

SECURE DIGITAL VOTING SYSTEM USING BLOCKCHAIN TECHNOLOGY

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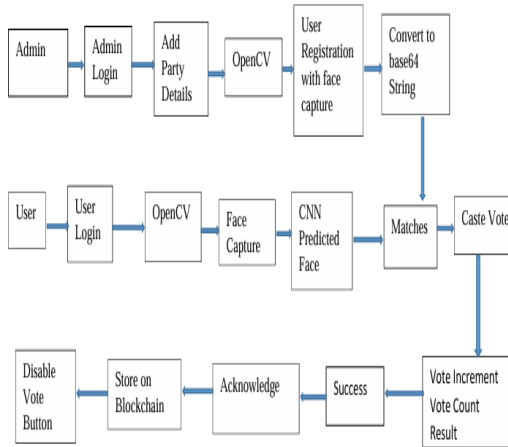
AGENDA

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- 5 Integration
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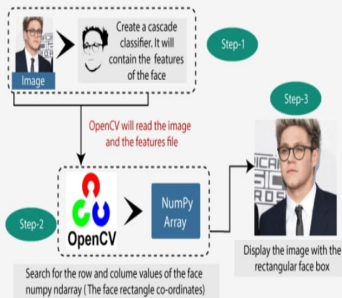
Summary of Stage I

- Developed an online voting platform for voting purpose.
- Designed various pages like home page, user login, admin login using html, css, javascript.
- We have used SHA-256 Algorithm tool for generating the address that is unique hash value for each voter.
- We have worked with blockchain technology by using Solidity to build smart contracts and tools like Ganache and Truffle for testing purpose.

Architecture



USING OPEN CV APPLICATION



Modules

- **Admin module:** In admin module it is the responsibility of adding the party details and registering the voters and validating the vote count. Admin login to system by using username as 'admin' and password as 'admin'.
- **User module:** In user module the user has to sign up with the application by using username as his ID and then upload his face photo which capture from webcam. After registering user can go for login which validate user id and after successful login user can go for casting the vote.

Functionality of the project

- **Register:** The voter must first register on the website using the user's basic information, including user name, password, address, contact number, email id, profile image.
- **Face-Capture:** After Entering all the basic details for registration the user will be redirected to the face capture page where the user's face will be captured and then the captured image will be converted in base64 string. The face is captured for avoiding the risk of fake voters.

Functionality of the project

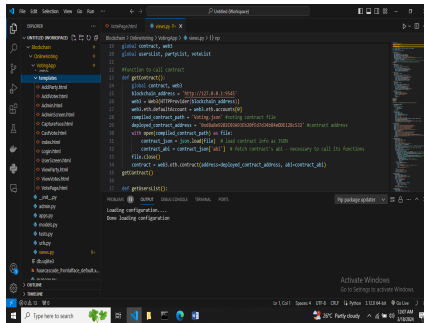
- **Login:** The voting system requires users to log in with their username and password, which are encrypted using SHA-256 Encryption, and upon successful verification, redirects them to the voting page.
- **Vote Casting:** After logging in successfully, users access the voting page to select a candidate from a dropdown list and cast their vote by clicking the "Vote" button. Once the vote is cast, the button is disabled to prevent multiple votes from the same user.

Functionality of the project

- **Face Proctoring:** The system will be able to detect faces by using the camera on the user's device. We are utilizing the Face-API library to detect faces. If the camera detects more than one face, the system will display an alert to the user and also sent the user back to the home page and stop their voting process.
- **Display Result:** A real-time update of the vote total will be shown. Thus the transparency will be maintained and user can also verify their vote is getting counted.

Module Integration

- We have defined function to manage all Voting system like voter details, party details and user registration details.



```

1  //main.js
2  Blockchain / Deploying / Deploy.js > @ vmmap / ()
3  global contract, web3
4  global voterlist, partylist, voterlist
5
6  //function to call contract
7
8  def getcontract():
9      global contract, web3
10     blockchain_address = "http://127.0.0.1:8545"
11     web3 = Web3Provider(blockchain_address)
12     web3.eth.defaultAccount = web3.eth.accounts[0]
13     compiled_contract_path = "contracts/compiled_contract_file"
14     deployed_contract_address = "0x0000000000000000000000000000000000000000"
15     with open(compiled_contract_path) as file:
16         contract_json = json.load(file)
17         contract_obj = web3.eth.contract(address=contract_address, abi=contract_json['abi'])
18         contract = contract_obj
19     return contract
20
21 def getvoterlist():
22     global contract, web3
23     voterlist = contract.voterlist()
24     return voterlist
  
```

Figure: Deploying Blockchain Contract

Module Integration

- First go inside 'hello-eth/node-modules/bin' folder and then double click on 'runBlockchain.bat' file to get below screen.

