Decentralized Voting System Using Blockchain

Final Year Project Proposal

Session 2021-2025

A 4th Year Student

A project submitted in partial fulfilment of the
Abbottabad UST Degree
of
BS in Software Engineering

Department of Computer Science

Abbottabad University of Science & Technology

18 March 2025

Project Registration

Project ID (for office use)	
Type (Nature of project)	[ ] **D**evelopment [ ] **R**esearch [ ] **R**&**D**
Area of specialization	Software Engineering/General Public

Project Group Members

Sr.#	Roll. #	Student Name	CGPA	Email ID	Phone #	Signature
(i)	10241	Haseeb Gul	2.96	ib.haseebgul@gmail.com	03135525948	
(ii)	10231	Hammad Latif	3.02	hammad8325@gmail.com	03705445057	

Plagiarism Free Certificate

This is to certify that, I am Haseeb Gul S/D/o Muhammad Hanif, group leader of FYP under roll no 10241 at Computer Science Department, Abbottabad UST. I declare that my FYP proposal is checked by my supervisor and the similarity index is 8% that is less than 20%, an acceptable limit by HEC. Report is attached herewith as Appendix A.

Date: 20/10/2024 Name of Group Leader: Haseeb Gul Signature: _____

Name of Supervisor: Ma'am Saman Shaheen Co-Supervisor (if any): _____

Designation: Lecturer Designation: _____

Signature: _____ Signature: _____

Approval of FYP Evaluation Panel

Member 1: Name: _____

[ ] Accept [ ] Defer [ ] Reject Signature: _____

Remarks: _____

Member 2: Name: _____

[ ] Accept [ ] Defer [ ] Reject Signature: _____

Remarks: _____

FYP Coordinator: Name: _____

[ ] Accept [ ] Defer [ ] Reject Signature: _____

Remarks: _____

Table of Contents

1 Project Abstract

The project is focused on creating a friendly and secure e-voting application to improve the conduct of elections, letting voters cast their votes electronically while maintaining the integrity, confidentiality, and accessibility of data. The system will employ technologies that will work towards improving the trustworthiness of the election process in order to facilitate higher turnout and simplify the voting processes.

2 Introduction

Over the years, due to the increased demand for accessibility and digital technologies, there has been an increased demand for secure and efficient systems to vote. Traditionally, voting takes such a long time and is usually prone to errors. Such traditional voting methods usually complain of low voter turnout, fraud and logistical problems, to mention just a few. E-voting application solve such problems through a platform that simplifies voting, ensures accuracy, and promotes civic engagement.

3 Motivation and Scope

3.1 Deliverable

A mobile application that will available on both iOS as well as Android.

A user authentication System that provides an effective means for voters to register and login to a system.

Provide an easy to navigate interface for voting.

An admin dashboard system that allows election administrators to perform management functions during voting.

Automated collection of results and reporting, means that once the voting period end the system automatically collect votes, count them and make results available to public.

Helping information and instructions are also available for users of the app.

3.2 Features

Confidential and easy process of signing up for users through verification.

Simple and easy steps that users will have to follow in order to vote.

All election data, from vote count and voter choices are kept safe and unseen during the voting until the officially announcement of the results

Once the voting period starts, no one-not even an administrator can see or access the results.

User will receive real time updates of the status of their casting or any other important announcements.

System maintains complete record of every voting or attempted voting activity.

3.3 Limitations

Needs a proper internet connection in order to work effectively.

Less technical friendly for some of the demographic.

There is a potential occurrence of cyber-attacks which could lead to loss of data.

The first stage of implementation can be limited to few areas or targets for the purpose of testing.

3.4 Acceptance Criteria

Users must be able to log in, register, cast their votes without critical errors during the testing of the app.

All users will be properly authenticated with strict password requirements to prevent unauthorized access.

The application must have more than 80% on user testing. In other words, it should be easy to navigate and understand.

Technical as well as user documentation should be prepared to explain all the features and functionalities of the apps clearly.

The application must be in compliance with local election laws and regulations specifically regarding voter privacy and data protection.

4 Related Work

We have seen many works in the recent years about E-voting systems. But most such systems have faced the problem of scalability and security with acceptance from the people.

