Project Synopsis

on

VIRTUAL VOTING SYSTEM

Submitted as a part of course curriculum for

# Bachelor of Technology

in

# Computer Science



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**DECLARATION**

We hereby declare that this submission is our work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.

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# CERTIFICATE

This is to certify that the Project Report entitled “**Virtual Voting System**” which is submitted by **Surya Pratap Singh , Adrika Tripathi and Utkarsh Mishra** in partial fulfillment of the requirement for the award of degree B. Tech. in Department of Computer Science of Dr A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidates own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

**Date: Supervisor Signature**

Supervisor Name (Designation)

# ACKNOWLEDGEMENT

It gives us a great sense of pleasure to present the synopsis of the B.Tech Mini Project undertaken during B.Tech. Third Year. We owe a special debt of gratitude to Ms. AKANSHA (ASSISTANT PROFESSOR), Department of Computer Science, KIET Group of Institutions, Delhi- NCR, Ghaziabad, for his/her constant support and guidance throughout the course of our work. Her sincerity, thoroughness and perseverance have been a constant source of inspiration for us. It is only his/her cognizant efforts that our endeavors have seen the light of the day.

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# ABSTRACT

The organization of elections by governments is extremely important to people in today's world. Elections play an important role in the governance of a country or organization, or as it is sometimes said, it is the factor that determines the fate of any country. Even the biggest democracies in the world, including India and the United States, nevertheless have unreliable voting procedures. The biggest problems in the current electoral system are vote rigging, EVM hacking, election manipulation and vote hijacking.

Blockchain is a new, decentralized and decentralized technology that has the potential to improve many elements in many sectors. The problem of the current electronic voting system can be solved by extending it with blockchain technology. The blockchain with smart contracts stands out as a strong contender to be used in the creation of safer, more affordable, more secure, more transparent, and simpler electronic voting systems.We developed and tested a virtual voting application for the Ethereum network as a smart contract using the Solidity programming language and the Ethereum platform. Because of its widespread use, reliability, and abundance of smart contract logic, Ethereum and its network rank among the finest. Duplicate vote prevention, full transparency, and privacy protection for participants are all ensured via a secure electronic voting method. The implementation of the virtual voting system involves the development of smart contracts to manage the voting process, ensuring that only eligible voters can participate and that votes are counted accurately. Additionally, mechanisms for voter authentication and verification are integrated into the system to prevent fraudulent activities.

Through the utilization of blockchain technology, the proposed virtual voting system offers a reliable and efficient solution for conducting elections, facilitating remote participation while maintaining the integrity and transparency of the electoral process. However, further research and testing are required to address scalability issues and ensure widespread adoption of this innovative approach to voting.

# INTRODUCTION

In an era characterized by unprecedented technological advancements, the traditional methods of conducting elections have come under increasing scrutiny. The digital age has ushered in the potential for innovation in the electoral process, promising greater transparency, security, and accessibility. One groundbreaking development that has garnered significant attention is the integration of blockchain technology into the realm of voting, giving rise to what is commonly referred to as "virtual voting”. The concept of virtual voting using blockchain technology is both revolutionary and disruptive. It offers the promise of a democratic system that is more secure, transparent, and efficient. This novel approach combines the security features of blockchain, such as decentralization and cryptographic protection, with the accessibility and convenience of a virtual voting platform. As a result, it has the potential to address longstanding concerns related to electoral integrity, voter fraud, and accessibility.

The virtual voting system proposed in this project embodies the principles of decentralization, transparency, security, anonymity, and verifiability. Through the utilization of blockchain's distributed ledger technology, every aspect of the voting process—from voter registration to ballot casting and tallying—is recorded in a tamper-proof and transparent manner, thereby mitigating the risks associated with fraud and manipulation.

The implementation of this virtual voting system involves the development of smart contracts to automate and enforce the rules governing the electoral process, as well as the integration of robust security measures to safeguard against potential threats. While challenges such as scalability and usability remain to be addressed, the potential benefits of adopting blockchain-based voting systems are vast, offering a pathway towards more inclusive, trustworthy, and democratic elections.

# PROBLEM STATEMENT

**1. Existing Challenges in Electoral Systems:**

* Traditional electoral systems are susceptible to various challenges such as fraud, manipulation, and lack of transparency.
* Geographical barriers and logistical constraints often limit voter participation, particularly in remote or inaccessible areas.
* Privacy concerns and security risks threaten the integrity of the voting process, undermining public trust in democratic institutions.