[illegible]

Figure: Running Blockchain

Module Integration

- In above screen Blockchain started with default private keys and account and now type command as 'migrate' and press enter key to deploy contract and get below output.

```
C:\truffle> truffle migrate

Starting migrations...
=====
> Network name: 'development'
> Network id: 5727
> Block gas limit: 8000000 (default)

> Deploying contracts...
=====
> Replacing 'token'
=====
> transaction hash: 0x4d9f723d8f44f1855c9e9e4209f4b1c323b0f
> blocks: 0
> contract address: 0x4d9f723d8f44f1855c9e9e4209f4b1c323b0f
> block number: 1
> block timestamp: 1700000000
> account: 0x4d9f723d8f44f1855c9e9e4209f4b1c323b0f
> balance: 0.00000000 ETH
> gas used: 250000 (0.00025 ETH)
> gas price: 20 Gwei
> value sent: 0 ETH
> total cost: 0.00025 ETH

> Saving artifacts
=====
> total cost: 0.00025 ETH

Summary
=====
> Total deployments: 1
> Final cost: 0.00025 ETH

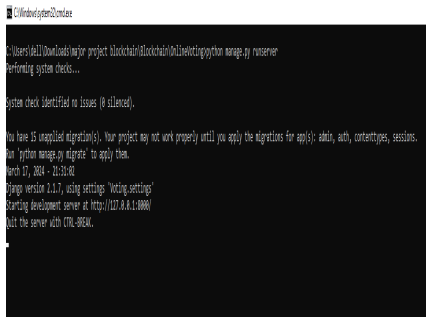
> Stacks: 0
> Seconds: 0

truffle(develop) >
```

Figure: Blockchain Truffle Suite Output

Module Integration

- In above screen Voting contract deployed and got contract address and this address need to specify in python code to call functions from Blockchain. Click on 'run.bat' file to start python web server.



```
C:\Windows\system32\cmd.exe

C:\Users\dell\Downloads\major project blockchain\Blockchain\OnlineVoting>python manage.py runserver
Performing system checks...

System check identified no issues (0 silenced).

You have 15 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): admin, auth, contenttypes, sessions.
Run 'python manage.py migrate' to apply them.

March 17, 2024 - 21:39:02
Django version 2.1.7, using settings 'Voting.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-C.
```