The more ancient work gives me the much-needed historical background to my research, and the importance and limitations of it come alive in that account. It is from this groundwork that my research identifies its limitations and confirms advancement in the field of study.

Some of the related work done in past are:

S No.	Project	Year	Techniques	Future work	Recommendations	Results
1	Blockchain Based E-voting System	2023	Review of blockchain technology in e-voting systems	Further research on scalability and security enhancement	Adoption of standardized protocols	Improved security and transparency
2	Blockchain for Electronic Voting System	2021	Review of blockchain application in e-voting system	Addressing open research challenges	Focus on user privacy and system robustness	Identification of key challenges
3	Implementation of Blockchain based e-voting app	2023	Use of smart contract for e-voting	Enhance security resistance to errors	Widespread acceptance and testing.	Development of a secure e voting portal
5	Development of Blockchain based e-voting app	2024	Using Ethereum blockchain	Enhance security resistance to errors	First test and implement this on small scale	Development of a secure e voting portal

Table 1: Related Work

5 Requirements

The requirements for the e-voting app can be categorized as follows:

5.1 Functional Requirements

User registration and authentication.

Eligibility check.

Voting interface and ballot design.

Voting and vote confirmation.

Calculations and reporting confidential results.

User Support (FAQs, Email Support).

5.2 Non-Functional Requirements

Security: It involves protecting digital information from unauthorized access, breaches, and loss.

Usability: An intuitive interface usable by a wide demographic of users.

Performance: Guarantees reasonable response times even when the application is highly used.

Compatibility**:** The app should be compatible with both iOS and Android.

Maintainability: Follow coding standards and best practices to ensure maintainable and readable code.

6 Goals and Objectives

Improve electoral processes that every voter, especially the disabled can use for voting.

Provide easier methods of carrying out the voting exercise in order to increase the number of people that vote.

Secure personal data of the voters and ensure that appropriate security controls are in place to ensure election security.

Encourage due processes and restrictions during voting with the aim of completing the activity within the shortest time possible.

Enable the counting and reporting of election outcomes in the fastest time possible.

Create a functional and inclusive mechanism for its target users.

Ensure that voters are identifiable and secured through trusted identification methods to avoid any electoral cons.

7 Features of the project

7.1 User Registration and Authentication

Safe registration process will be open to the users to make their registration.

Verification could be Email confirmation or any other secure method.

Login will authenticate using either username /password or multi-factor authentication

7.2 Voting Interface and Ballot Design:

The user interface will be easy and public friendly.

Names, pictures, party affiliation, and more details will appear on the ballot.

Voters should be easily able to browse the ballot and make their choices.

7.3 Voting and Vote confirmation:

They will allow secret and safe voting for the candidates for whom they wish to vote.

A confirmation screen might show the user's selections before final submission.

They can also view and alter the ballots before submitting.

7.4 Data Computation and Confidential Results

Votes are encrypted and safely stored, and are not accessible or alternate by any others.

The result cannot be seen or changed by either the administrators or any other party during the voting period.

Results are kept private till voting ends. After voting is over, the system automatically calculates and presents all the final results to each person.

7.5 User Support and Documentation

Assistance section within the application that includes FAQs.

Users should be able to reach support through email.

Admin have to assist those complications and solve them.

Provide a full documentation of the software as a user manual for better understanding of the project

8 Gantt Chart

Activity/Time	Month 1	Month 2	Month 3	Month 4-5	Month 6	Month 7	Month 8
Planning							
Requirement Gathering							
Design Phase							
Development Phase							
Testing Phase							
Deployment Phase							
Maintenance Phase							