**2. Need for Secure and Transparent Voting Solutions:**

* There is a pressing need for innovative voting solutions that can address the shortcomings of traditional electoral systems.
* Ensuring the security, transparency, and integrity of the voting process is paramount to upholding democratic principles and fostering public trust in electoral outcomes.
* Remote participation in elections has become increasingly important, especially in the context of global mobility and digital connectivity.

**3. Opportunities Offered by Blockchain Technology:**

* Blockchain technology offers unique features such as decentralization, transparency, immutability, and cryptographic security.
* Leveraging blockchain for voting systems has the potential to mitigate existing challenges by providing a tamper-proof and transparent platform for conducting elections.
* Blockchain's decentralized architecture enables trustless interactions among participants, eliminating the need for intermediaries and reducing the risk of manipulation

# OBJECTIVE

**Enhance Electoral Integrity**: The primary goal of the project is to develop a virtual voting system that significantly enhances the integrity of electoral processes. By leveraging blockchain technology, the system aims to minimize the risk of fraud, manipulation, and other irregularities that may compromise the fairness and legitimacy of elections.

**Ensure Transparency and Accountability**: Another objective is to promote transparency and accountability in the electoral process. Through the use of blockchain's transparent and immutable ledger, the system aims to provide a verifiable record of all voting activities, enabling stakeholders to audit and verify the integrity of the election results.

**Facilitate Remote Participation**: The project seeks to enable remote participation in elections by providing a secure and accessible platform for voters to cast their ballots from any location with internet connectivity. This objective aims to overcome barriers such as geographical distance, mobility issues, and other constraints that may hinder voter participation.

**Protect Voter Privacy:** The project aims to safeguard the privacy and anonymity of voters while ensuring the integrity of the voting process. By employing cryptographic techniques and decentralized architecture, the system aims to protect sensitive voter information and prevent unauthorized access to voting data.

**Promote Trust in Democratic Processes**: Ultimately, the overarching objective is to promote trust and confidence in democratic processes. By offering a secure, transparent, and inclusive voting system, the project seeks to strengthen public trust in the electoral system and uphold the principles of democracy.

**Research and Innovation:** Additionally, the project aims to contribute to the advancement of research and innovation in the field of blockchain technology and e-governance. By exploring the potential applications of blockchain in electoral processes, the project seeks to drive forward-thinking solutions for addressing societal challenges related to governance and democracy.

Overall, the objectives of the project align with the broader goals of promoting electoral integrity, transparency, accessibility, and trust in democratic processes through the innovative application of blockchain technology.

# LITERATURE REVIEW

***A. Votereum: An Ethereum-based E-voting system* :**

Tuan A. Nguyen, Chuong Dang-Le-Bao, Khoi Cao-Minh, and Linh Vo-Cao-Thuy, 2019"Votereum: An Ethereum-based Electronic Voting System," Information Technology Faculty, Vietnam National University Before recommending Votereum, a blockchain-powered digital voting platform, Vietnam's HCMC looks over the requirements. The Ethereum platform, consisting of a single server, facilitates the proposed design. manages all system operations, and the other handles any blockchain-related inquiries.

***B.Decentralized Voting Platform Based on Ethereum Blockchain:*** Hamza Harb, Ali Kassem, David Khoury, and Elie F. Kfoury (2018) "Decentralized Voting Platform Based on Ethereum Blockchain," Department of Computer Science, American University of Science and Technology, We provide a novel approach for a blockchain-based decentralized trustless voting network that tackles trust issues. Enforcing a single, secure vote per mobile phone number for every poll and ensuring data integrity and transparency are the main features of this method. The Ethereum Virtual Machine (EVM) serves as this system's Blockchain runtime environment.

***C. Blockchain-Based E-Voting System:***

Friðrik Þ. Hjálmarsson , Gunnlaugur K . Hreiðarsson, “Blockchain-Based E-Voting System”,2018, This paper, from the School of Computer Science at Reykjavik University in Iceland, assesses the potential of distributed ledger technologies by describing a case study that involves the election process and the implementation of a blockchain-based application that lowers the cost and increases security for holding a national election.

