FINAL YEAR PROJECT REPORT

BLOCKCHAIN-POWERED VOTING WITH FINGERPRINT AUTHENTICATION

In fulfillment of the requirement
For degree of
BS (COMPUTER SCIENCES)

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FALL-2024

DECLARATION

We hereby declare that this project report is based on our original work except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

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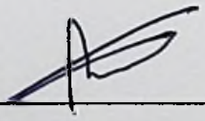

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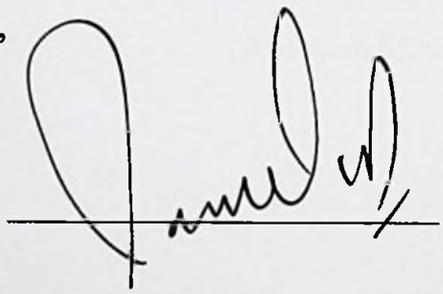
Signature : 

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Specially dedicated to

My beloved parents & teachers

(Waleed Muhammad)

My beloved mother & father

(Furqan Zaka Ud Din)

My beloved grandparents & parents

(Abdullah Mashood Jafri)

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BLOCKCHAIN-POWERED VOTING WITH FINGERPRINT AUTHENTICATION

ABSTRACT

This project presents a comprehensive approach to creating a secure, transparent, and user–friendly voting platform that leverages the strengths of modern blockchain technology and sophisticated authentication mechanisms. By employing Ethereum smart contracts, all voting data is recorded in an immutable ledger that preserves the integrity of election information and mitigates the risk of tampering. The platform not only allows administrators to establish campaigns and register candidates with confidence but also ensures that voters can cast their ballots without fear of manipulation.

To enhance the overall security and user experience, the system integrates both conventional password–based authentication and advanced WebAuthn credentials. This dual–method approach recognizes that while some users prefer familiar login credentials, others value the added protection that biometric verification and hardware–bound credentials can provide. A Python–based application programming interface interacts seamlessly with a database, preserving sensitive user information and fingerprint data with a high level of confidentiality. Meanwhile, a Node.js server orchestrates communication among the blockchain network, the backend services, and the browser–based frontend interface. Through these carefully designed interactions, participants enjoy a cohesive, secure, and accessible voting environment.

Rigorous testing procedures and evaluations confirm that this decentralized solution not only strengthens trust through verifiable on–chain transactions but also streamlines the voting process. By reducing reliance on centralized authorities and introducing robust safeguards against fraud, the platform empowers communities to hold elections that are both technologically sophisticated and socially accountable. The result is a blueprint for future electoral systems that prioritize transparency, security, and inclusivity at every stage.

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