E-VOTER

The use of technology has had a tremendous impact on the world, transforming many aspects of our daily lives, including the way we conduct elections. In a democratic society, it is crucial that technology has a positive impact on the democratic process. However, current voting systems face many challenges, such as vote rigging, hacking, and election manipulation. The use of **blockchain technology**, with its decentralized and distributed structure, offers immense potential to improve the integrity of the voting process.

E-Voter is a blockchain-based voting system that leverages the **Ethereum** blockchain, **ReactJS** frontend, **MongoDB** database, and **cloud** deployment to provide secure and transparent voting. The platform offers a user-friendly interface, **voice-based assistant**, and **multilingual** website, making it accessible and inclusive to all eligible voters.

SHA hashing algorithm is used for database encryption, When a user creates an account or changes their password in the E-Voter application, the application can hash the password using SHA and store the hash in the database. This way, even if the database is compromised, the attacker will not be able to see the actual passwords of the users. When a user logs in, the application can hash the user's input password using SHA and compare it with the hashed password stored in the database to authenticate the user.

To ensure the integrity of the voting process, E-Voter uses **multi-factor authentication** to verify the user's identity before casting their vote. This authentication process uses Aadhaar cards, which are issued to all eligible Indian citizens, to verify their identity. By using **Aadhaar**

authentication (this is done with the help of **UIDAI** (Unique Identification Authority of India's API), E-Voter ensures that only eligible voters participate in the voting process.

In the E-voter application, the user's vote and other relevant data are encrypted before being added to the blockchain. When a user casts their vote, the application uses the UIDAI authentication system to verify their identity. Once their identity is verified, the application generates a unique **digital signature** for the user's vote, using the **ECDSA algorithm**.

The user's vote is then encrypted using **symmetric-key cryptography**, which involves a shared secret key that is known only to the user and the application. This shared key is derived from a key-derivation function that uses a unique identifier for the user, such as their Aadhaar number, to generate the key.

After the vote is encrypted, it is added to a new block on the **Ethereum blockchain**. The block is then validated by other nodes in the network using consensus algorithms, such as Proof of Work or Proof of Stake. Once the block is validated and added to the blockchain, it becomes immutable and tamper-proof. The blockchain provides transparency in the voting process, as each vote can be tracked and verified by all stakeholders. Moreover, it guarantees that the voting process is secure and confidential, as votes are encrypted and stored on the blockchain.

The frontend of the **E-Voter** platform is built using ReactJS, providing a highly responsive and intuitive interface. The MongoDB database provides fast and reliable storage for the platform, ensuring that the system can handle a large number of voters without any performance degradation. The **cloud deployment** of the platform ensures easy

accessibility and inclusivity, making it an ideal solution for **large-scale elections**.

In conclusion, the use of blockchain technology in the voting process offers a **reliable** and **tamper-proof** voting process, making it an ideal solution for **large-scale** elections. E-Voter provides secure and transparent voting, user-friendly interfaces, **multilingual** support, and cloud deployment, ensuring easy accessibility and inclusivity. Furthermore, the platform leverages blockchain technology and **Aadhaar authentication** to improve the **integrity** and transparency of the voting process. With the use of **multi-factor authentication**, E-Voter ensures that only eligible voters participate in the voting process, providing a trustworthy and reliable voting system that upholds the values of democracy.