A

Project Report

On

Online Election Voting Web Site

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[T.YB.C.A Semester 6]

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22BCA117

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Acknowledgment

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I am grateful to our project guide **Mr. Praful Vankar** for the guidance, inspiration and constructive suggestion that helpful us in the preparation of this project.

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I am also pleased to receive all facilities from our Management of C. E .Society.

I also thank my colleagues who have helped in successful completion of the project.

Kishan G. Solanki

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Introduction to the project :-

Project Request:

Online voting makes it easy for people to vote from home, which can encourage more people to participate. It can also save money and help the environment by using less paper and other resources. With strong security, online voting keeps votes safe and fair.

Purpose:

The purpose of creating an online election voting website is to enhance accessibility and convenience in the voting process. It aims to increase voter participation by allowing people to vote from anywhere, eliminating geographical and physical barriers. Such a platform can streamline the voting process, making it more efficient and cost-effective by reducing the need for physical polling stations and paper ballots.

Objectives of the proposed system:

- Reduce the manual work.
- Make voting more accessible for people in remote areas or with mobility challenges.
- Allow voters to cast their votes from home or anywhere with internet access.
- Encourage higher voter turnout by simplifying the voting process.
- Implement robust security measures to protect the integrity and confidentiality of votes.
- Lower the expenses associated with traditional voting methods, such as printing and staffing.

Main features of the proposed system:

- User Authentication
- Secure Voting System
- Voter Accessibility
- Real-Time Updates
- Technical Support

Scope of Work :-

An online election website is designed to be a safe and easy-to-use platform where people can register and vote. It protects voter information with strong security and follows privacy rules. The system allows real-time tracking, provides accurate results, and offers reliable technical support. It can handle large numbers of users and includes checks to keep the process fair and transparent.

We have used SQL Server as our backend tool and ASP.NET as our front-end framework to develop our online election voting system. ASP.NET is a powerful and user-friendly platform that ensures a smooth and secure voting experience. It provides a better graphical user interface (GUI) and enhances system performance for fast and efficient operations. The system runs on Windows 10.

Previously, the election process was manual, making voter registration, record-keeping, and result calculation time-consuming and difficult to manage. Retrieving past records was also challenging. To overcome these issues, we developed a computerized online voting system that streamlines voter management, ensures secure data handling, and provides a seamless voting experience.

An Existing System :-

The current voting system is manual. The election process starts with voter registration through the Election Commission of India (ECI). Once elections are announced, candidates campaign before voting day. On the voting day, citizens visit polling stations to cast their votes using Electronic Voting Machines (EVMs). After voting, the EVMs are sent to counting centres, where votes are tallied, and results are announced by the ECI.

Our new system is developed using ASP.NET as the front-end and SQL Server as the back-end. ASP.NET ensures a smooth and user-friendly interface, while SQL Server securely manages voter data. Unlike the manual process, our computerized system automates voter registration, voting, and result calculation, making the process faster, more secure, and efficient.

This system is designed to handle all election-related information efficiently. It is easy to use, reduces errors, and improves overall transparency. Compared to the traditional system, our online voting platform offers better security, speed, and convenience, making it a more advanced and reliable solution for modern elections.

Problem Identification :-

The Phase of system analysis process deals with problems which are affecting in the current manual system. The problems are those which are affecting the manual system.

As the growing trend in Info-Tech world of computers need of accuracy, perfectness, speed and high memory data storage is must. Each and every problem must be solved with a least amount of time and energy.

The problems faced by existing system are described as below:

1. Accessibility Issues
2. Long Queues
3. Administrative Challenges
4. Security Concerns
5. Environmental Impact

1) **Accessibility Issues:** In offline voting, some people face difficulties reaching polling stations, especially in remote areas with poor transportation. This can make it hard for elderly, disabled, or faraway voters to cast their votes, leading to lower participation. As a result, some groups may not be well represented in elections. Making voting accessible to everyone is a major challenge in the offline system.
2) **Long Queues:** Long lines at polling stations are a common issue in offline voting, especially in crowded areas or during busy elections. These delays can make voters wait a long time, causing frustration and discouraging some from voting. Better management and more resources are needed to reduce wait times and make voting easier for everyone.

3) **Administrative Challenges:** Managing offline voting comes with many challenges, such as handling large numbers of voters, setting up polling stations, and organizing ballot distribution and collection. Careful planning is needed to avoid mistakes and

ensure a smooth election. Poor management can cause delays, confusion, and may prevent some people from voting.

4) **Security Concerns:** Security in offline voting involves protecting ballot boxes from tampering, theft, or fraud to keep the voting process fair. Strong measures are needed to safeguard ballots and ensure their safe transport to counting centres, preventing any unauthorized interference.

5) **Environmental Impact:** Offline voting has an environmental impact because it requires paper ballots, which can lead to deforestation and waste. Additionally, transporting ballots and polling materials creates carbon emissions.

Need of Propose System :-

The main purpose of an online election voting website in Indian elections is to provide a secure, accessible, and efficient platform for voters to cast their votes electronically, ensuring transparency and convenience while reducing the logistical challenges of traditional voting methods.

- **Secure voting**: Ensures a safe voting process.
- **Accessibility**: Makes voting accessible to more people.
- **Efficiency**: Streamlines the voting process.
- **Convenience**: Allows voters to vote from anywhere.
- **Transparency**: Enhances the transparency of elections.
- **Cost-effective**: Reduces the cost of conducting elections.
- **Time-saving**: Saves time for voters and organizers.
- **Paperless process**: Minimizes paper use and wastage.
- **Real-time updates**: Provides quick updates and results.
- **Reduced logistical issues**: Decreases the need for physical polling stations.

Feasibility Study :-

A feasibility study examines whether a project is possible and practical. It includes three main aspects: technical, economic, and operational feasibility. **Technical feasibility** looks at whether the technology, equipment, software, and staff are sufficient to meet the needs of the project. **Economic feasibility** evaluates whether the new system will be more cost-effective than the current one. Finally, **operational feasibility** assesses whether the users will be able to accept and use the system effectively.

- **Operational Feasibility:** This online voting website offers many benefits. It makes voting easier by allowing people to vote from anywhere with internet access, boosting participation, especially for those abroad or with mobility issues. Online voting eliminates the need for polling stations and long lines, speeds up vote counting, and provides quick results. Strong security helps prevent fraud and keeps the election fair. Overall, it saves money by reducing the resources needed for traditional voting.

- **Technical Feasibility:** Since the required technology and equipment are already in place, the management is keen to develop the project. The system will be expandable and adjustable, ensuring accuracy, reliability, and data security.

- **Economic Feasibility:** An online voting website cuts costs by removing the need for physical polling stations, setup, and staffing. It reduces expenses for printing and distributing paper ballots, as well as transporting and storing ballot boxes. Automated vote counting and result reporting lower the need for manual labours. Overall, the online system makes the election process more cost-effective.

System Features :-

1. **Secure Login and Authentication**: Uses multi-factor authentication to verify voter identities and prevent unauthorized access.
2. **User-Friendly Interface**: Offers a simple and intuitive design for easy navigation, ensuring all voters can use it effectively.
3. **Ballot Customization**: Allows voters to view and select from different candidates and propositions relevant to their region.
4. **Real-Time Feedback**: Provides voters with confirmation of their vote being cast and the option to review their selections before final submission.
5. **Robust Security Measures**: Implements encryption and other cyber security protocols to protect voter data and maintain election integrity.
6. **Accessibility Features**: Includes support for multiple languages and tools for users with disabilities, such as screen readers.
7. **Scalability and Reliability**: Ensures the system can handle high volumes of traffic, especially during peak voting periods, without downtime.

Hardware and Software :-

Hardware requirement of the system

This phase of the software development process deals with a brief study of different hardware used in the computerized system. There is a list of hardware materials used during the making and also during the use of the proposed system.

All the hardware needed here are generally the basic configuration of a typical office computer. A list of the hardware requirement used in the system given below:

Component	Minimum	Recommended
Processor	2.5 gigahertz (GHz)	Dual processor that are each 3 GHz or faster
RAM	1 GB	2 GB
Disk	NTFS file system-formatted partition with a minimum of 3 GB of free space	NTFS file system-formatted partition with 3 GB of free space plus adequate free space for your Web Sites
Drive	DVD Drive	DVD drive or the source copied to a local or network-accessible drive
Display	1440 x 900	1440 x 900 or higher

Software Specification

- ✓ **Operating System:** Windows 2000 or later
- ✓ **Front End:** Microsoft ASP.NET with C#
- ✓ **Back End:** SQL Server

An Overview of the Visual Studio.net Framework

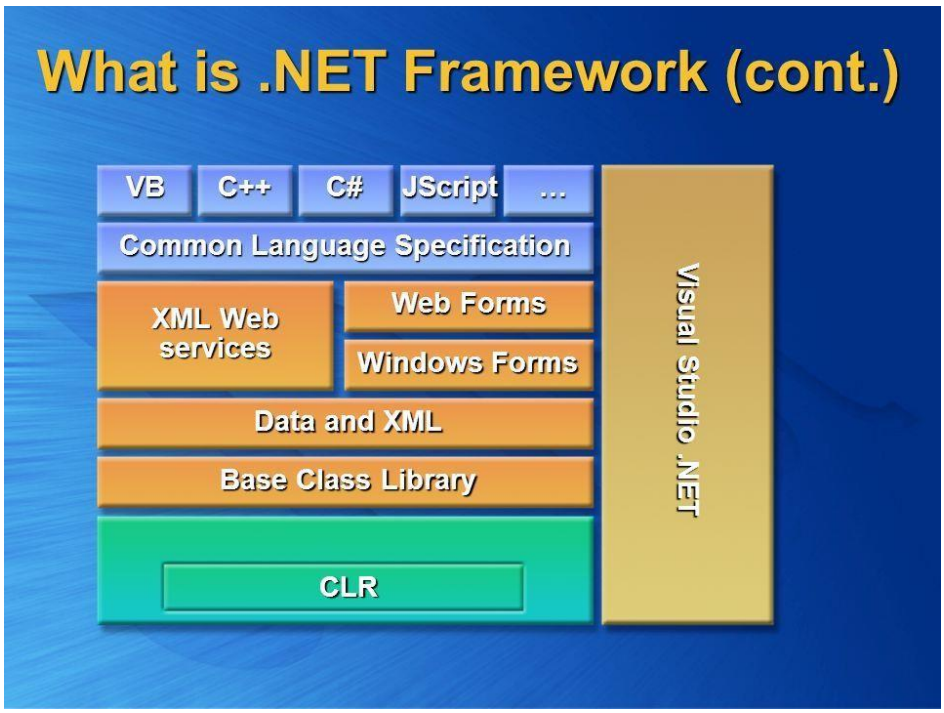
Introduction

The .NET Framework is a software development framework developed by Microsoft that provides a runtime environment and a set of libraries and tools for building and running applications on Windows operating systems. The framework includes a variety of programming languages, such as C#, F#, and Visual Basic, and supports a range of application types, including desktop, web, mobile, and gaming applications.

It is used to develop Form-based applications, Web-based applications, and Web services. There is a variety of programming languages available on the .Net platform, VB.Net and C# being the most common ones. It is used to build applications for Windows, phones, web, etc. It provides a lot of functionalities and also supports industry standards.

.NET Framework supports more than 60 programming languages of which 11 programming languages are designed and developed by Microsoft. The remaining Non-Microsoft Languages are supported by .NET Framework but not designed and developed by Microsoft.

.NET Framework Components



As shown in given figure, C# sits at the top of the framework (along with the other language in Visual Studio.net). Below that is the Common Language Specification (CLS). This specification is as set of rules that govern the minimum language features that must be supported to ensure that a language will interoperate with other CLS compliant components and tools. As long as a language conforms to the CLS, it is guaranteed to work with the CLR. In this way, when third-party compliers target the .net framework, as long as they conform to the CLS, the code is guaranteed to work.

Web Services

Web services provide a Web-enabled user interface with tools that include various HTML controls and Web controls. Forms creating using Web Services are the same as forms created for a Window Application. The code behind a Web form is the same as the code behind a Window Form. The markup language that is used by Web forms is still there, but the Web Form applications generate it for you.

User Interface

At the same level as Web Services is the User Interface. The User Interface is where Windows forms live. It also provides code for drawing to the screen, printing, rendering text and displaying images.

Data and XML

Both Web Services and the User Interface sit on the top of the Data and XML block. As you will learn later in this paper, XML (or extensible markup language) plays just as important of a role as data. XML is used to provide a text view of data that can be shared between services on the same PC or passed through a firewall to a web server across the country using SOAP (more on SOAP a little later).

Base Class Library

The base class library (BCL) is underneath the data and XML block. This area is the origin for the base class of all .net programs. Everything in Visual Basic.net is an object, and all objects originate from a class named *System.* The BCL also provides collections, localization, text objects, interoperability with non-net code and ActiveX controls and a variety of other services.

Introduction to C#

Microsoft created the language C#, known as C Sharp, in the year 2000. C# is an object-oriented programming language that is used in .NET Framework. C# is designed to be simple, efficient, and versatile, and is often used to build a wide range of desktop, web, and mobile applications.

C# and the .NET Framework provide a powerful and versatile development platform that is widely used for building desktop, web, and mobile applications on Windows operating systems.

SQL SERVER

Introduction

Data is a collection of facts and figures and we have humungous data available to the users via the internet and other sources. To manipulate the data, Structured Query Language (SQL) in short has been introduced years ago. There are different versions of SQL available in the market provided by different organizations. Here, we shall see the version of SQL provided by Microsoft.

Microsoft SQL Server or MS SQL Server is the query language provided for data definition and manipulation. SQL Server is a Relational Database Management Systems which was developed and marketed by the Microsoft company. SQL and SQL servers are built as two layers where the SQL server is on the top for interacting with the relational databases.

As it is a Microsoft's developed system, it worked only on Microsoft's environment until it was made available on Linux platforms in the year 2016.

SQL Server is composed of: **Database engine**, and **Relational engine**, and **Storage engine**. They are explained as following below.

1. **Database Engine:** Database is a collection of various data items on which the user can perform any kind of manipulations.

   The database engine has a relational engine on which a user can perform queries and it also comes with a storage engine which manages the data files, indexes and procedures.

   The database engine also creates and executes objects like triggers, views, procedures etc.

2. **Relational Engine:** Relations are the connections between the two different databases or within the same database. It is stored in the form of a row and column intersection named tables. It manages query processing, memory management, buffer management, threads, and much more. It has another layer named storage engine.

3. **Storage Engine:** It looks upon the storage of data. It is done using systems like disks and Storage Area Network or SAN.

SQL Server capabilities deliver on the Three key areas of the data platform visions.

