A Project Report on

Decentralized Voting Application

Submitted in partial fullment of the requirements for the award

of the degree of

Bachelor of Engineering

in

Computer Engineering

by

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Academic Year 2018-2018

Approval Sheet

This Project Report entitled ***Decentralized Voting Application*** Submitted by ***Siddhant Bhadsavale(16102038), Himanshu Malhotra(17202006)*** is approved for the partial fulfillment of the requirement for the award of the degree of ***Bachelor of Engineering*** in ***Computer Engineering*** from ***University of Mumbai***

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Head Department of Computer Engineering

Place:A.P.Shah Institute of Technology, Thane

Date::

CERTIFICATE

This is to certify that the project entitled ***"Decentralized Voting Application"*** submitted by ***"Siddhant Bhadsavale"(16102038),"Himanshu Malhotra"(17202006) ,*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Computer Engineering***,to the University of Mumbai,is a bonafide work carried out during academic year 2017-2018.

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Date:

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

_____

(Signature)

_____

(Siddhant Bhadsavale 16102038)
(Himanshu Malhotra 17202006)

Date:

Acknowledgement

We have great pleasure in presenting the report on Project Title. We take this opportunity to express our sincere thanks towards our guide Guide Name & Co-Guide Co-Guide Name Department of computer, APSIT thane for providing the technical guidelines and suggestions regarding line of work. We would like to express our gratitude towards his constant encouragement, support and guidance through the development of project.

We thank Prof. Sachin Malve Head of Department,IT, APSIT for his encouragement during progress meeting and providing guidelines to write this report.

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Siddhant Bhadsavale:

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Abstract

Blockchain technology has attracted tremendous attention in both academia and capital market. However, overwhelming speculations on thousands of available cryptocurrencies and numerous initial coins offering scams have also brought notorious debates on this emerging technology. One such application of blockchain is a decentralized application. This project eliminates the traditional client server architecture and establishes a decentralized network.

This network will not have the conventional database instead each node will have its own storage called as the ledger and it will store the ever-growing records as per the invoked transaction. This project basically focuses on establishing a basic decentralized voting application which will reflect the transparency in the voting application which checks and avoids double voting.

CONTENTS

1. Introduction:

Unlike the electoral system, there are many conventional uses of paper in its implementation. The aspect of security and transparency is a threat from still widespread election with the conventional system (offline). General elections still use a centralized system, there is one organization that manages it. Some of the problems that can occur in traditional electoral systems is with an organization that has full control over the database and system, it is possible to tamper with the database of considerable opportunities.
Blockchain technology is one of solutions, because it embraces a decentralized system and the entire database are owned by many users.

Decentralized Voting Application is developed using Solidity Programming Language, NodeJS. Main aim of this project is to implement blockchain to create a secured voting system . This system will eliminate the possibilities of double voting and to keep the candidate votes transparent.

2. Literature Review

1) **Decentralized Applications: The Blockchain-Empowered Software System:- DOI(**10.1109/ACCESS.2018.2870644 **)**
    - Blockchain technology has attracted tremendous attention in both academia and capital market. However, overwhelming speculations on thousands of available cryptocurrencies and numerous initial coin offering scams have also brought notorious debates on this emerging technology. This paper traces the development of blockchain systems to reveal the importance of decentralized applications (dApps) and the future value of blockchain.

    - In this project we have used the concept of a decentralized application

2.) **Blockchain Based E-Voting Recording System Design**:-
DOI(10.1109/CLOUD.2018.00151)
    - The use of technology has become commonplace at this point in helping to meet human needs. The increasing use of technology has brought new challenges in the process of democracy as most people today don't trust their governments, making elections very important in modern democracy. Elections have a great power in determining the fate of a nation or an organization.