Table 2: Gantt Chart

9 Architectural Diagram

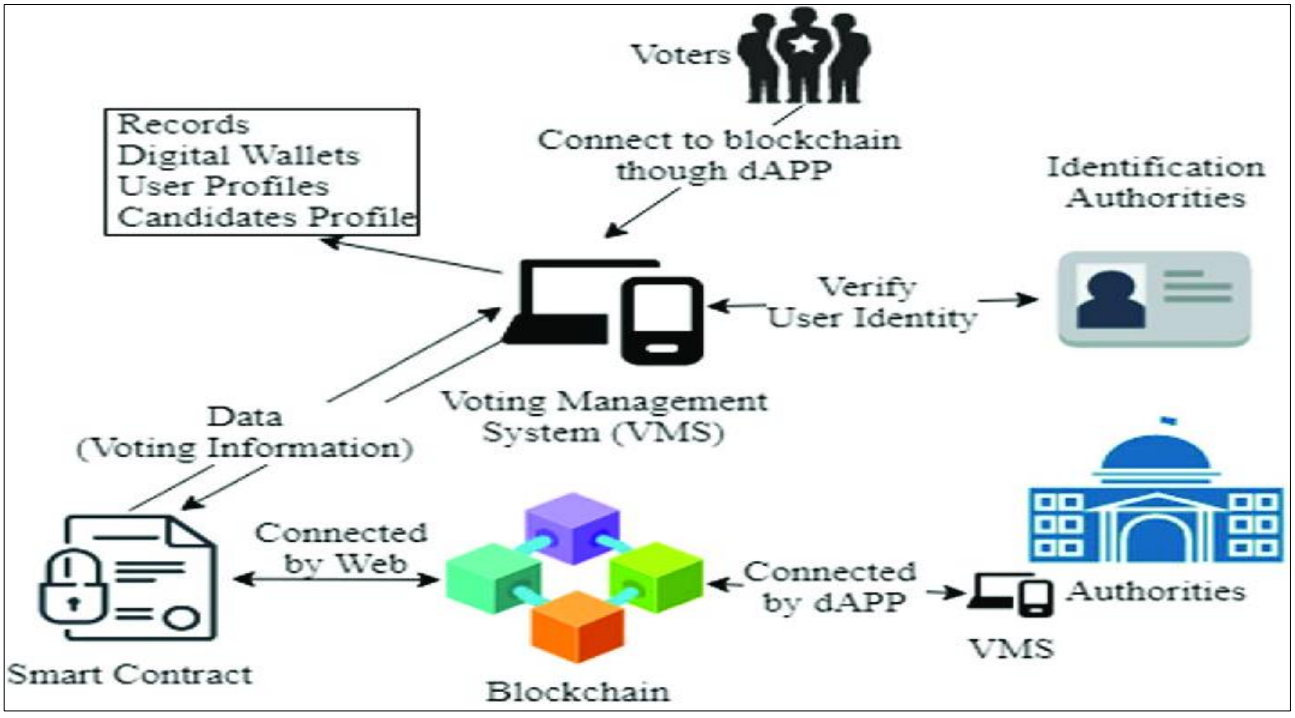

Figure 1: Architecture Dignam

10 Tools and Technologies

Tools	Usage
Vs Code	IDE for writing Code
Remix IDE	IDE for writing Smart Contracts for Blockchain
Android Studio	Tool for developing Mobile Applications

Table 1: Tools

Technologies	Usage
React Native	For frontend development
Solidity	For smart contract development
Sepolia Test Net	Deployment of application over blockchain
Firebase	Database

Table 2: Technologies

11 References

Blockchain-Based E-Voting Systems: A Technology Review by Mohammad Hajian Berenjestanaki, Hamid R. Barzegar and Nabil El Ioini https://www.mdpi.com/2079-9292/13/1/17

Blockchain for Electronic Voting System—Review and Open Research Challenges by Uzma Ja, Mohd Ziauddin and Ab Aziz Zarina Shukur. https://www.mdpi.com/1424-8220/21/17/5874

Enhancing Security and Transparency in Online Voting through Blockchain Decentralization by Inderpreet Singh, Inderpreet Singh, Amandeep Kaur,Parul Agarwal and Sheikh Idrees. https://www.researchgate.net/publication/384465973_Enhancing_Security_and_Transparency_in_Online_Voting_through_Blockchain_Decentralization

…… DO NOT WRITE BELOW THIS LINE…..……

FOR OFFICE USE ONLY	
Approved	☐ Yes ☐ No

Checked & Approved/Not Approved By:

Name: _____

Signature: _____

Day Month Year

DATE | | | – | | | – | | | | |

Appendix A

Include here the 1st page of Turnitin Report