Abstract

BlockVote – Transparent Voting System with Blockchain

BlockVote is a secure, transparent, and tamper-proof online voting platform developed using PHP and MySQL, enhanced with a custom blockchain algorithm to ensure the integrity and immutability of votes. The system addresses the need for trust in digital elections by recording each vote as a block in a chained structure, ensuring that no vote can be altered or deleted once submitted.

The platform supports three main user roles:

Voters:

- Register and log in securely
- View upcoming elections and candidate details
- Cast vote (only once per election)
- View their vote confirmation (hashed for anonymity)
- View the public blockchain ledger for transparency (read-only)

Admins (Election Officials):

- Create and manage elections
- Add candidates with details and party information
- Monitor voter registration and activity
- View and verify the blockchain ledger
- View real-time vote counts and declare results

Blockchain Module (Core Engine):

- Records each vote as an immutable block
- Uses SHA-256 hashing for secure linkage between blocks
- Automatically validates the chain for consistency and integrity
- Prevents tampering or duplication of votes

Key Modules:

1**. Authentication Module** – Secure login for voters and admins with session management

2. **Election & Candidate Management** – Admin creates elections and adds candidates

3**. Voting Module** – Voters cast their vote; each vote becomes a new block in the chain

4. **Blockchain Engine** – PHP-based block generation, linking via hash, and chain validation

5. **Results Dashboard** – Admins and users can view real-time results

6. **Blockchain Viewer** – Transparent display of vote blocks for public audit

7. **Vote Validation** – Detects any tampering or broken chains via hash mismatch detection

Technology Stack:

- Frontend: HTML, CSS, Bootstrap
- Backend: PHP
- Database: MySQL
- Other: SHA-256 hashing (via PHP), File-based or DB-based blockchain storage, Session Management