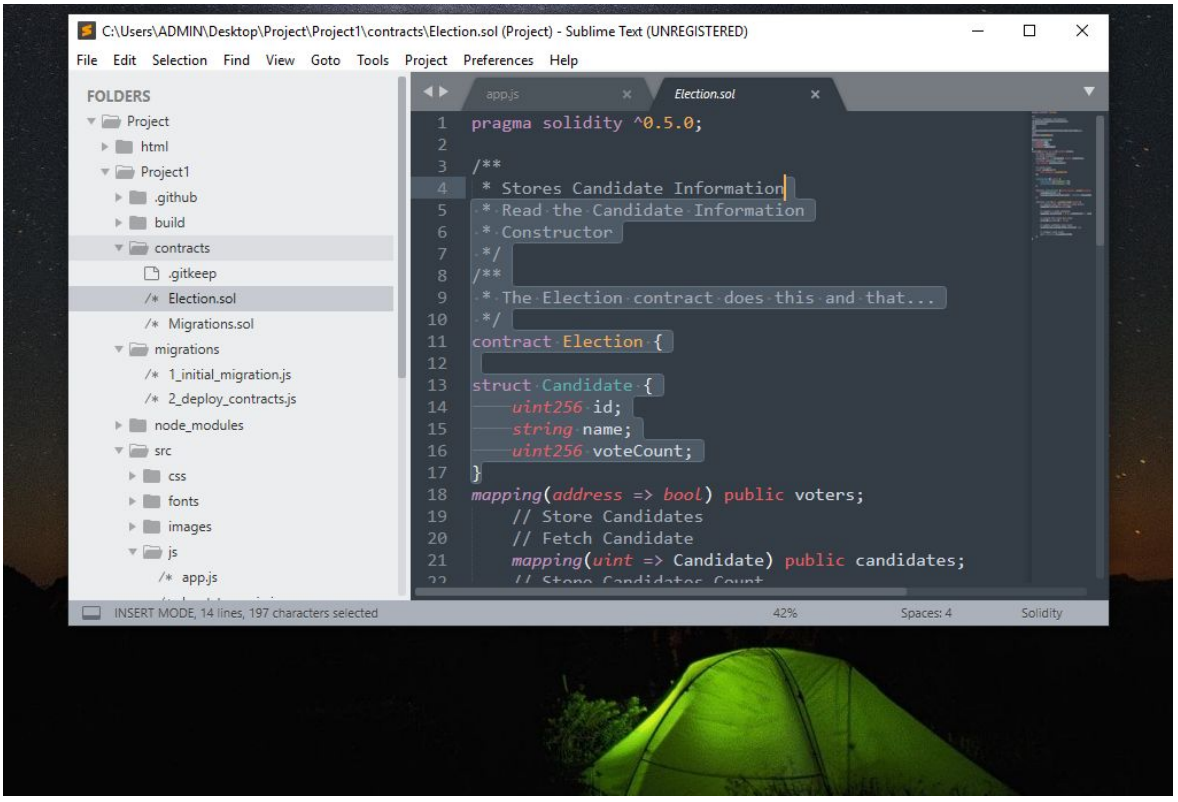
3. TECHNOLOGIES SETUP AND ENVIRONMENT

About The System

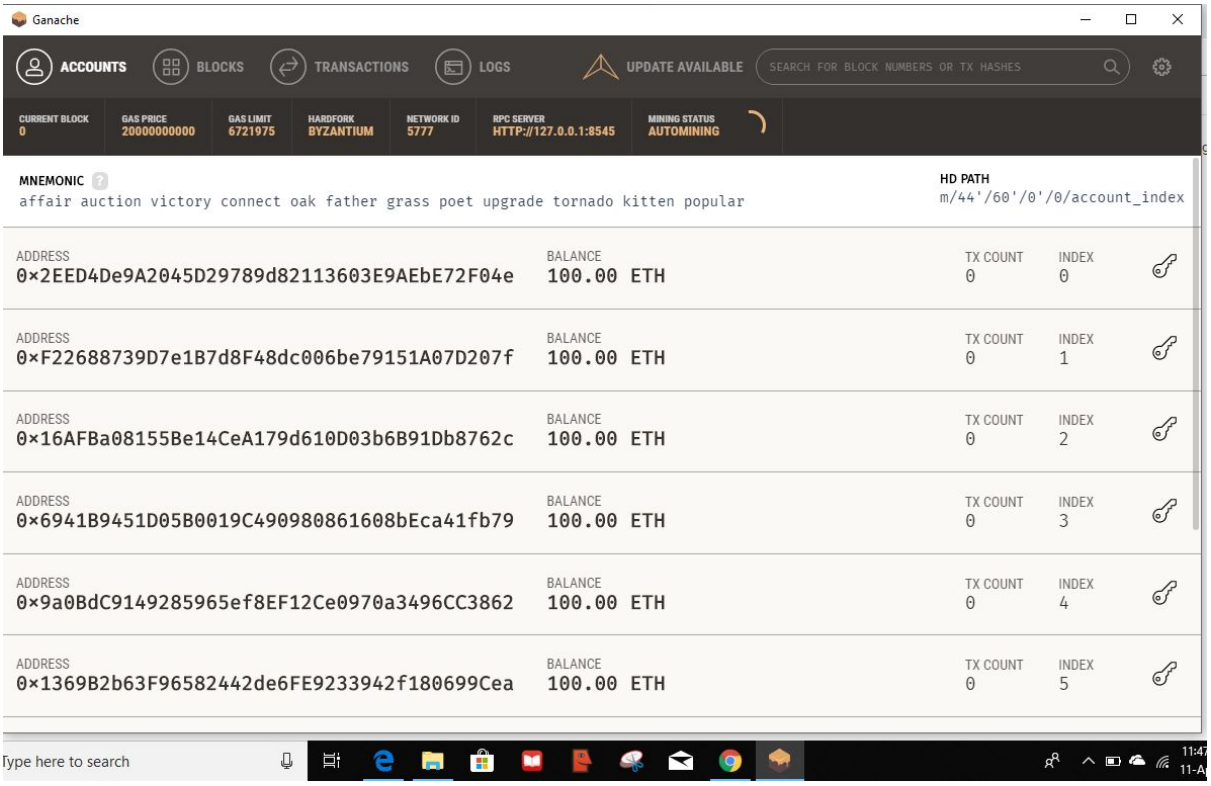
Truffle Framework: Truffle is a development environment and a testing framework for blockchains using Ethereum Virtual Machine(EVM).