- **Mission-Critical Platform:** SQL Server enables IT groups to be more productive by providing a more secure, scalable, and manageable platform. It includes a new policy-based management framework that shifts from managing by scripts to managing by rules. SQL Server 2008 also protects valuable information in existing applications and

disconnected devices. In addition, SQL Server delivers predictable query performance with an optimized platform.

- **Dynamic Development:** - SQL Server along with the .NET Framework enables developers to build the next generation of application. Developers are more productive because they work with business entities instead of tables and columns. They can build application that enables users to take their data with them and synchronize their data with back-end servers.
- **Beyond Relational Data:** - SQL Server enables developers to consume any type of data, from XML to documents, and build applications that incorporate location awareness.

DATA FLOW DIAGRAM (DFD): -

Data Flow Diagram is a graphical presentation for defining inputs, processes and outputs.

Data flow diagram is a graphical tool used to describe and analyses the movement of data through a system-manual or automated-including the Processes stores the data, and delays in the system.

The transformations of the data from input to output through the Processes may be described logically and independently of the physical components Associated with the system. They are termed logical data flow diagrams.

In contrast, physical data flow diagrams show the actual implementation and the movement of data between people departments and workstations.

The simple notations are flow understood by users and business persons who are part of the process being studied. Therefore, analysts can work with users and actually involve them in the study of data flow diagram.

The data flow diagram covers all the processes and data storage area, which takes place during any transaction in the system. The data flow diagrams are functionality divided into context level, Zero level and First level data flow diagrams.

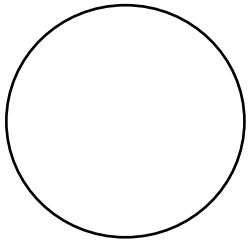
Rules of DFDs: -

1. Processes should be named and numbered for easy references.
2. The direction of flow from top to bottom and from left to right.
3. Data traditionally flow from the source (Upper Left Corner) to the destination (Lower Right Corner) although they may flow back to the source.
4. When a process is exploded into lower level details, they are numbered.

Symbols used in DFDs: -

1. **Process: -** Here flow of data is transformed.

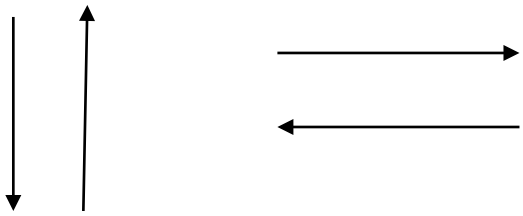
   E.g. Update leave Summary File.



2. **External Entity: -** A source or destination of data which is external to the system.

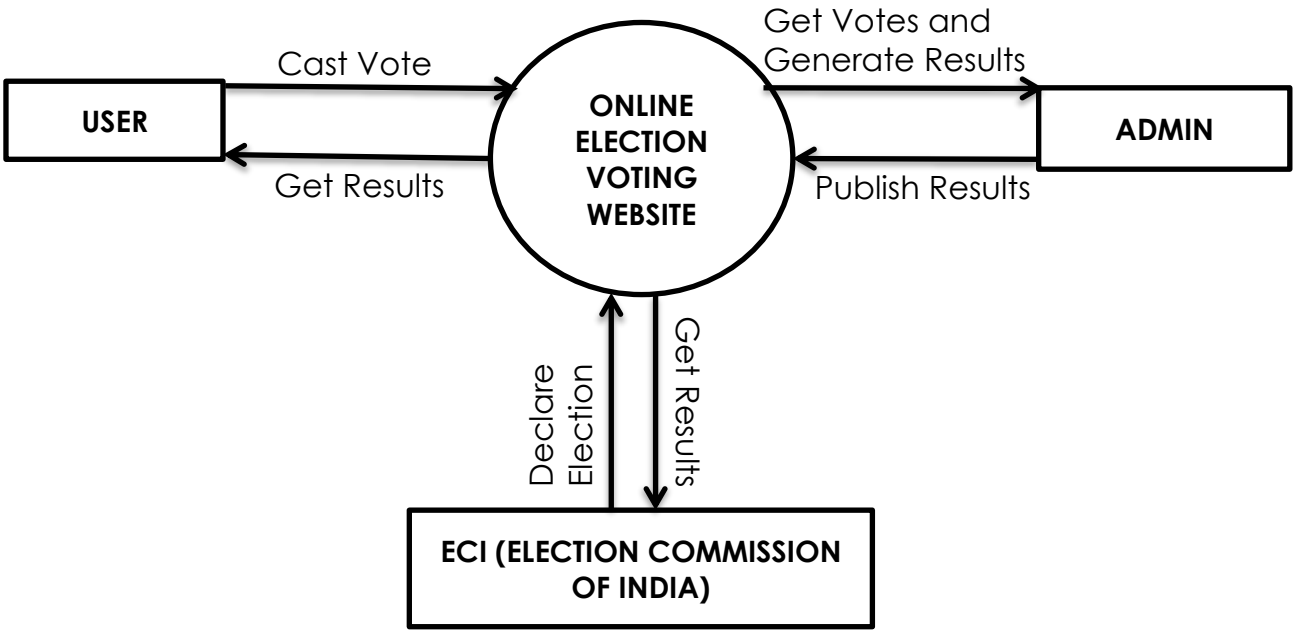
   E.g. Employee, Patient, etc.

3. **Data Flow: -**It is packet of data. It may be in the form of document, letter etc.

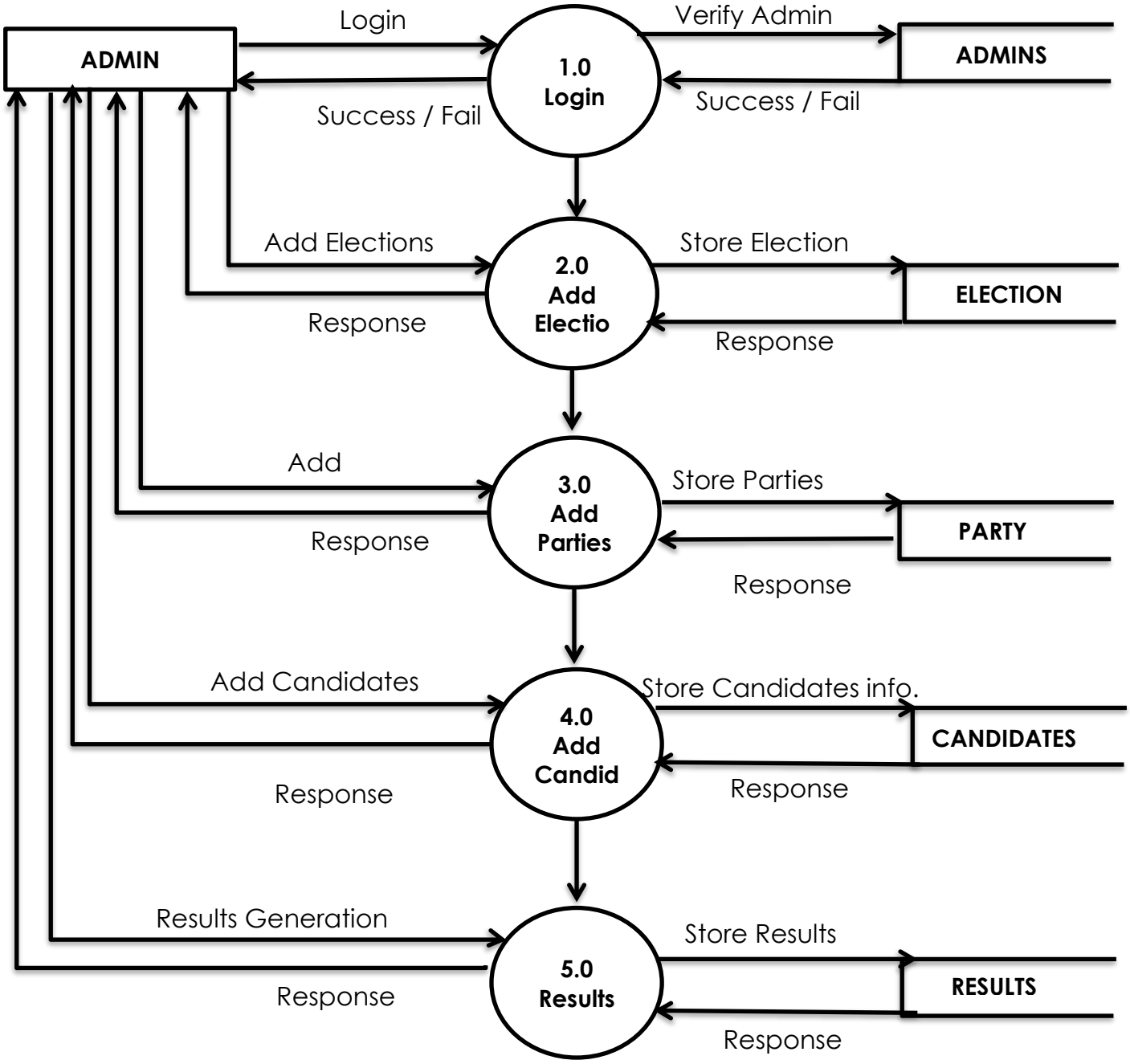


4. **Data Store: -**Any store data but with no reference to the physical method of storing.

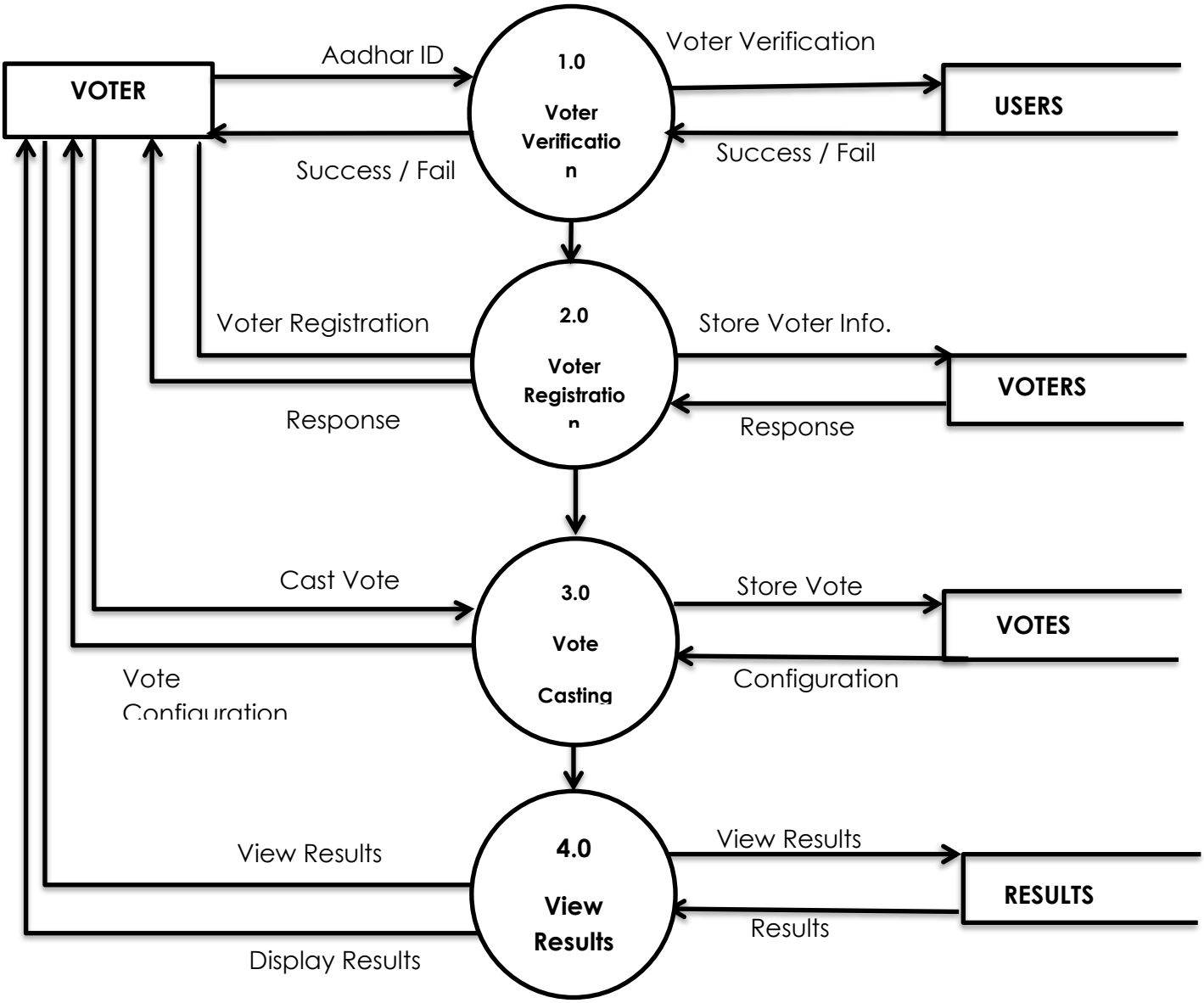
Context Level DFD: -



Admin Zero Level DFD: -



User Zero Level DFD: -



Database Layout

- **Admins (To Store Admin Information)**

FIELD	DATATYPE	CONSTRAINT
AdminName	nvarchar(50)	Not Null
AdminEmail	nvarchar(50)	Not Null
AdminPassword	nvarchar(256)	Not Null
AdminMobile	nvarchar(50)	Not Null
AdminGender	nvarchar(50)	Not Null
AdminAddress	nvarchar(50)	Not Null
AdminBirthdate	nvarchar(50)	Not Null
AdminImage	nvarchar(50)	Not Null

- **Election (To Store Election Information)**

FIELD	DATATYPE	CONSTRAINT
ElectionID	nvarchar(50)	Primary Key
ElectionName	nvarchar(50)	Not Null
StateName	nvarchar(50)	Not Null
TotalParties	nvarchar(50)	Not Null
TotalCandidates	nvarchar(50)	Not Null
TotalVoters	nvarchar(50)	Not Null
DateOfElection	date	Not Null
DateOfResults	date	Not Null

- **Party (To Store Party Information)**

FIELD	DATATYPE	CONSTARINT
ElectionID	nvarchar(50)	Foreign Key
PartyID	nvarchar(50)	Primary Key
PartyName	nvarchar(50)	Not Null
TotalCandidates	nvarchar(50)	Not Null
PartyLeader	nvarchar(50)	Not Null
LeaderPicture	nvarchar(50)	Not Null
PartySlogan	nvarchar(50)	Not Null
EstablishedYear	nvarchar(50)	Not Null
PartyLogo	nvarchar(50)	Not Null