Figure: Run Server output

Module Integration

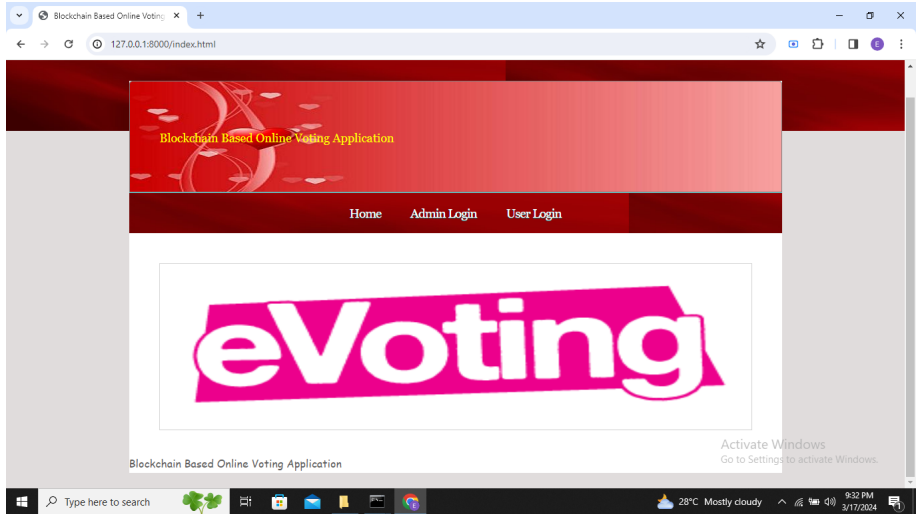


Figure: Home Page

Module Integration

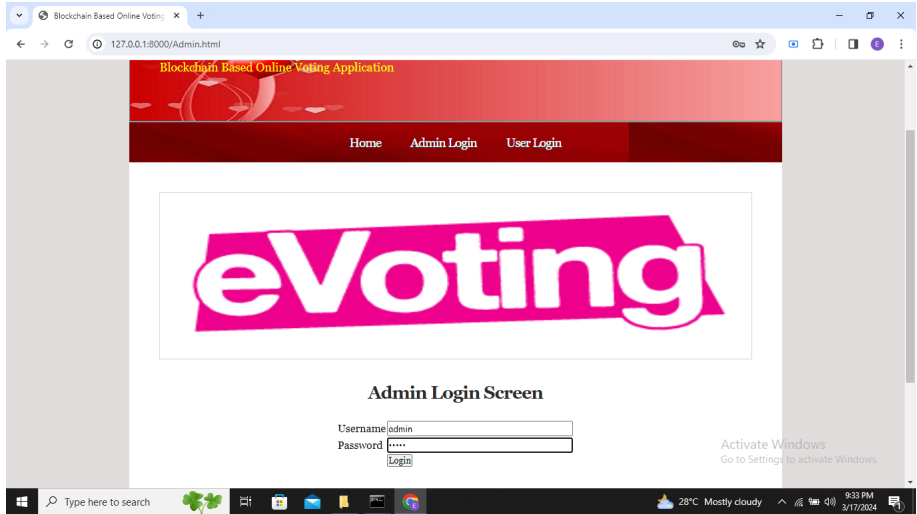


Figure: Admin Page

Module Integration

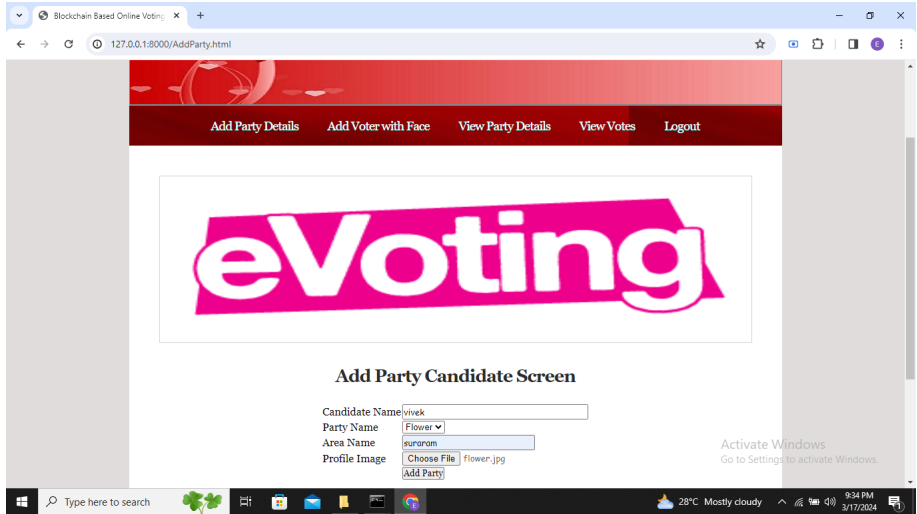


Figure: Adding Parties

Module Integration

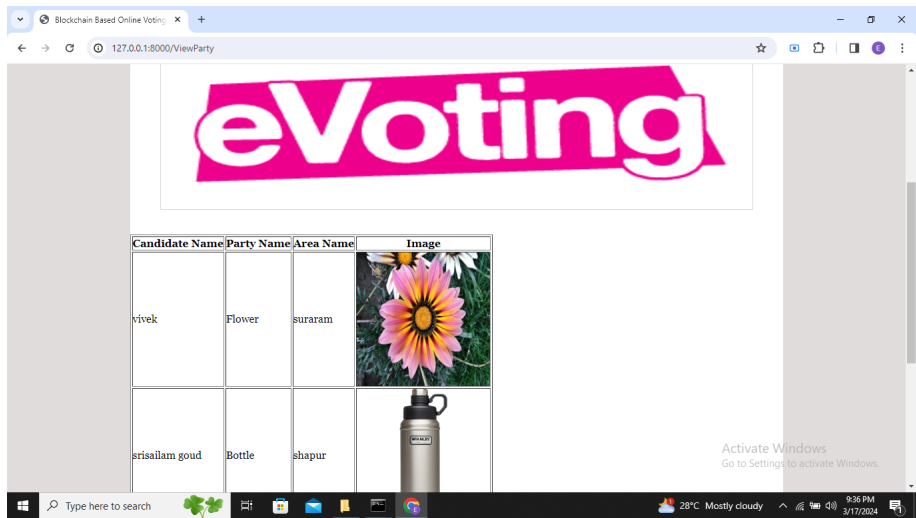


Figure: Party Details

Module Integration



Figure: Initial Vote Count

Module Integration

The screenshot shows a web browser window with the URL `127.0.0.1:8000/AddVoter.html`. The browser's tab bar includes several open tabs: "Inbox (3,944)", "overleaf login", "MAJOR PROJECT", "Blockchain Base", "my vote block", "(PDF) MyVote", and "Blockchain Base". The webpage features a dark red navigation bar at the top with the following links: "Add Party Details", "Add Voter with Face", "View Party Details", "View Votes", and "Logout". The main content area displays the "eVoting" logo in a large, stylized font. Below the logo, the heading "New User Signup Screen" is centered. The registration form consists of the following fields: "Username", "Password", "Contact No", "Email ID", "Aadhar No", and "Address". A "Register" button is positioned at the bottom of the form. In the bottom right corner of the page, there is a watermark that reads "Activate Windows Go to Settings to activate Windows." The Windows taskbar at the bottom of the screen shows the search bar, task view button, and several application icons. The system tray on the right indicates a temperature of 27°C, sunny weather, and the date and time as 11:22 AM on 3/18/2024.