- It provides Built-in smart contract compilation and deployment
- To install truffle framework **npm install –g truffle**

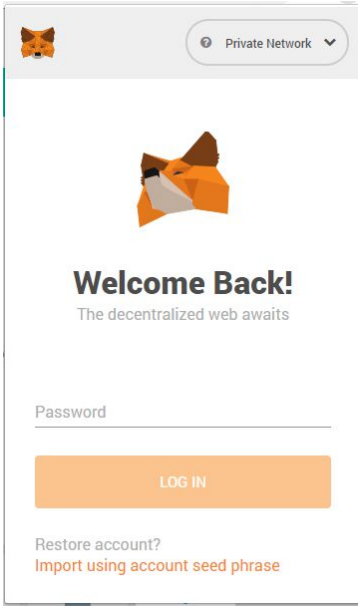
Solidity : This is the programming language which is used for writing smart contracts. Smart contract contains the main business logic of user interaction with the blockchain. It is contract oriented language



Ganache : It is the local blockchain used for deploying smart contracts and to run blockchain based application . It gives us ten unique accounts each containing 100 ether for development purpose



Metamask : Metamask is a browser extension which can be used in Google Chrome or brave browser. This extension is required as it connects the user with the local blockchain or the main Ethereum network



web3: web3.js is a javascript library that allows our client-side application to talk to the blockchain. We configure web3 inside the "initWeb3" function

4. Flow of the project

4.1 Deploy the smart contracts on the local blockchain

```
C:\Users\ADMIN\Desktop\Project\Project1>truffle migrate --reset

Compiling your contracts...
===========================
> Everything is up to date, there is nothing to compile.


Starting migrations...
======================
> Network name:    'development'
> Network id:      5777
> Block gas limit: 6721975


1_initial_migration.js
======================

   Replacing 'Migrations'
   ----------------------
   > transaction hash:    0x3c3b088395bb43f1298f8becc8c0d667fbabde8e9dbcd276a63e98f786444db2
   > Blocks: 0            Seconds: 0
   > contract address:    0xAB9a43460E54af1CeBdfD9f55CDAe342460c75a2
   > account:             0x2EED4De9A2045D29789d82113603E9AEbE72F04e
   > balance:             99.99430312
   > gas used:            284844
   > gas price:           20 gwei
   > value sent:          0 ETH
   > total cost:          0.00569688 ETH


   > Saving migration to chain.
   > Saving artifacts
   -------------------------------------
   > Total cost:          0.00569688 ETH


2_deploy_contracts.js
```

```
Command Prompt
======================

   Replacing 'Election'
   --------------------
   > transaction hash:    0x69cd663bfc4617a94a5a10ecfe61fb5db7b254e2b292e24e737adc724b3200fb
   > Blocks: 0            Seconds: 0
   > contract address:    0x2D3c0Da13E04ee9Bd6cdbF91c9e1b94ed26886Fe
   > account:             0x2EED4De9A2045D29789d82113603E9AEbE72F04e
   > balance:             99.98385142
   > gas used:            480551
   > gas price:           20 gwei
   > value sent:          0 ETH
   > total cost:          0.00961102 ETH


   > Saving migration to chain.
   > Saving artifacts
   -------------------------------------
   > Total cost:          0.00961102 ETH


Summary
=======
> Total deployments:   2
> Final cost:          0.0153079 ETH


C:\Users\ADMIN\Desktop\Project\Project1>
```