- **Candidates (To Store Candidate Information)**

FIELD	DATATYPE	CONSTRAINT
PartyId	nvarchar(50)	Foreign key
PartyName	nvarchar(50)	Not Null
CandidateId	nvarchar(50)	Primary Key
CandidateName	nvarchar(50)	Not Null
State	nvarchar(50)	Not Null
District	nvarchar(50)	Not Null
DOB	nvarchar(50)	Not Null
Gender	nvarchar(50)	Not Null
Email	nvarchar(50)	Not Null
Mobile	nchar(50)	Not Null

- **Users (To Store USERS Information for Verification)**

FIELD	DATATYPE	CONSTRAINT
VoterID	nvarchar(50)	Primary Key
Name	nvarchar(50)	Null
State	nvarchar(50)	Null
District	nvarchar(50)	Null
DOB	nvarchar(50)	Null
Gender	nvarchar(50)	Null
Email	nvarchar(50)	Null
Mobile	nvarchar(50)	Null
Password	nvarchar(256)	Null

- **Voters (To Store VOTERS Information After Registration)**

FIELD	DATATYPE	CONSTRAINT
VoterID	nvarchar(50)	Primary Key
AadharID	nvarchar(50)	Not Null
Name	nvarchar(50)	Not Null
DOB	nvarchar(50)	Not Null
State	nvarchar(50)	Not Null
District	nvarchar(50)	Not Null
Gender	nvarchar(50)	Not Null
Image	nvarchar(50)	Not Null

- **Result (To Store the Results)**

FIELD	DATATYPE	CONSTRAINT
VoterID	nvarchar(50)	Primary Key
PartyID	nvarchar(50)	Foreign Key
PartyName	nvarchar(50)	Not Null
CandidateID	nvarchar(50)	Foreign Key
CandidateName	nvarchar(50)	Not Null
District	nvarchar(50)	Not Null
Timestamp	nvarchar(50)	Null

- **UserSecurity (To Ask Security Questions)**

FIELD	DATATYPE	CONSTRAINT
VoterID	nvarchar(50)	Primary Key
BirthCity	nvarchar(50)	Not Null
FirstSchool	nvarchar(50)	Not Null
FavTeacher	nvarchar(50)	Not Null
FavTVShow	nvarchar(50)	Not Null

- **Identity (To Identify User)**

FIELD	DATATYPE	CONSTRAINT
AadharID	nvarchar(50)	Primary Key
Name	nvarchar(50)	Not Null
DOB	nvarchar(50)	Not Null
Gender	nvarchar(50)	Not Null
State	nvarchar(50)	Not Null
District	nvarchar(50)	Not Null

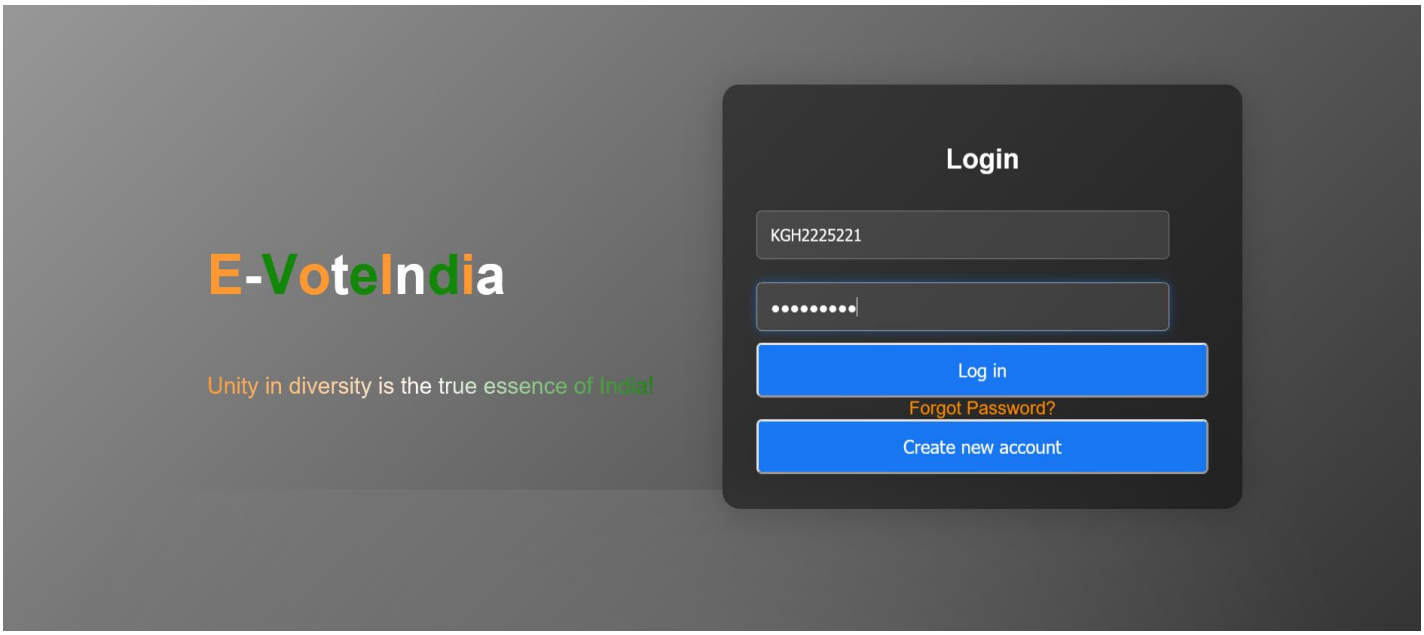
- **Notifications (To Notify)**

FIELD	DATATYPE	CONSTRAINT
ID	int	Primary Key
Message	nvarchar(255)	Not Null
IsRead	bit	Not Null