Figure: User Register

Module Integration

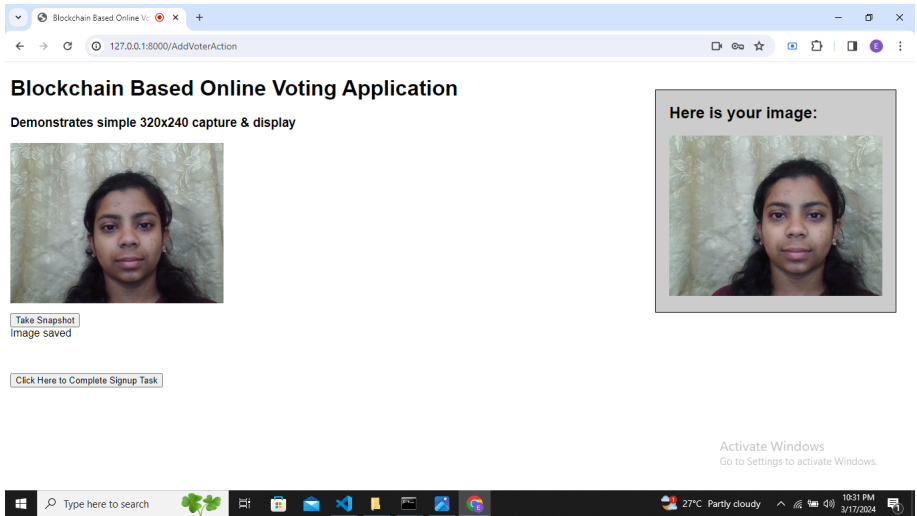


Figure: Face Capture

Module Integration

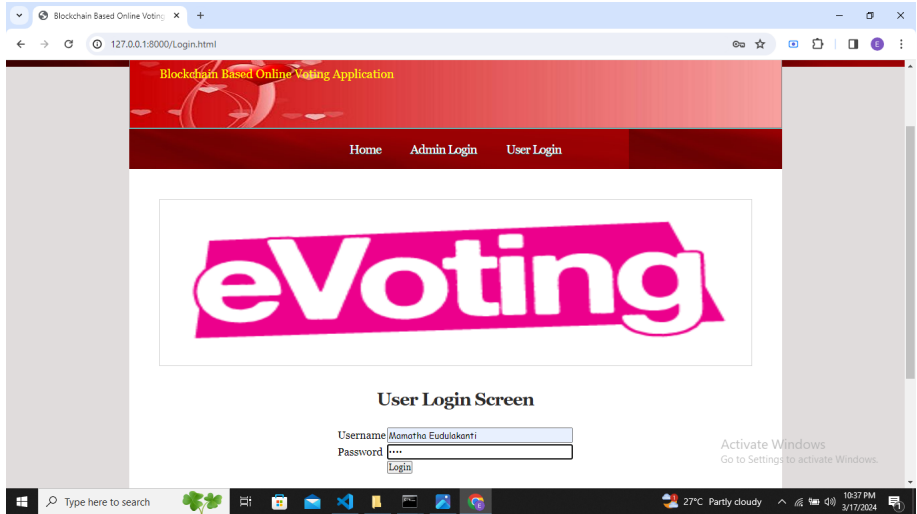


Figure: User login

Module Integration

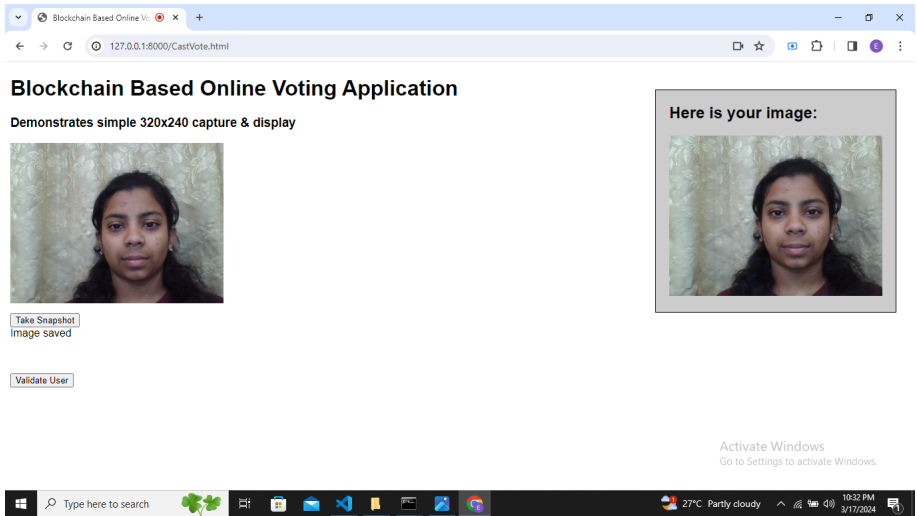


Figure: Validate User

Module Integration

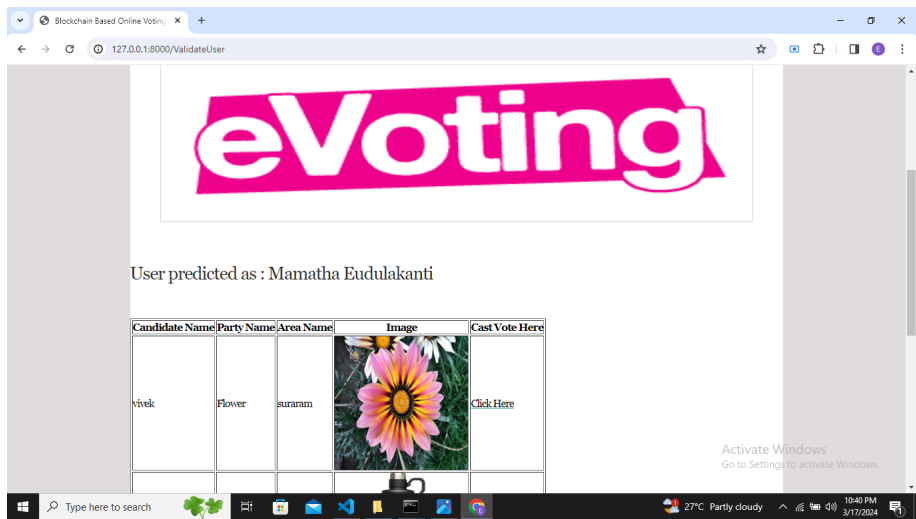


Figure: caste vote

Module Integration

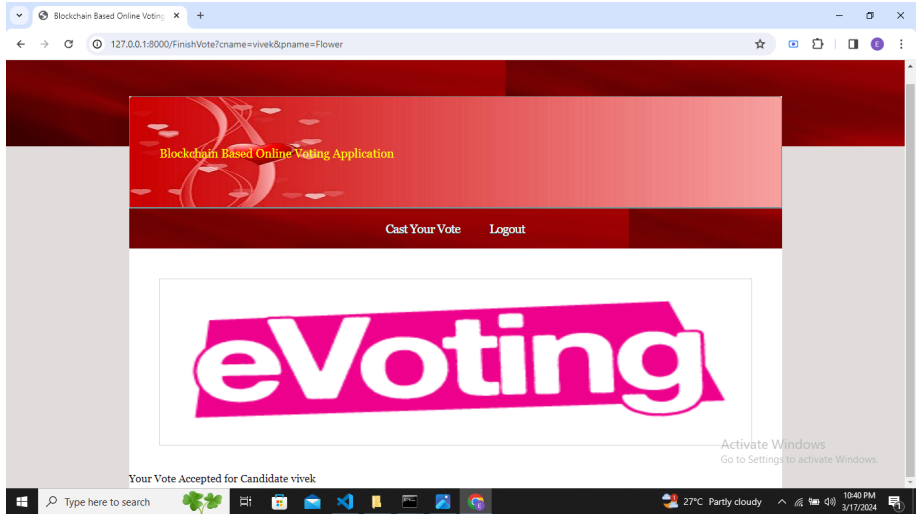


Figure: vote casted

Module Integration



Figure: final Vote count

Results & Discussion

- To Overcome all the Shortcomings in the present voting system we came up with the modern technology of Blockchain that can provide a secure, transparent, decentralized, and auditable way for citizens to vote, ensuring the integrity and credibility of the electoral process.
- Secure digital voting system using blockchain technology has numerous potential applications in various industries and contexts such as government elections, corporate elections, non-profit organizations, universities, and union elections.
- Faith and Trust of people in the voting systems is increased and many people cast their vote and select the right candidate for fair and transparent democracy.

Project Execution

To view the implementation video, click **Project Execution**

R&D Showcase Flex



BVRIT HYDERABAD College of Engineering for Women (UGC Autonomous)

R&D SHOWCASE 2024



SECURE DIGITAL VOTING SYSTEM USING BLOCKCHAIN TECHNOLOGY

ABSTRACT

Voting is crucial worldwide, but traditional methods face issues like disruption, low turnout, and hacking. To solve this, we turn to blockchain technology, offering voter anonymity and a secure, transparent process. Online voting via blockchain ensures each voter casts only one vote, boosting participation rates. This system uses smart contracts, face detection, and cryptography to ensure validity and privacy. It's a promising solution for secure, transparent voting.

UNIQUENESS

- Security
- Decentralization