***D. Blockchain Based E-Voting Recording System Design:*** Rifa Hanifatunnisa and Budi Rahardjo,2017,The "Blockchain Based E-Voting Recording System Design" starts recording as soon as the vote is over. One potential answer to the issues that frequently arise in the election system is blockchain technology. This recording technique is more secure because it uses hash values to record the voting results of each polling place that is connected to one another. It is also more dependable since it uses digital signatures. Considering that in an electoral system where voter data and numbers are clear and voters are not permitted to select more than once, the use of the sequence proposed in the blockchain creation process in this system ensures that all nodes that are legally connected and capable of avoiding collision in transportation.

***G.“How to Leak a Secret: Theory and Applications of Ring Signatures”*:** BlockVote was developed using the Ring Signature method and the Bitcoin network. Generally speaking, Ring Signature offers a means of confirming someone's membership in a group without disclosing their identity. A shortcoming of the Ring Signature technique is that the protocol only functions well for less than 3,000 users, as stated in the paper. Moreover, Bitcoin isn't used for application development because it was created as an online payment mechanism. As a result, the system servers manage the majority of crucial tasks, including the tallying stage.

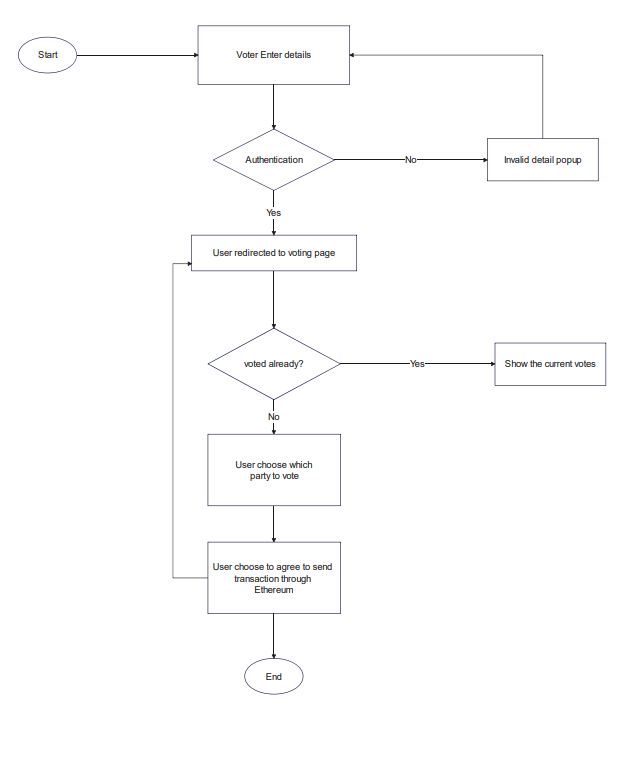
***J. An anonymous distributed electronic voting system using Zerocoin:*** Y. Takabatake, D. Kotani, and Y. Okabe, “An anonymous distributed electronic voting system using Zerocoin” One public database is Bitcoin. An administrator can link voters to vote if it just uses bitcoin. That is a concern, however we utilize one of the bitcoin laundry systems, zerocoin, to address the privacy problems that arise with bitcoin. Because of this, an administrator or other third party can confirm that the person is a voter, but they are unable to identify them. Furthermore, this system has the ability to adjust the voter pool prior to the voting phase, making it more difficult for the administrator to spoof votes.

***I. Towards secure e-voting using ethereum blockchain:*** Emre Yavuz ; Ali Kaan Koç ; Umut Can Çabuk ; Gökhan Dalkılıç (2018) Towards secure e-voting using ethereum blockchain. The blockchain and Ethereum network architecture. At this point, Ethereum and smart contracts—one of the most groundbreaking innovations since the blockchain itself—helped to dispel the misconception that blockchain is only a cryptocurrency or coin. Instead, they transformed blockchain into a more comprehensive set of solutions for a variety of contemporary Internet-related problems, and they may even pave the way for blockchain's widespread application.

***G.“How to Leak a Secret: Theory and Applications of Ring Signatures”*:** BlockVote was developed using the Ring Signature method and the Bitcoin network. Generally speaking, Ring Signature offers a means of confirming someone's membership in a group without disclosing their identity. A shortcoming of the Ring Signature technique is that the protocol only functions well for less than 3,000 users, as stated in the paper. Moreover, Bitcoin isn't used for application development because it was created as an online payment mechanism. As a result, the system servers manage the majority of crucial tasks, including the tallying stage.

# METHODOLOGY

# FLOWCHART

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# TECHNOLOGY USED

BLOCKCHAIN

* Smart Contracts
* Etherium
* Solidity
* React

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