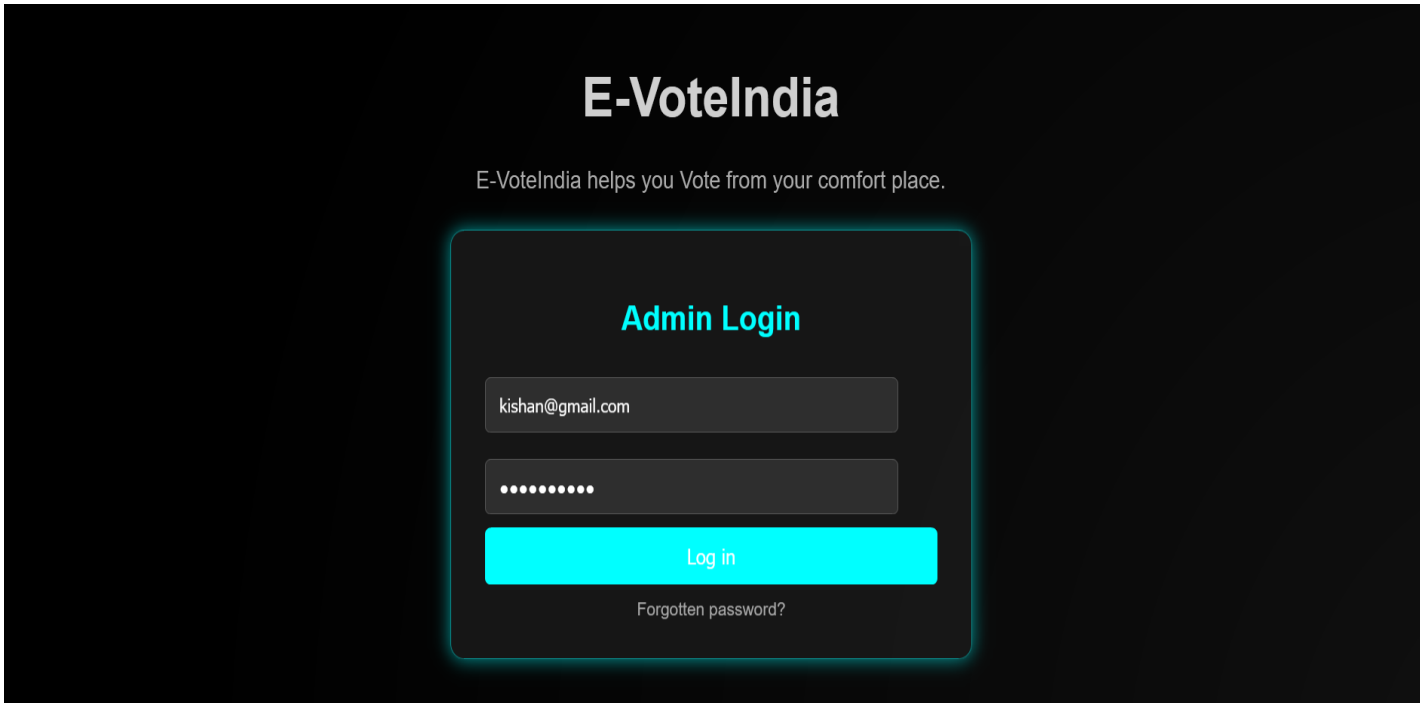
Design of Input Screens

➢ Admin Side Pages

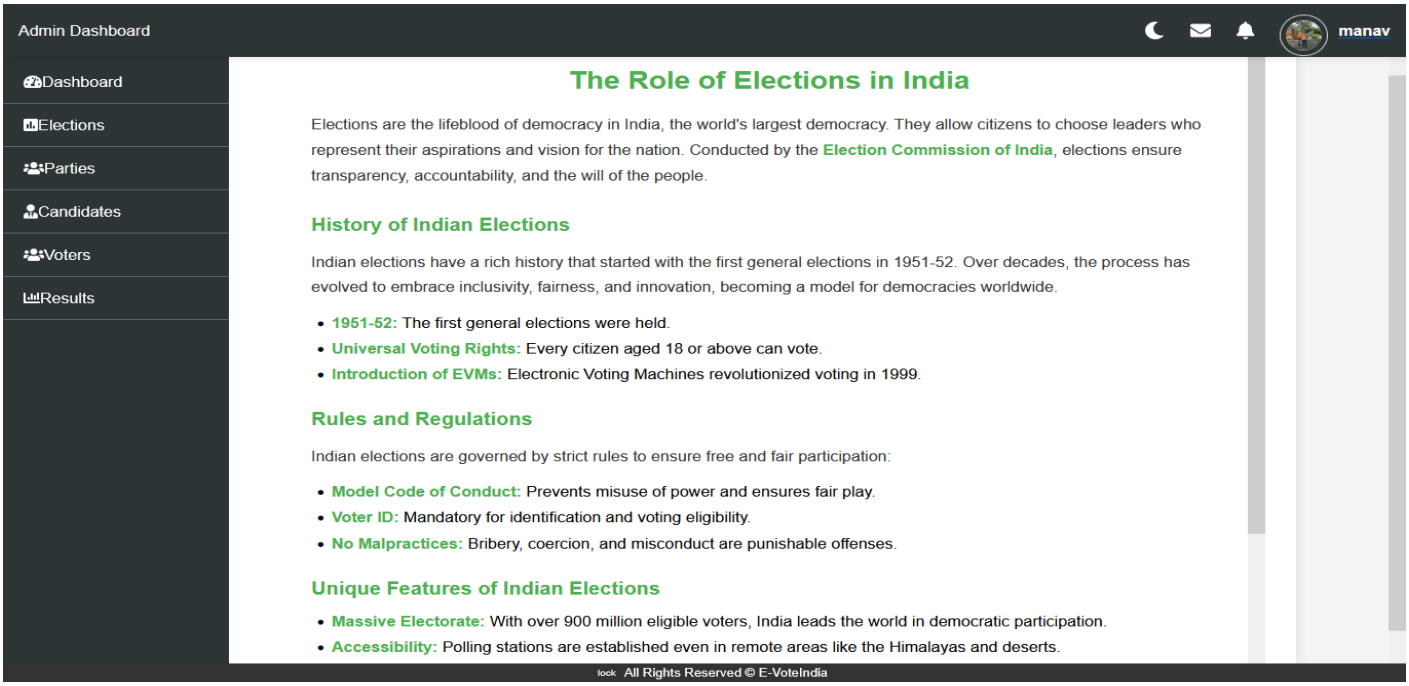
1. Login Form



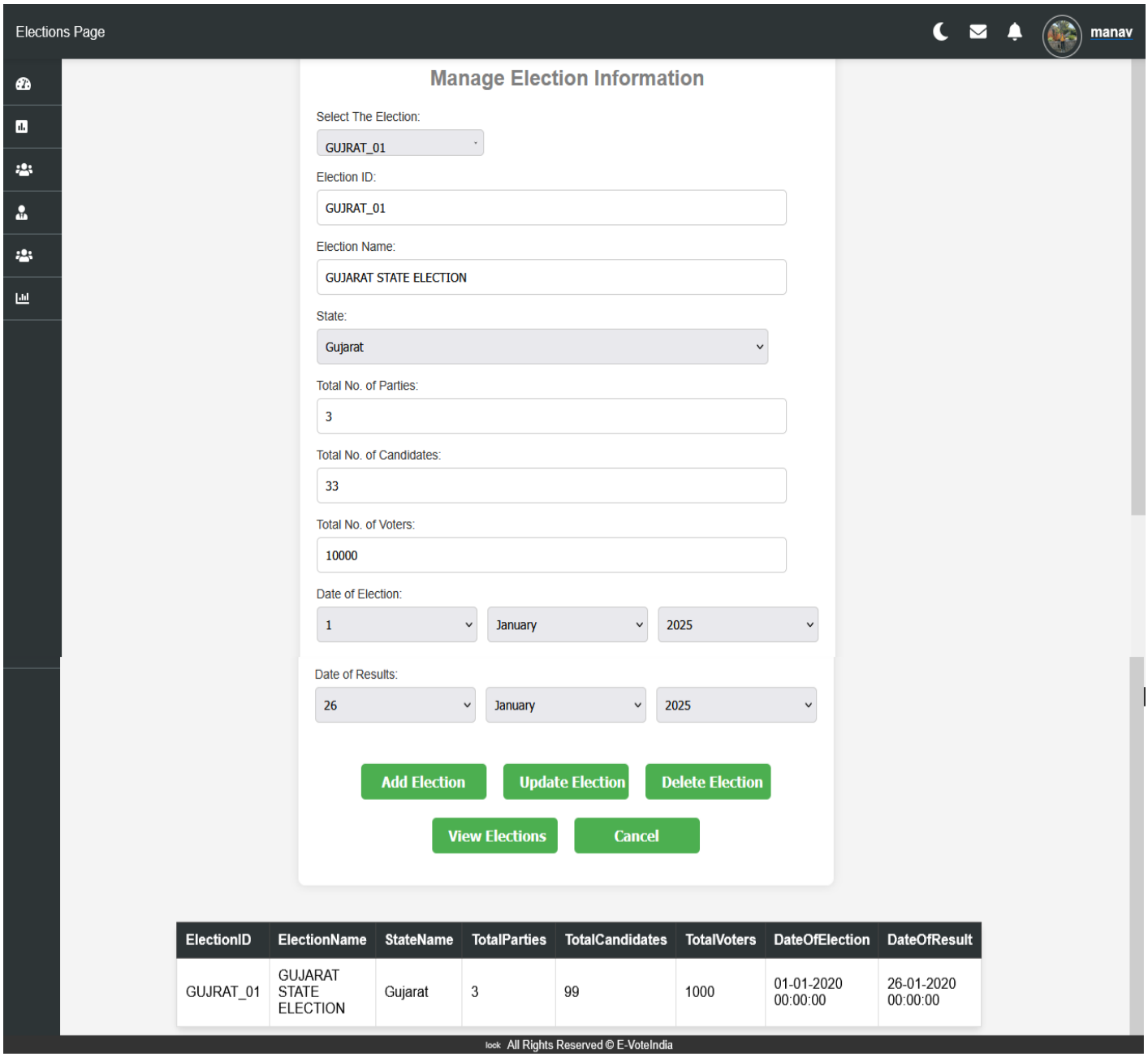
2. Admin Login



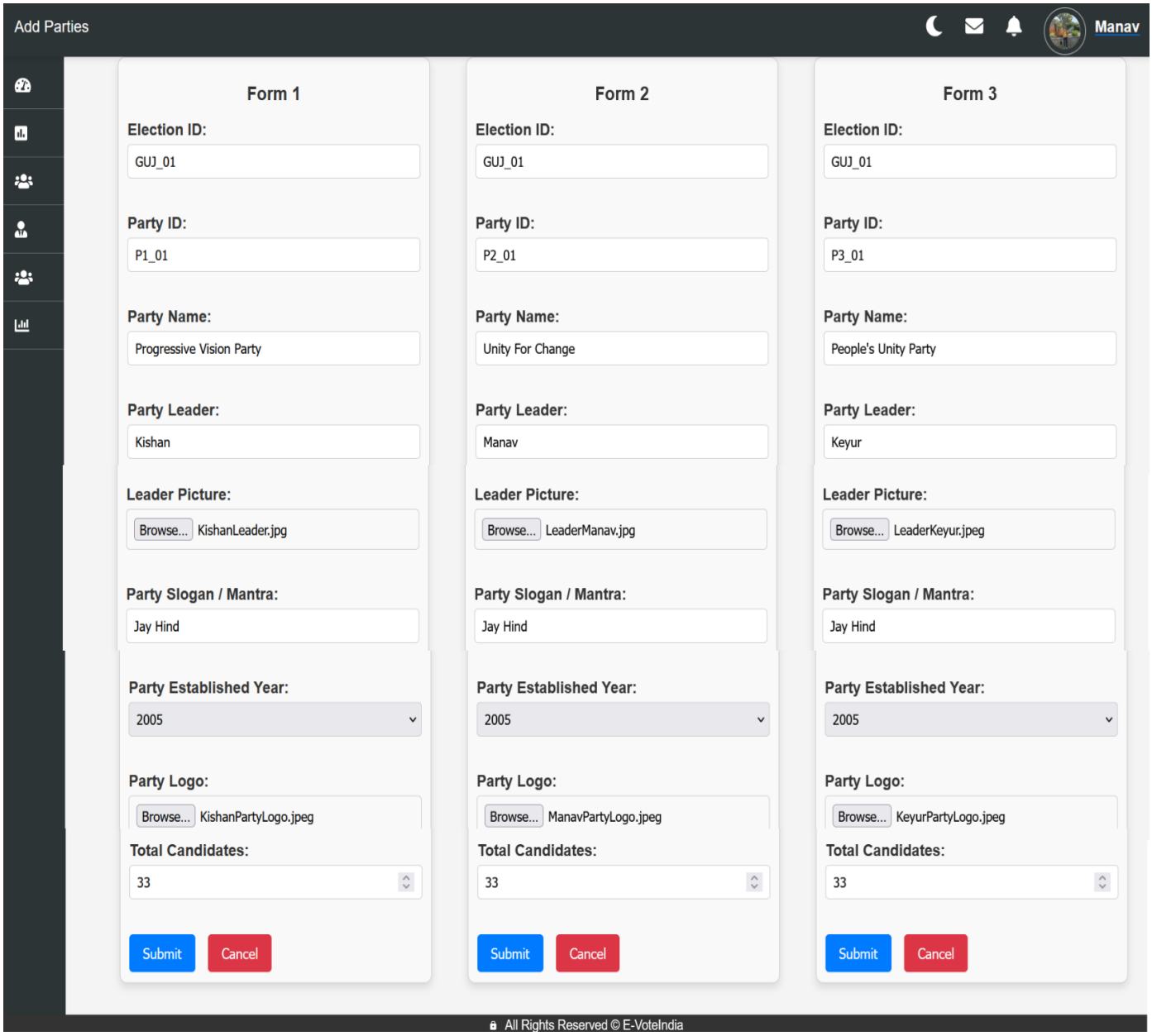
3.Admin Dashboard Page



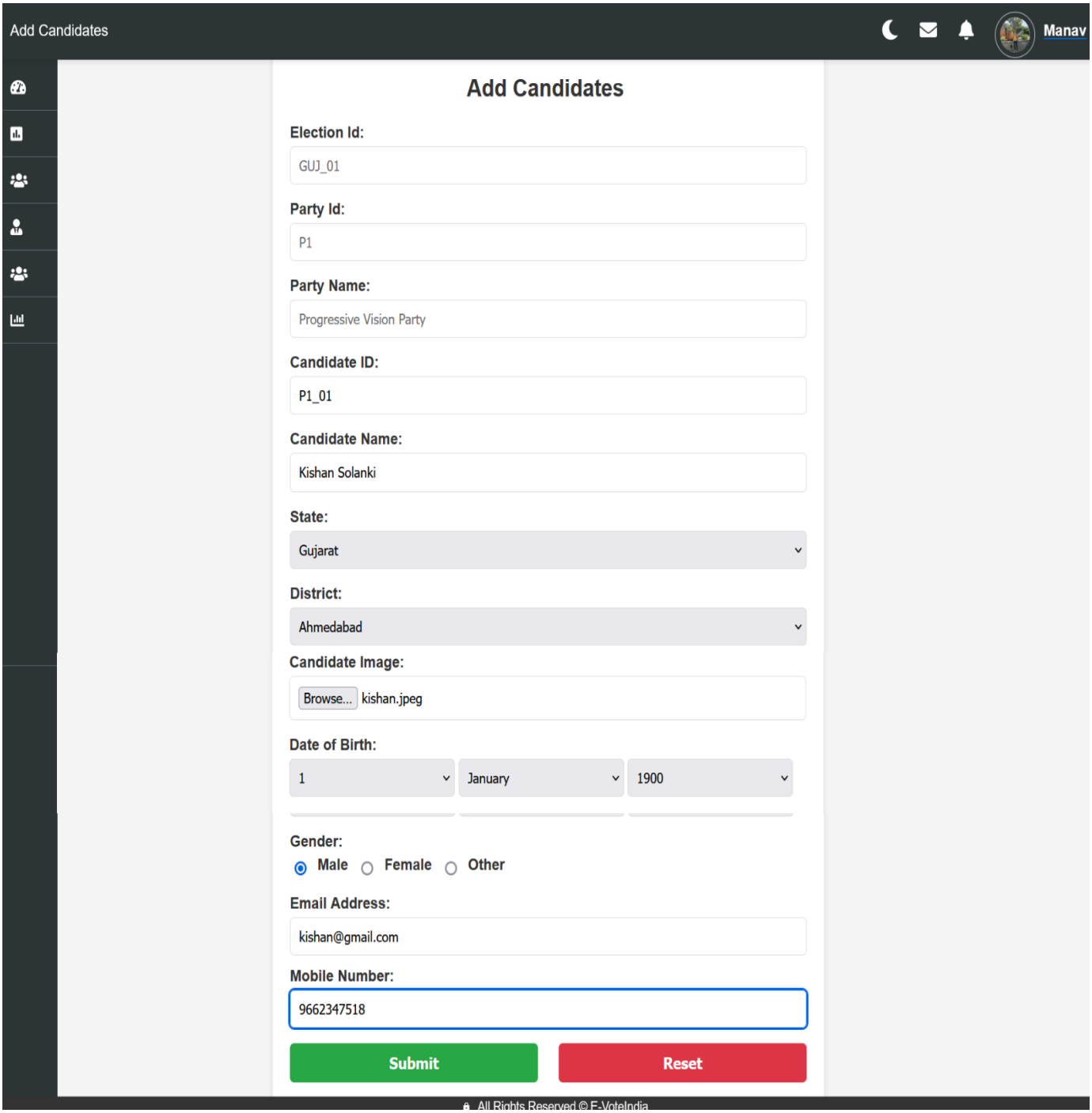
4. Add Election Page



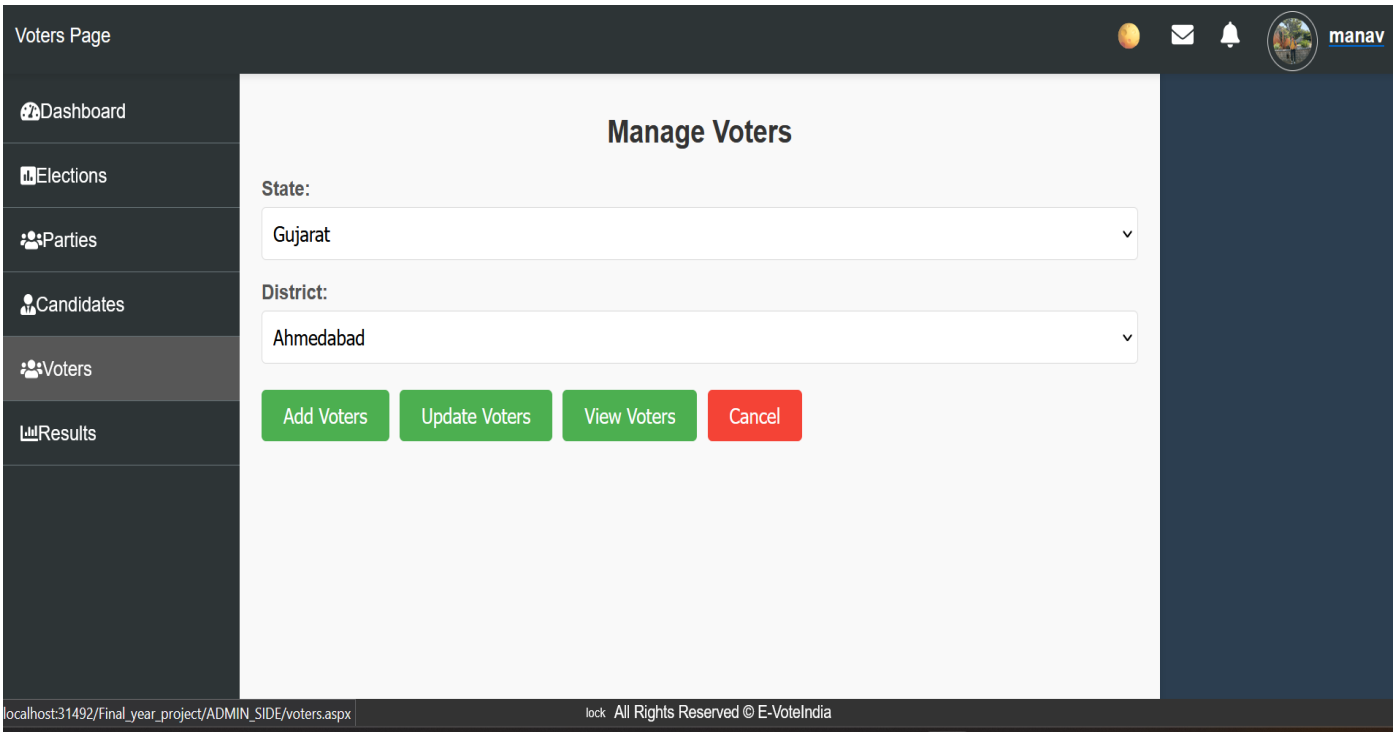
5. Add Parties Page



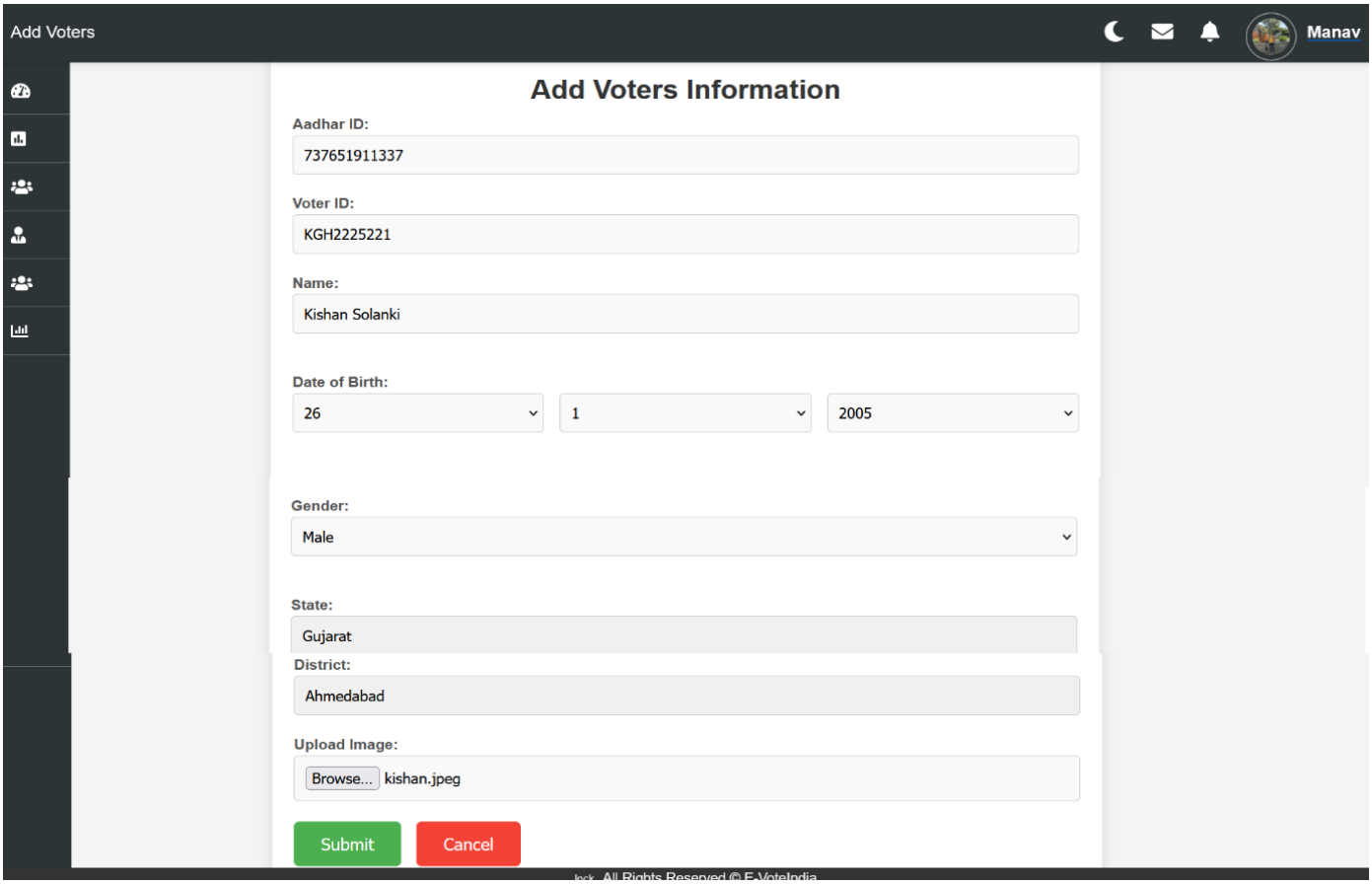
6. Add Candidate Page



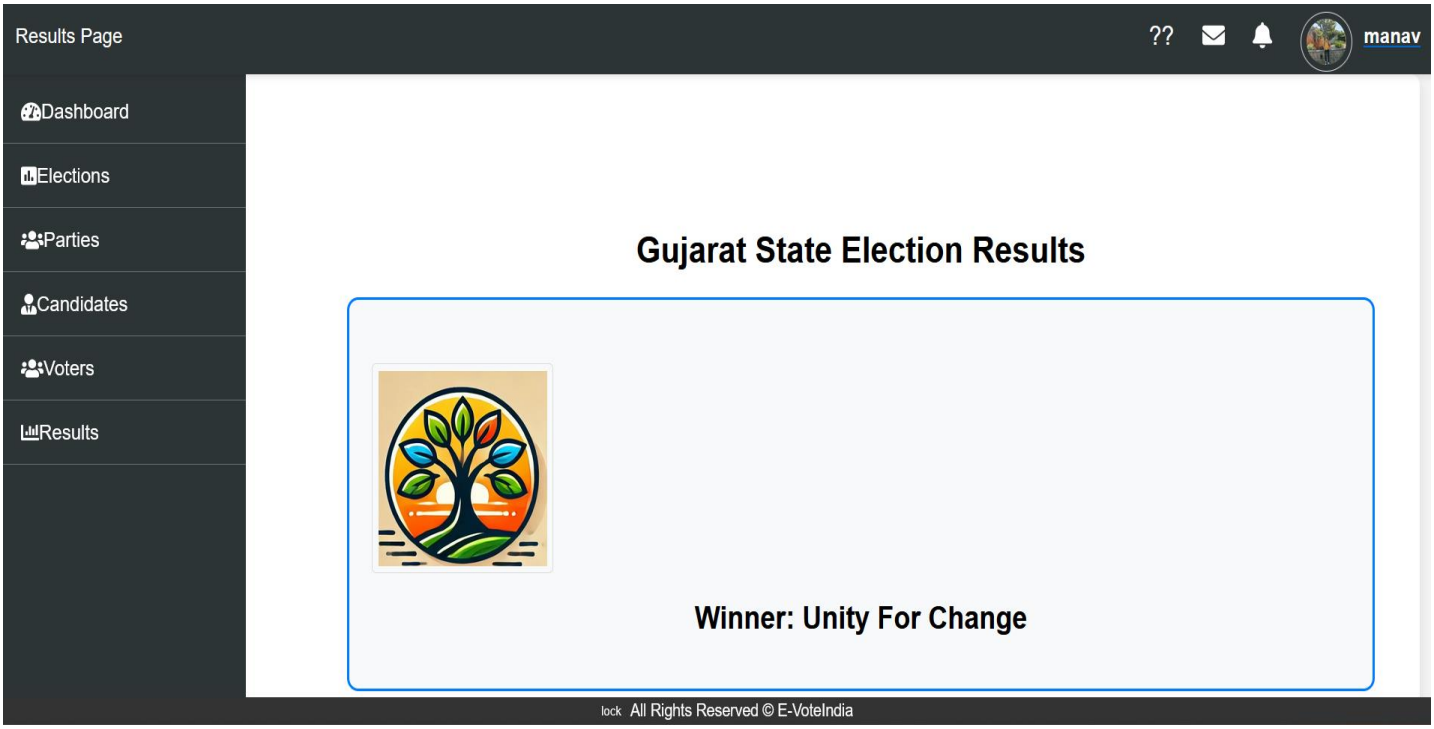
7. Voters Page



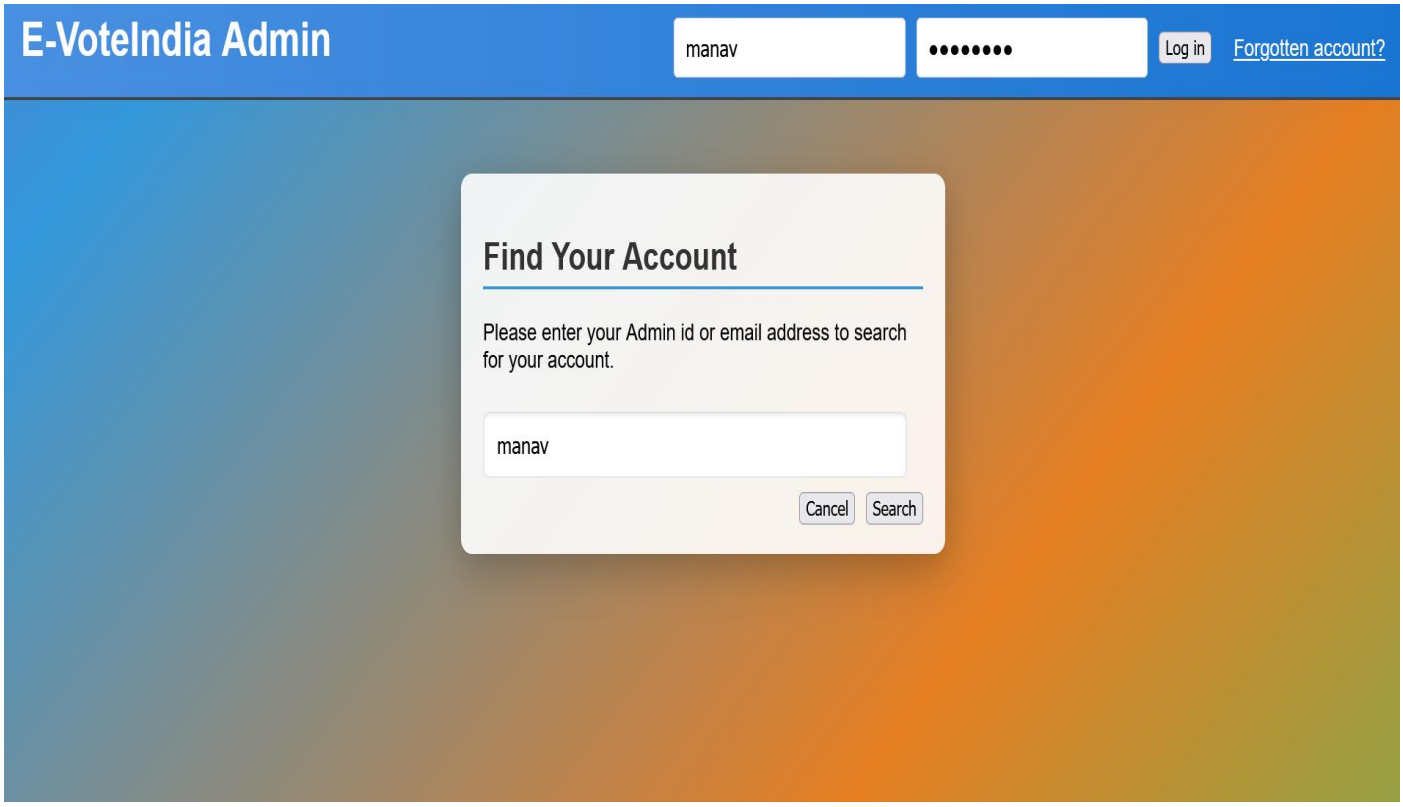
8. Add Voters Pag



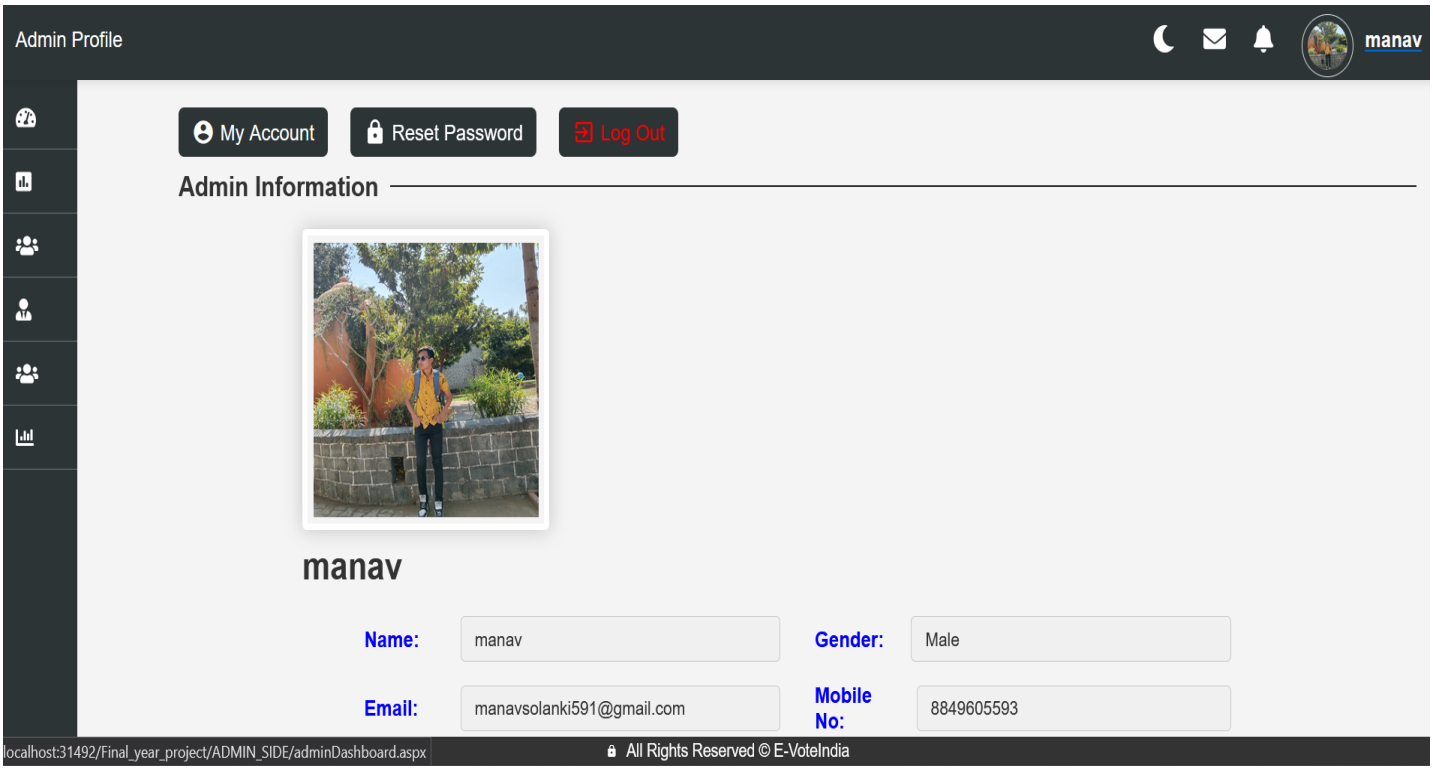
9. Result Page



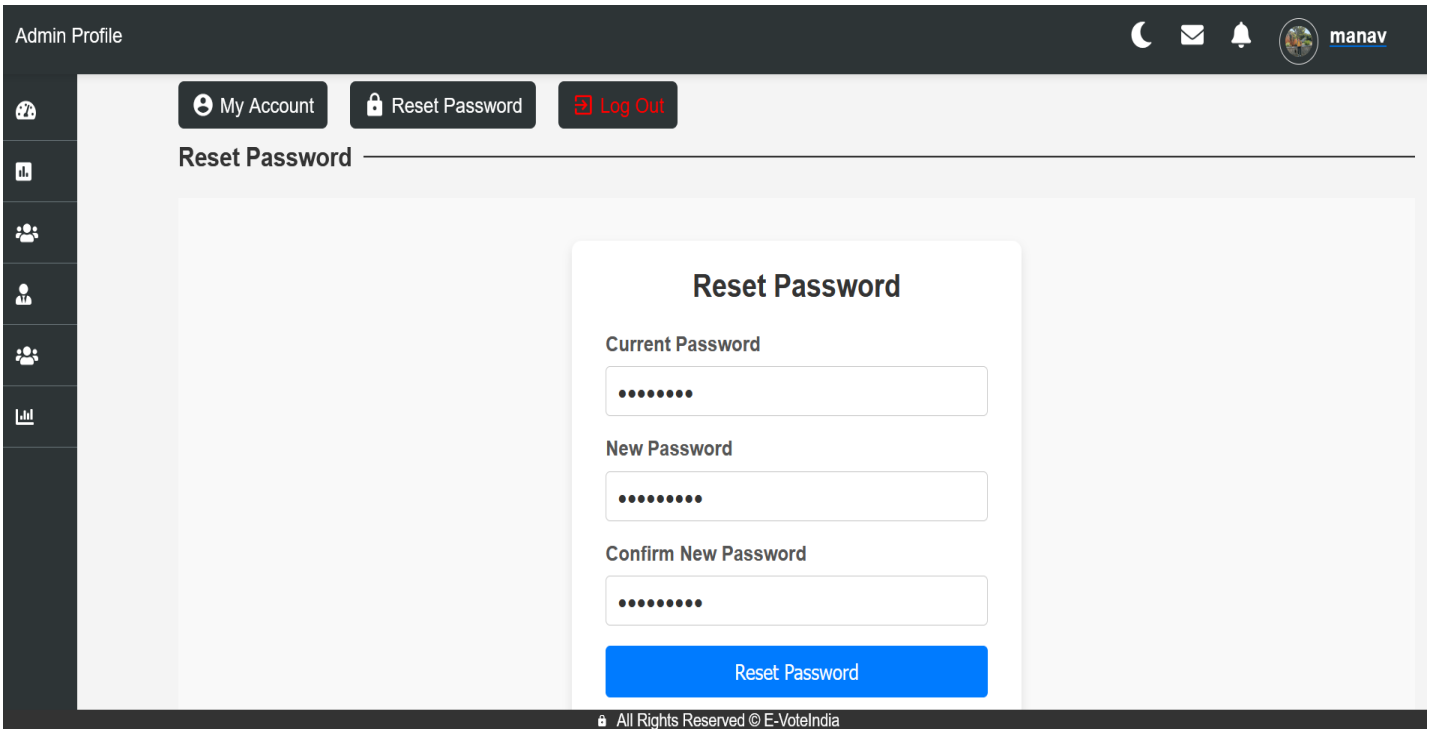
10. AdminForgotPassword Page



11. Admin Profile Page

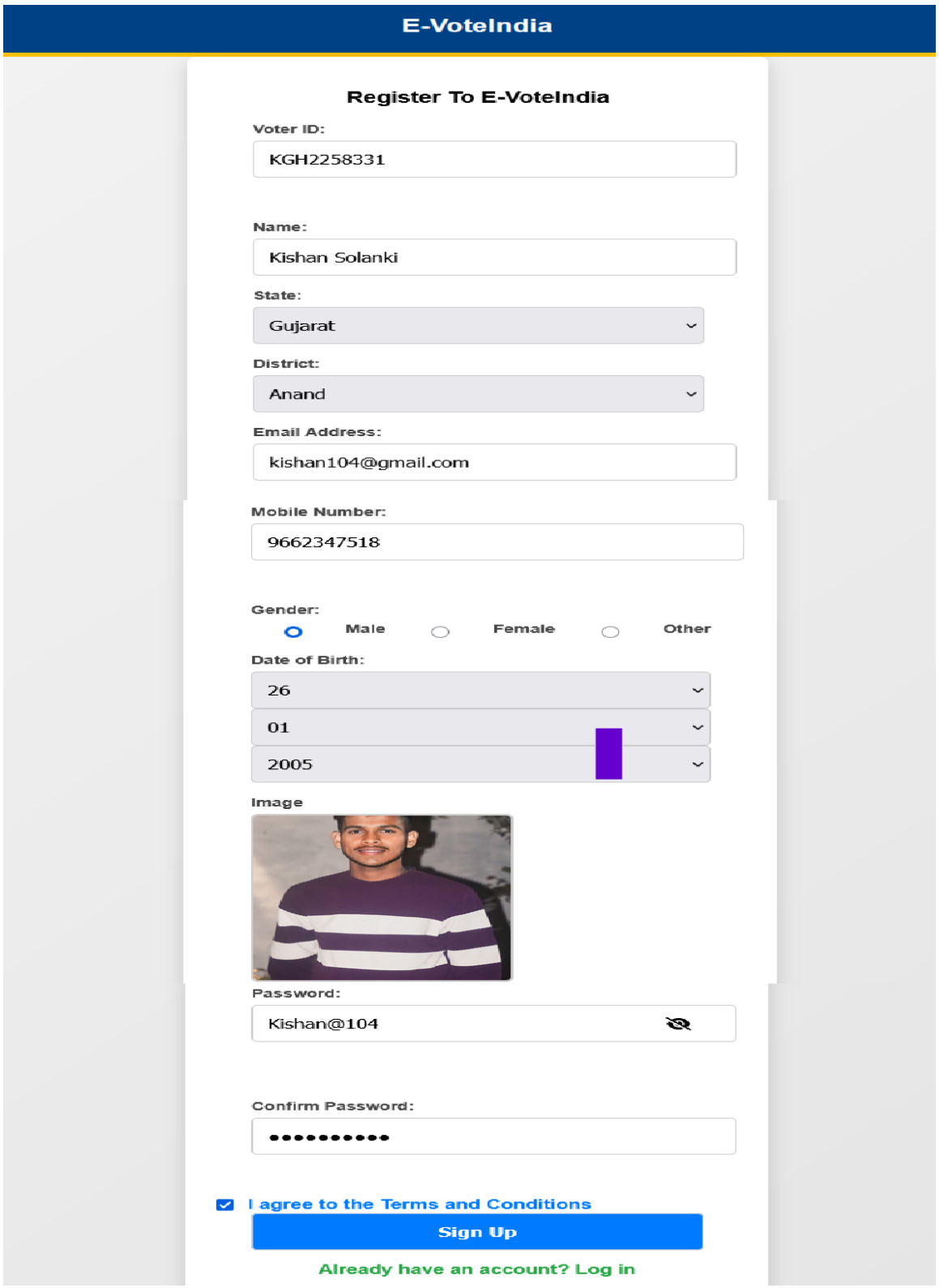


12. Admin Reset Password Page

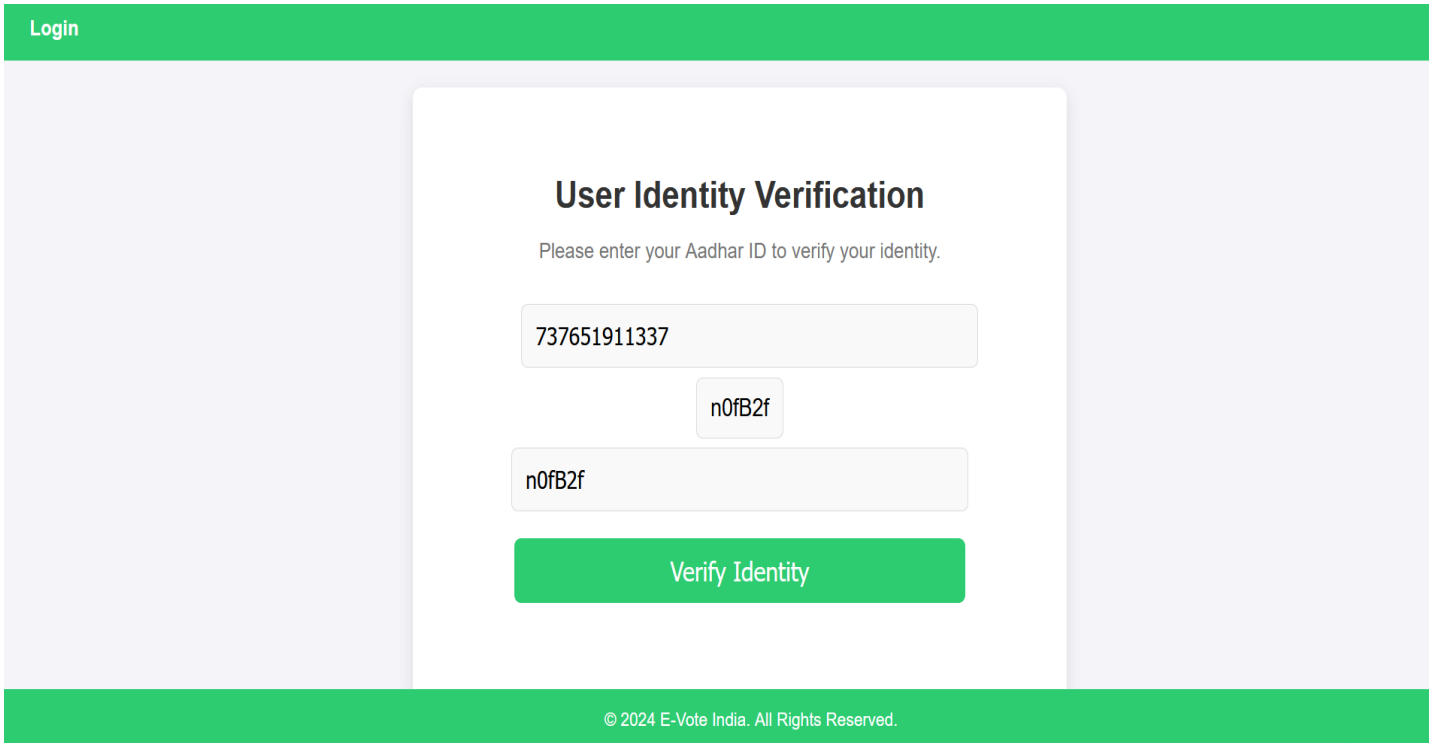


➢ User Side Pages

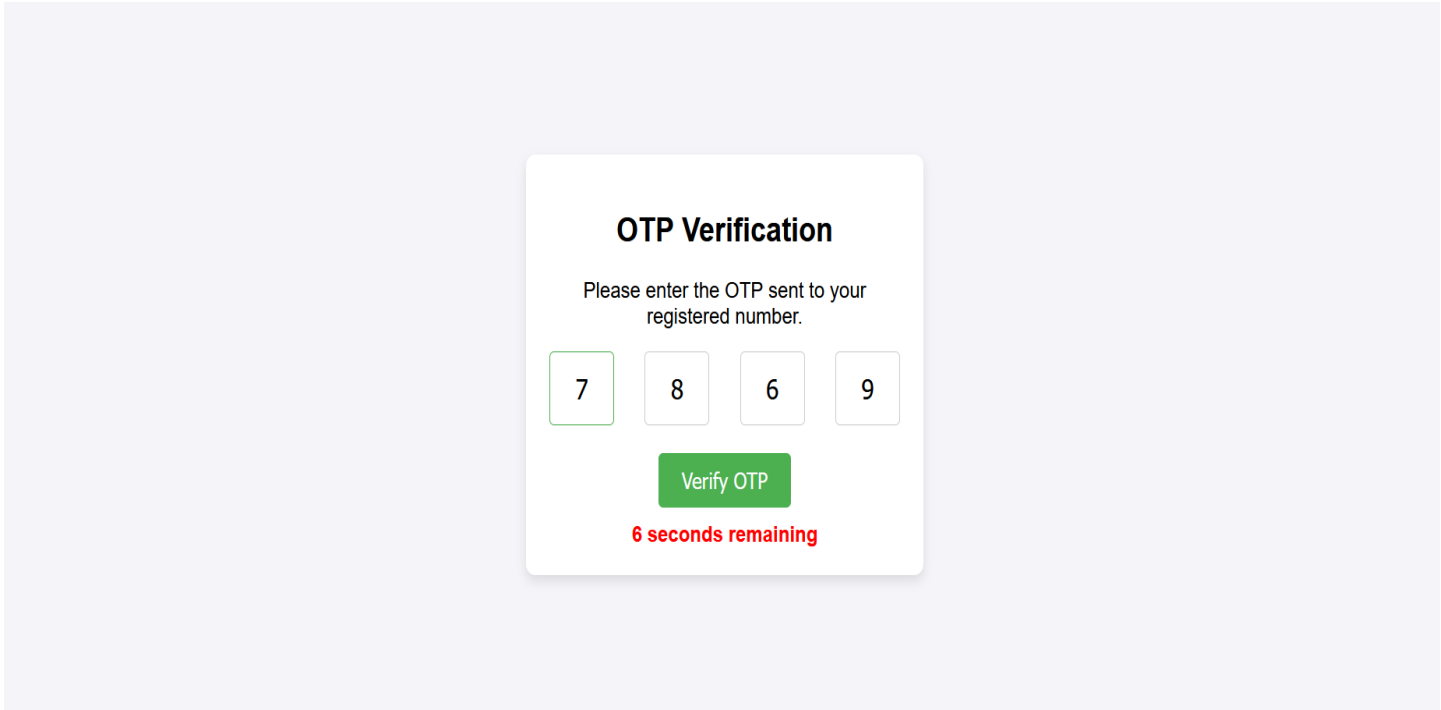
13. Sign Up Page



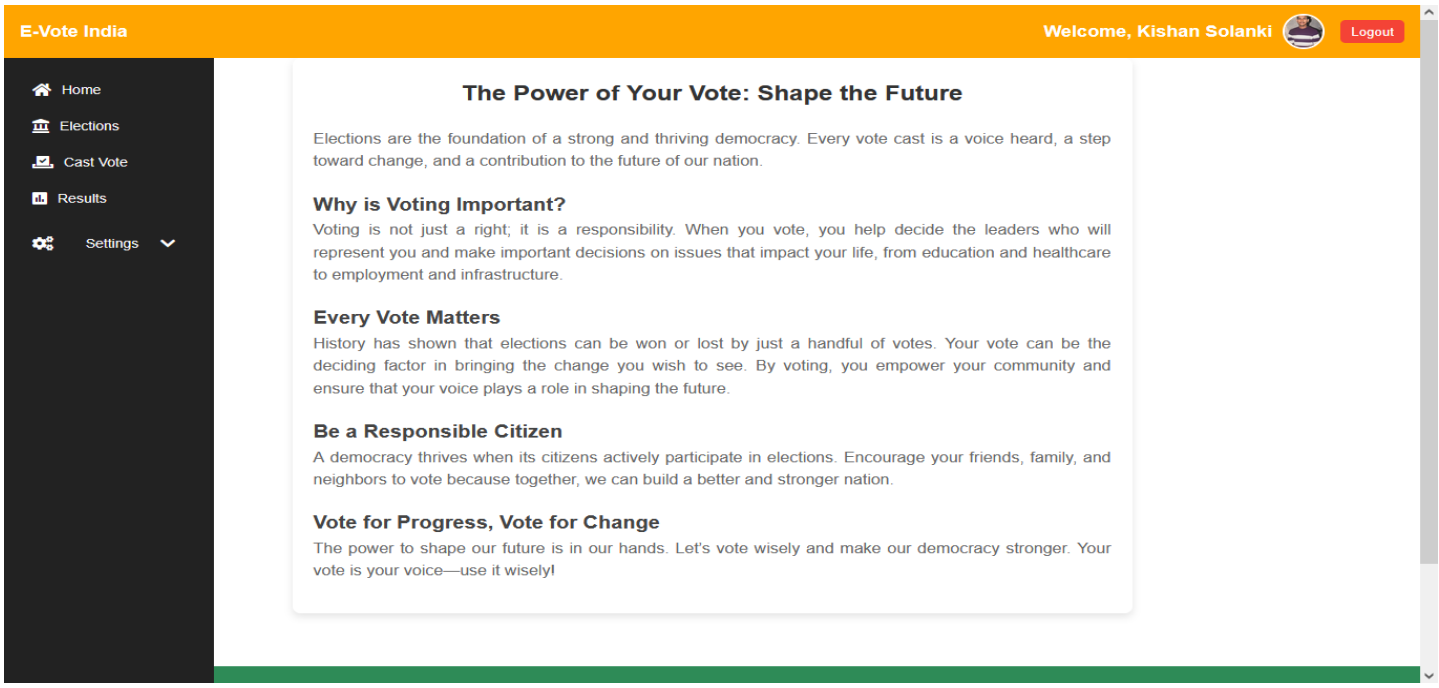
14. User Identity Verification Page



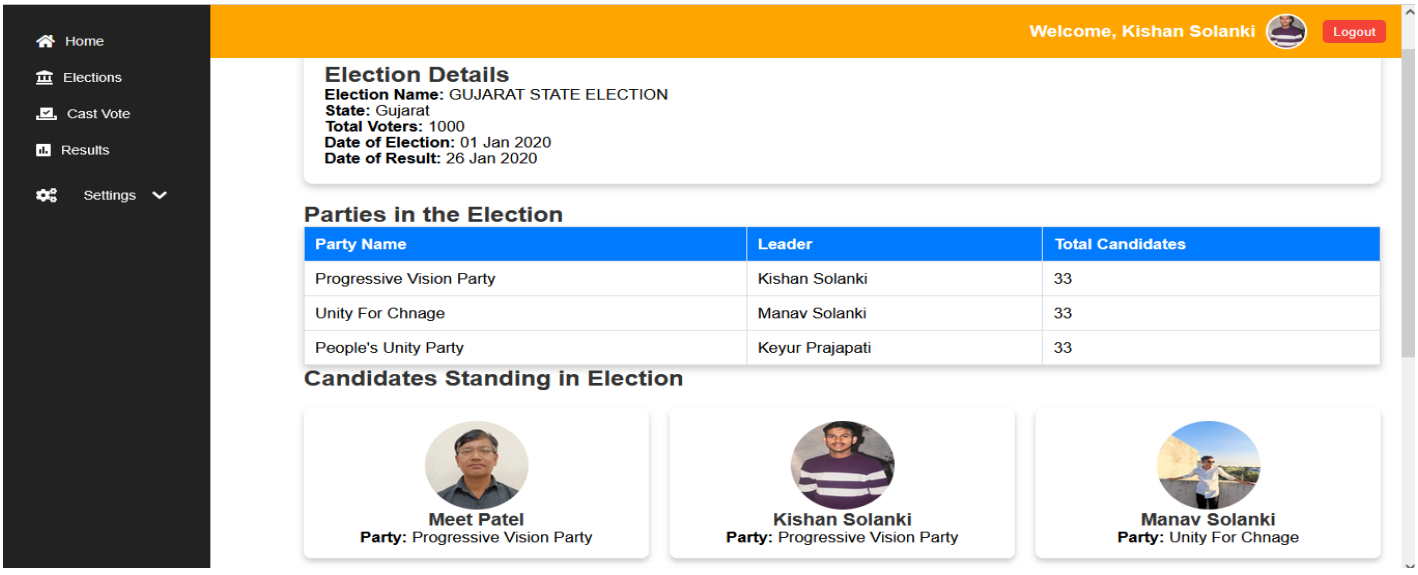
15. OPT Verification Page



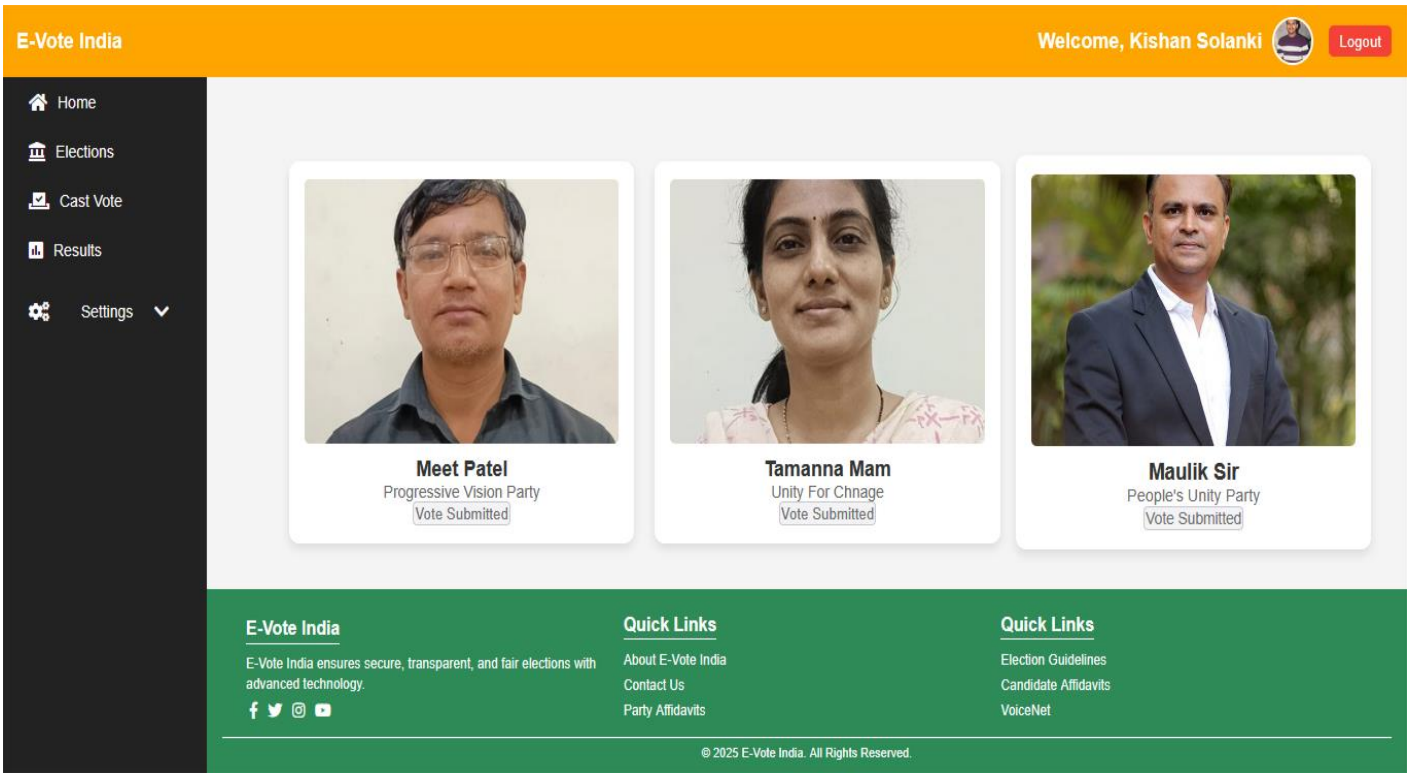
16. User Dashboard Page



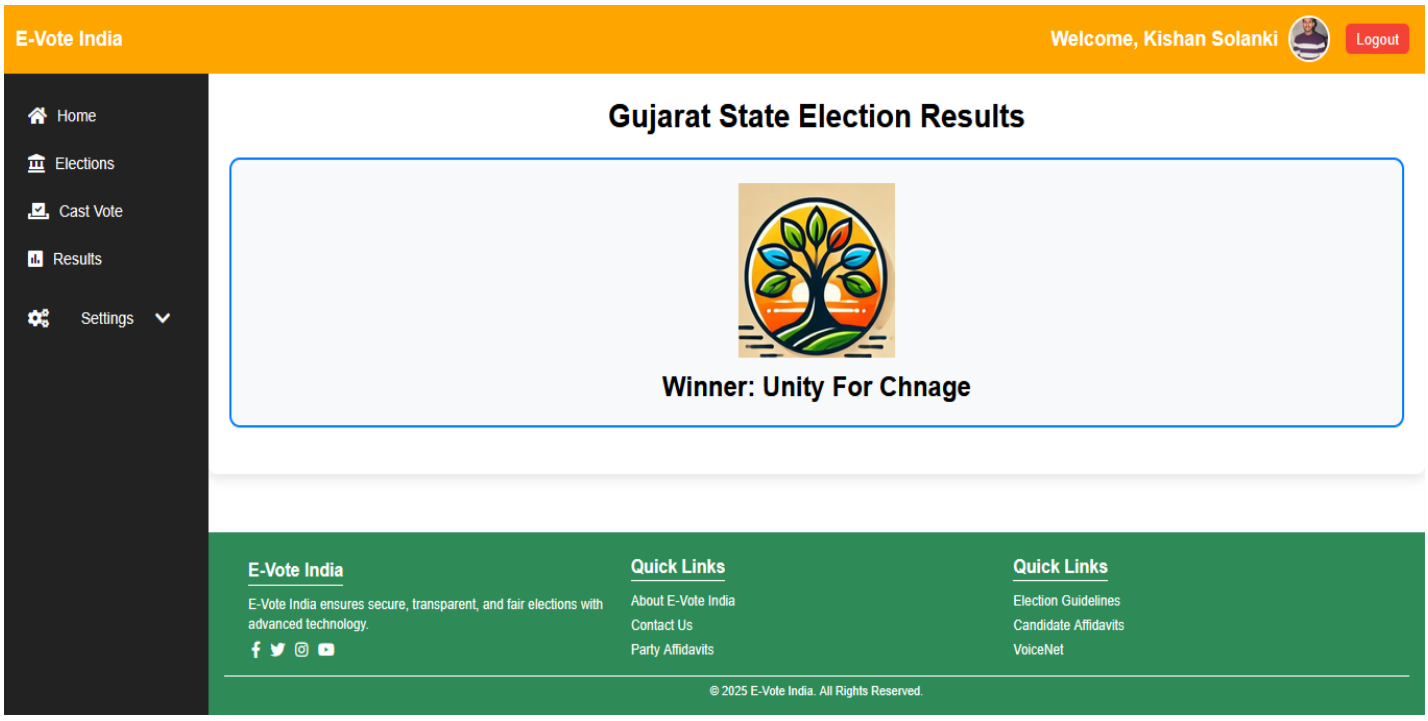