4.2 To run this server use the command **npm run dev**

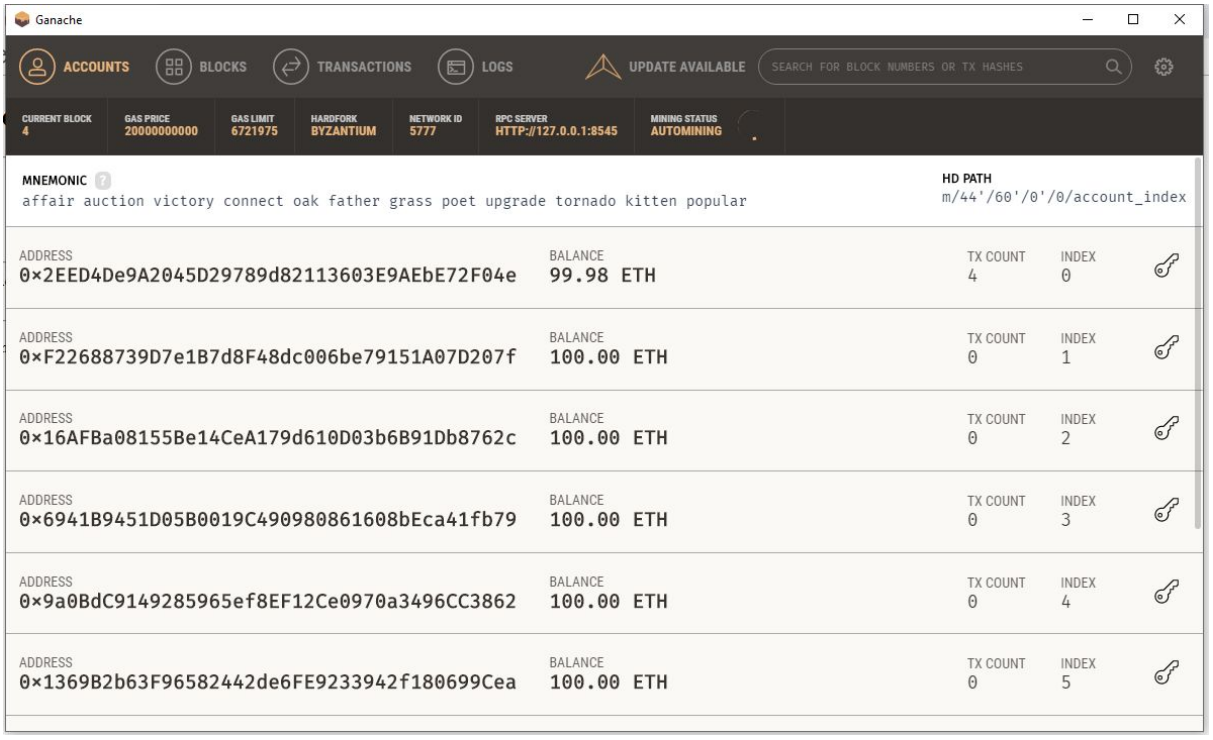
```
C:\Users\ADMIN\Desktop\Project\Project1>npm run dev

> pet-shop@1.0.0 dev C:\Users\ADMIN\Desktop\Project\Project1
> lite-server

** browser-sync config **
{ injectChanges: false,
  files: [ './**/*.{html,htm,css,js}' ],
  watchOptions: { ignored: 'node_modules' },
  server:
   { baseDir: [ './src', './build/contracts' ],
     middleware: [ [Function], [Function] ] } }
[Browsersync] Access URLs:
 --------------------------------------
       Local: http://localhost:3000
    External: http://192.168.43.161:3000
 --------------------------------------
          UI: http://localhost:3001
 UI External: http://localhost:3001
 --------------------------------------
[Browsersync] Serving files from: ./src
[Browsersync] Serving files from: ./build/contracts
[Browsersync] Watching files...
19.04.11 11:50:58 304 GET /index.html
19.04.11 11:50:58 304 GET /js/bootstrap.min.js
19.04.11 11:50:58 304 GET /js/web3.min.js
19.04.11 11:50:58 304 GET /js/truffle-contract.js
19.04.11 11:50:58 304 GET /js/app.js
19.04.11 11:50:58 200 GET /Election.json
19.04.11 11:50:59 404 GET /favicon.ico
19.04.11 11:51:13 304 GET /index.html
19.04.11 11:51:13 304 GET /js/bootstrap.min.js
19.04.11 11:51:13 304 GET /js/web3.min.js
19.04.11 11:51:13 304 GET /js/truffle-contract.js
19.04.11 11:51:13 304 GET /js/app.js
19.04.11 11:51:13 304 GET /Election.json
```

5.Result

5.1 After deploying the smart contracts and running them on the lite-server we get the following outputs
Frontend :

Ganache: The contract deployment fee is reflected in the first account

When you select a certain account and vote you require a certain fee



6. Conclusions and Future Scope

This will be the final chapter of the report. A brief report of the work carried out shall form the first part of the Chapter. Conclusions derived from the logical analysis presented in the Results and Discussions Chapter shall be presented and clearly enumerated, each point stated separately. Scope for future work should be stated lucidly in the last part of the chapter.