- Face Capture
- Vote Count

METHODOLOGY

The methodology uses PC webcam for voter registration with face capturing and converting the image to base64 string and validating the voter with CNN predicted face. Cryptographic technique SHA-256 for encrypting the data and generating the unique hash keys. Ganache-Truffle for performing the transaction and Ethereum blockchain for securing the data.

Online Voting System



Results & Analysis



SOCIETAL USE

Secure Digital Voting System Using Blockchain Technology contributes to the SDG Sustainable Industry, Innovation by increasing transparency, security and efficiency in electoral process. Online voting can encourage more people to participate in elections, potentially increasing voter turnout and make it easier for citizens who are geographically distant. Digital voting systems contribute to building more inclusive, accountable and democratic societies.

CONCLUSION

In conclusion, secure digital voting system using blockchain employs decentralized ledger for immutable votes. Smart contracts and cryptographic techniques automate voting rules, boosting efficiency and reducing reliance on intermediaries. This innovation ensures verifiable and robust electoral process.

REFERENCES

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- A.K.A.G.P.P.Mrunal Pathak, Amol Suradkar, "Blockchain based e-voting system", USRST, vol. 8, 2021.

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Figure: R&D Showcase Flex

Conclusion

- There will be very less chance that votes will be tampered with or altered because they will be stored on a blockchain.
- No single authority will therefore be able to exercise any type of control.
- Online voting can encourage more people to participate in elections, potentially increasing voter turnout and make it easier for citizens who are geographically distant.
- Industry, Innovation increases transparency and contributes efficiency in electoral process.

Thank you

Thank you