17.Elections Page



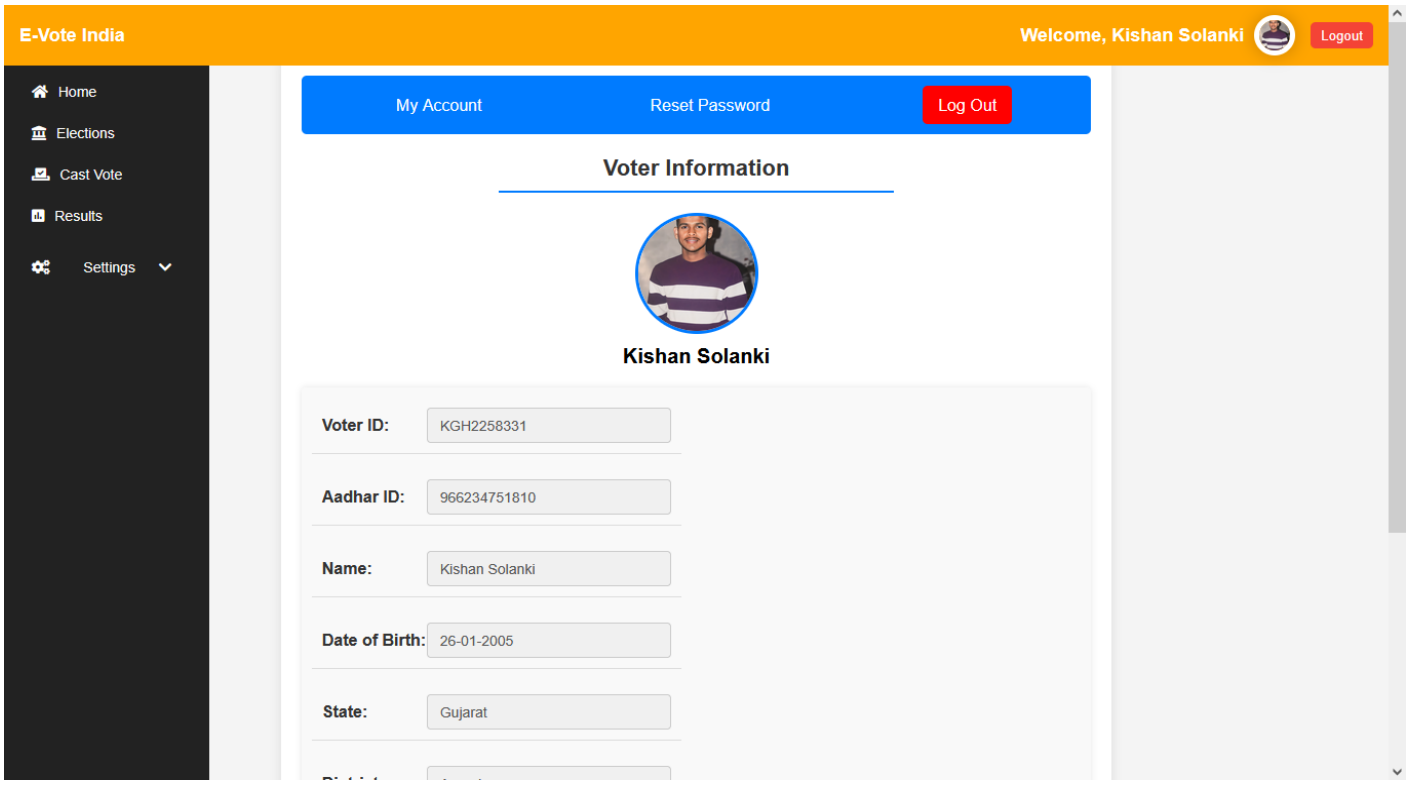
18. Cast Vote Page



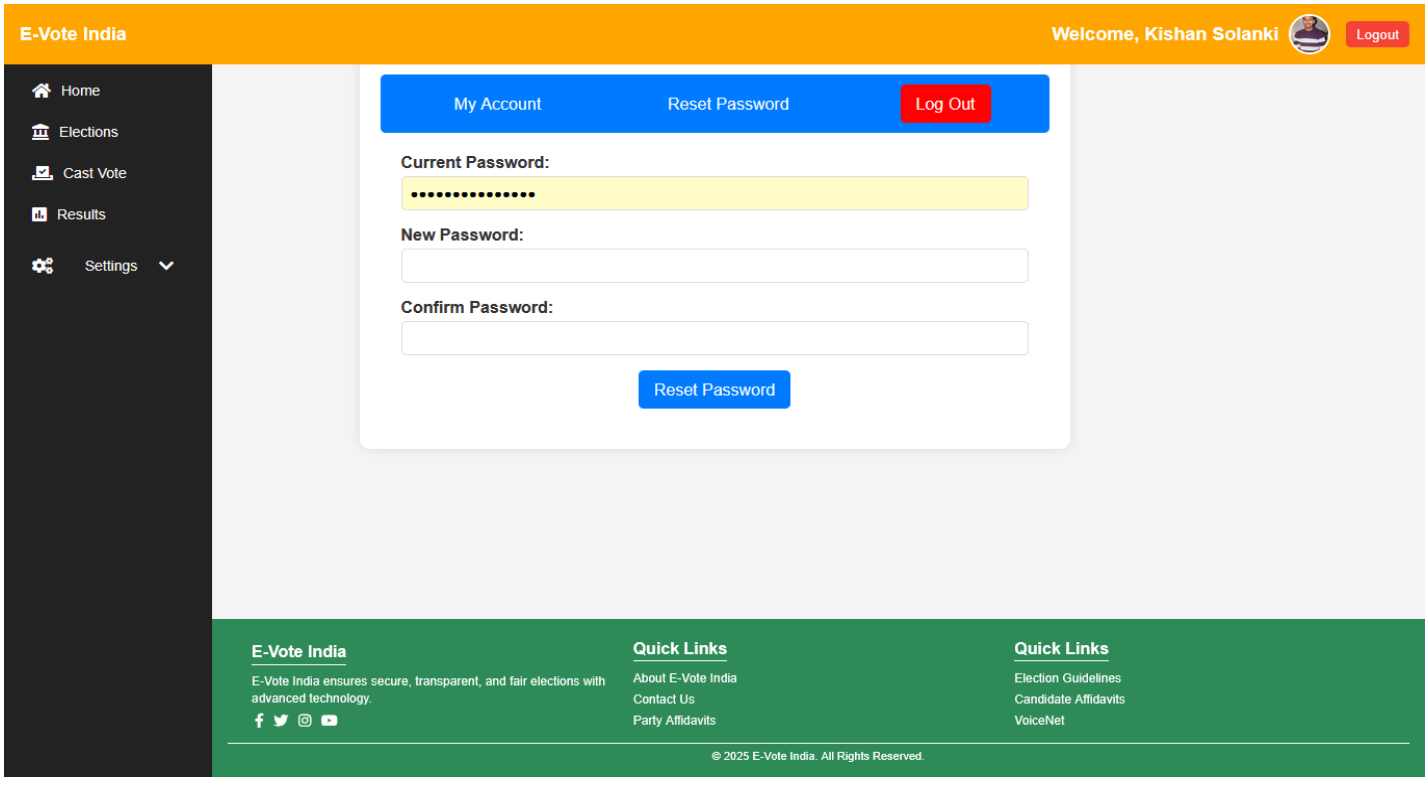
19. Result Page



20. Profile Page

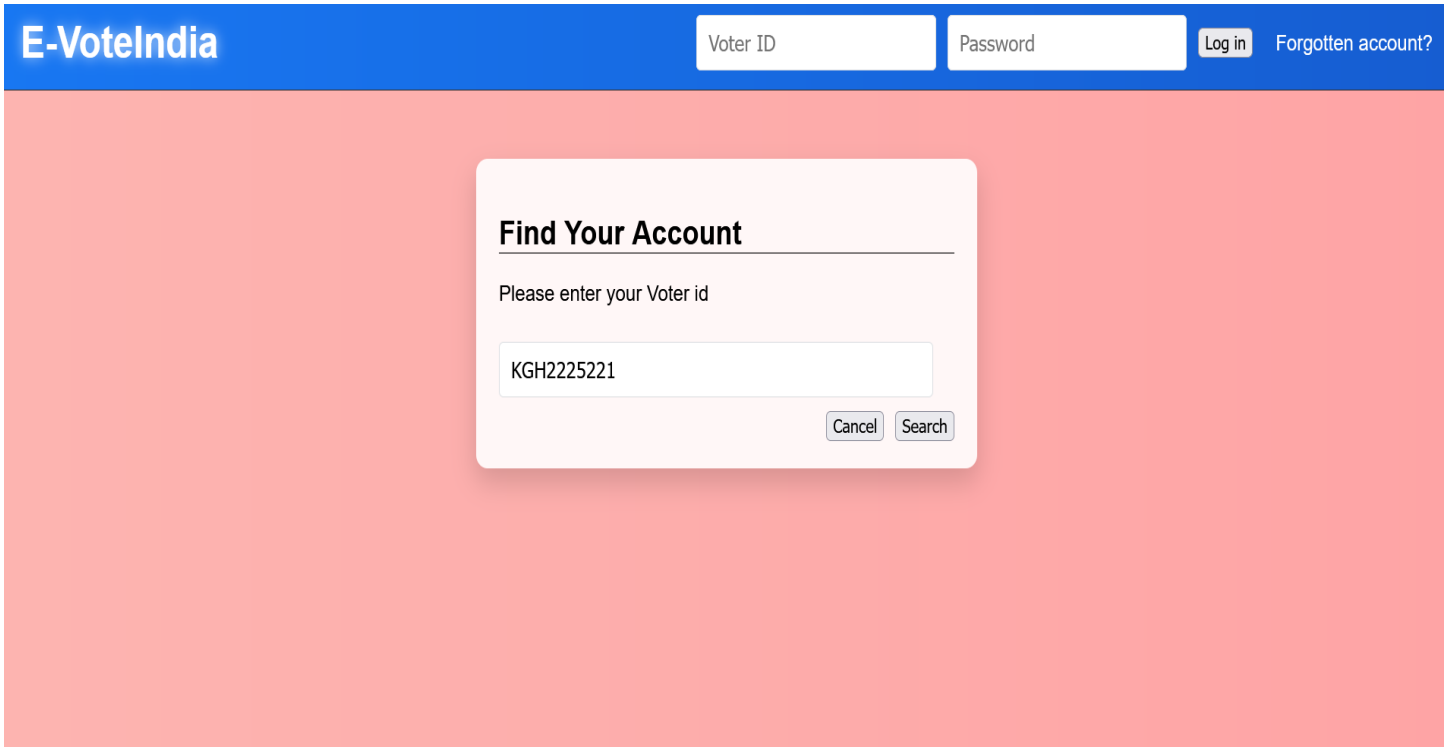


21. Reset Password

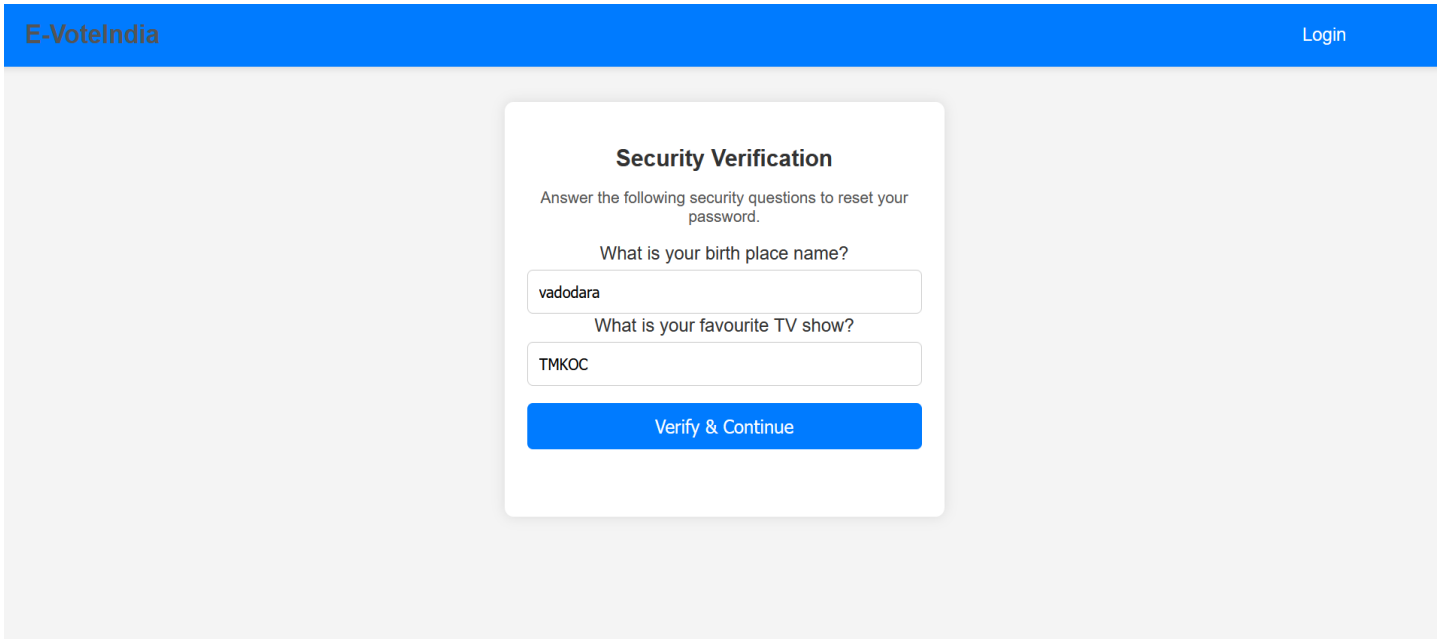


22. List Of Parties Page

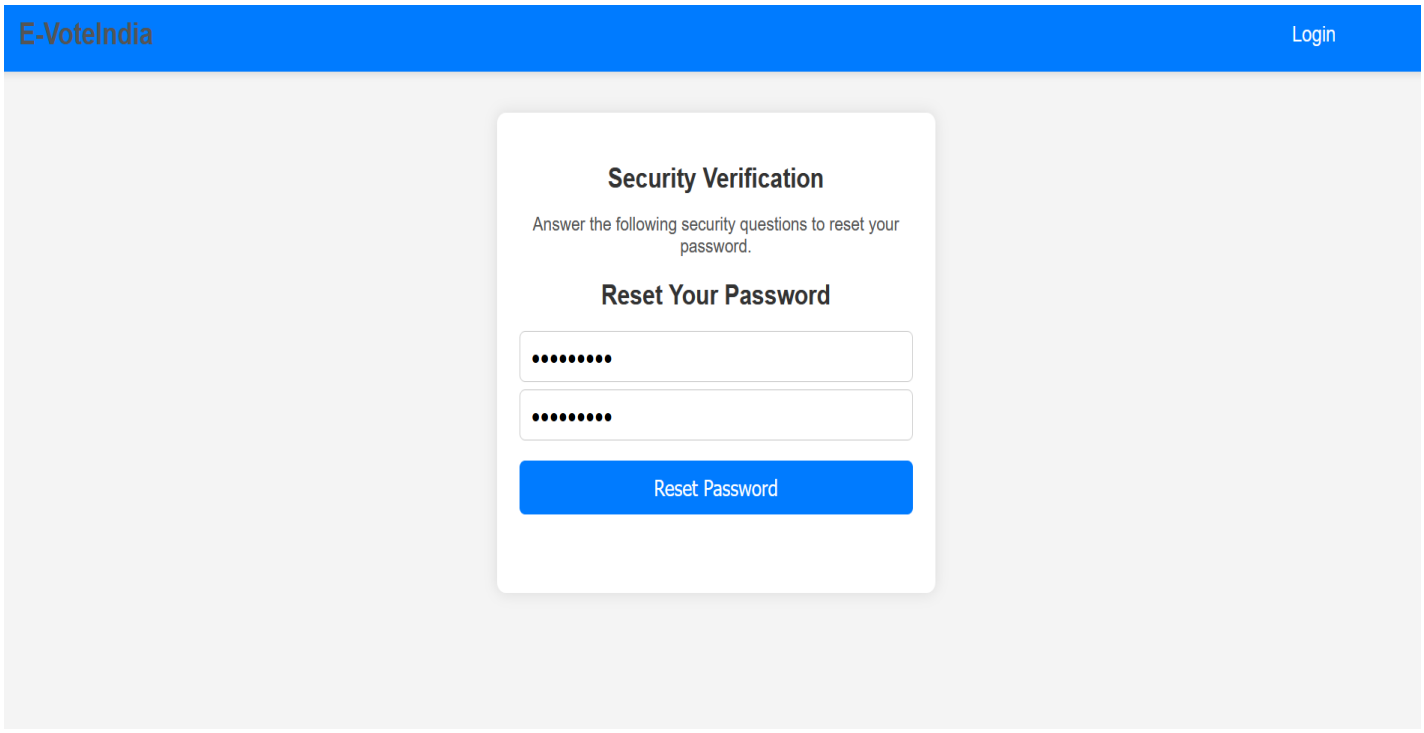
23. User Forgot Password Page



24. User Security Questions



25. Reset Password Page



Testing Procedures and Implementation Phases

Software testing is a critical element of software quality assurance and represents the ultimate reviews of specification, design and coding. The testing phase involves the testing of the system using various test data; preparation of test data plays a vital role in the system testing. After preparing the test data, the system under study is tested using those test data, and errors found are corrected and correction are recorded for future references. Thus, a series of testing is performed before the system is ready for implementation.

Various types of testing carried out on the system are:

- Validation testing
- Output testing
- User Acceptance Testing

Validation Testing:

Validation and verification is major part of testing

Validation:

The process of evaluating software at the end of its developing process to ensure that it is free from failures and complies with its requirement.

Verification:

Verification approaches attempt to identify product faults or errors which give rise to failures.

- **Validation and Verification Techniques:**

First, the validation and verification objectives for our project were decided. During this stage, we have to consider various aspects like constraints, complexities etc. the objectives of validation and verification is to be systematic and technical evaluation of software and their associated product of development.

For this purpose, at the end of the development process, it is very much required to do testing to ensure that the software requirements are compete.

- **Reviews:**

It is always very much required to review a project at the end of a phase to determine whether the requirements are established, design concepts and specifications have been met or not.

For example, if tax rates changes are required, then it should be possible to do so.

- **Inspection or Walkthrough:**

As inspection or walkthrough is a detailed examination of the product on a step-by-step basis. All program codes are subject to review. The purpose is to find errors. The project leader reviews the code to check its functionality.

- **Output Testing:**

After performing validation test the next phase is the output that of the system because no system can be useful if it does not produce the desired output in the desired format. By considering the format of reports, they are generated or

displayed, and tested. Here, output format is considered in two ways; one is on the screen and the other is in the printed form.

- **User Acceptance Testing:**

User Acceptance test for a system is the factor the success of the system. The system under consideration is listed for user acceptance by keeping in constant touch with the perspective user of the system at the time of design, development and making changes whenever required. This is done with regards to the following points.

- ✓ Input screen design
- ✓ Output design
- ✓ Menu driven system

Limitations: -

- The files that are prepared for the procedures require a lot of space.
- The Online Election Voting Website does not support multi-language User Interaction.
- Every procedure in the Online Election Voting Website needs documentation of the process. It is time consuming.
- To retrieve the old information is very tedious job.
- The Online Election Voting Website is only Can Be Used for The Gujarat State Election.

Proposed Enhancement :-

- Right now, the website is only for Gujarat's elections. It can be upgraded to work for elections in other states of India.
- The website currently uses only one language. It can be improved to support multiple languages so more people can use it easily.
- Accessibility features can be added to help voters with disabilities, making the voting process easy and inclusive for everyone.

Conclusion: -

The online voting website for Gujarat's elections is a big step forward in using technology to improve democracy. It allows people to vote easily, safely, and from anywhere in the state, removing problems like long lines and travel issues. Strong security features, like verifying voters and encrypting data, ensure the process is fair, accurate, and trustworthy.

References: -

- **https://learn.microsoft.com/en-us/aspnet/tutorials**
- **https://www.w3schools.com/**
- **https://www.eci.gov.in/**