
	Wisconsin	Pennsylvania	Texas
		South Dakota	West Virginia
		Virginia	
		Wyoming	

- ❖ Besides, since the voting process is a very important process, it should be ensuring the fairness.
- ❖ As the discussion in chapter 2, there are a lot of limitation on traditional voting system.
- ❖ Moreover, this project tries to overcome the limitation of traditional voting system. But even it overcome some of the limitation, some limitations are not able to totally solve.

12. FUTURE SCOPE

- ❖ Further improvement of the prototype device could be done at the later development by using fingerprint modules for every party so that it is more secure.



- ❖ People with no hands won't be able to cast votes following this procedure.
So in future we plan to extend our biometric identification system to a multibiometric system by integrating facial recognition, retinal scan and iris scan system to our model.
- ❖ Since the system in this project is not able to fully ensure the security and fraud free.
- ❖ But the system can keep increase the security of the system, and also improve the authentication of the system to make the system become harder and harder to break or cheat.
- ❖ Therefore, the chance of voting system getting fraud is become less.

13. APPENDIX

- ❖ This analysis uses data collected by the [National Council of State Legislatures](#) on the most recent policies regarding voting across the states, last updated on Oct. 10, 2020 (accessed Oct. 12, 2020).
- ❖ States in the category "All voters can vote by mail, ballots mailed to all" are states with a permanent policy in which all voting is conducted by mail or states that have adopted a temporary measure for this election.
- ❖ States in the category "All voters can vote by mail, applications mailed to all" are states where all voters are allowed to vote absentee and all registered voters were sent applications to request a mail-in ballot for the 2020 presidential election.
- ❖ States in the category "All voters can vote by mail by request" include all states where absentee voting is allowed for all, but voters need to take steps to request an absentee ballot.



- ❖ The remaining states (“Only voters with an excuse can vote by mail”) include those that require voters to document reasons why they are requesting an absentee ballot.

State voting policies

All voters can vote by mail, ballots mailed to all	All voters can vote by mail, applications mailed to all	All voters can vote by mail by request	Only voters with an excuse can vote by mail
California	Connecticut	Alaska	Alabama
Colorado	Delaware	Arizona	Arkansas
District of Columbia	Illinois	Florida	Indiana
Hawaii	Iowa	Georgia	Kentucky
Montana*	Maryland	Idaho	Louisiana
Nevada	Massachusetts	Kansas	Mississippi
New Jersey	Michigan	Maine	Missouri
Oregon	Nebraska	Minnesota	New Hampshire
Utah	New Mexico*	North Carolina	New York
Vermont	Ohio	North Dakota	South Carolina
Washington	Rhode Island	Oklahoma	Tennessee
	Wisconsin	Pennsylvania	Texas
		South Dakota	West Virginia
		Virginia	
		Wyoming	

- ❖ Online voting shall be opened 2 weeks prior to the GA, EGA or any previously defined deadline.
- ❖ The list of voters shall be uploaded 1 week before opening of the vote, for generating and sending access codes to voters.
- ❖ The voters' lists shall be updated and closed 1 week prior to upload into the voting system (= at the same time as the invitation and agenda for the GA are sent to members).
- ❖ Two separate voters' lists shall be generated for the Chamber of Associations and the Chamber of Individuals, and two separate ballots shall be organized, held and counted.

Source Code

- ❖ The system is set to close voting at midnight before the date of the GA or EGA in order to be able to announce the results at the GA or EGA.