Department of Computer Science

II Project Presentation (KCS 753)
(E-Voting using blockchain)
Project Id-PCS 24-23

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CONTENTS

Key takeaways:

Problem Statement

Traditional voting systems have been around for several years, but they have faced several challenges. Major issues of traditional voting system are:

- Security
- Results can be manipulated
- Transparency
- Expensive

Blockchain technology offers a solution to these challenges by providing a secure and transparent platform for voting.

OBJECTIVES

Main Objectives :

Blockchain technology offers a solution to these challenges by providing a secure and transparent platform for voting.

- Provide secure and transparent platform for voting
- Prevent tampering of votes
- Ensuring results are accurate
- You can vote anytime/anywhere (During Pandemics like COVID-19 where it's impossible to hold elections physically).
- More reliable process

Technologies Used

- **Blockchain – Ethereum**
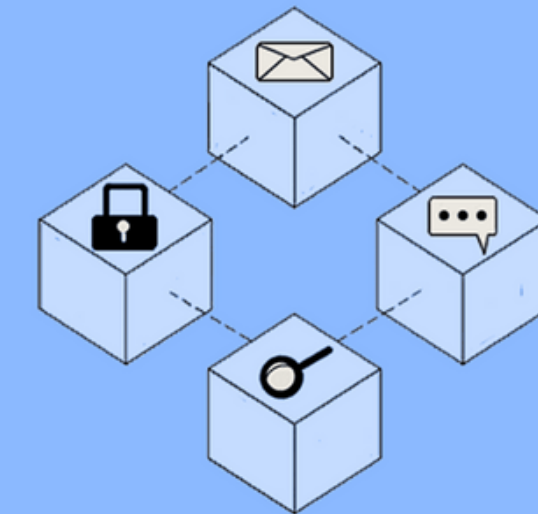- **Solidity**
- **MetaMask**
- **React.js**
- **Node.js**

Literature survey

Blockchain And The Future of the Internet: A Comprehensive Review by Fakhar ul Hassan, Anwaar Ali, Siddique Latif, Junaid Qadir, Salil Kanhere, Jatinder Singh, and Jon Crowcroft-March 2019

In this research [1] Jon Crowcroft, emphasizes blockchain's role in challenging the centralized trust infrastructure of the internet. It highlights its principles of decentralization and transparency, showcasing its applications in diverse fields. The paper surveys blockchain-based network applications and provides guidance while addressing potential challenges, making it a reference manual for interested parties.

User-Perceived Privacy in Blockchain Simin Ghesmati, Walid Fdhila, and Edgar Weippl -2022.

In this research [2] by Simin Ghesmati, Walid Fdhila, and Edgar Weippl, users' privacy perceptions in UTXO-based blockchains like Bitcoin are investigated. The research, which involves interviews and questionnaires, aims to establish a mental model for employing privacy-preserving techniques in blockchain transactions. Additionally, it evaluates users' awareness of blockchain privacy issues and their preferences regarding existing privacy-enhancing solutions, comparing add-on techniques for Bitcoin to built in techniques in privacy coins. The research uses Bitcoin as an example to highlight discrepancies between user privacy perceptions, preferences, and current implementations.

Blockchain Technology and its Impact on the Global Economy Dr. Burcu Sakız (Istanbul Aydın University, Turkey) Prof. Dr. Ayşen Hiç Gencer (Beykent University, Turkey) -2019

In this research [3] Dr. Burcu Sakız and Prof. Dr. Ayşen Hiç's explores the economic landscape of blockchain technology. Data has become the most valuable resource in today's world, surpassing oil. With smartphones and the internet, data has become abundant and invaluable. Modern algorithms and AI extract predictive insights. Blockchain is presented as a decentralized, fair-sharing mechanism for knowledge. It enables secure, direct transactions without intermediaries, disrupting traditional finance and enhancing economic transparency.

Blockchain Research, Practice and Policy: Applications, Benefits, Limitations, Emerging Research Themes and Research Agenda. Laurie Hughes, Yogesh K. Dwivedi, Santosh K Misra, Nriprenda Rana-2019

In this research [4] Laurie Hughes, Yogesh K. Dwivedi, Santosh K Misra, Nriprenda Rana analyzed that the blockchain has gained substantial attention in technology research, but its adoption in Information Systems (IS) and Information Management (IM) literature has been slow. This study, through an IS/IM perspective, reviews existing blockchain research to identify key themes. Although commercial-grade blockchain applications are currently limited, the technology shows significant potential for various industry-wide use cases. The research discusses potential blockchain applications, the technology's future, and the barriers to adoption. It also highlights the blockchain's potential to contribute to UN Sustainability Development Goals and drive change in established industries and practices.

Bitcoin: A Peer-to-Peer Electronic Cash System. Satoshi Nakamoto-2009
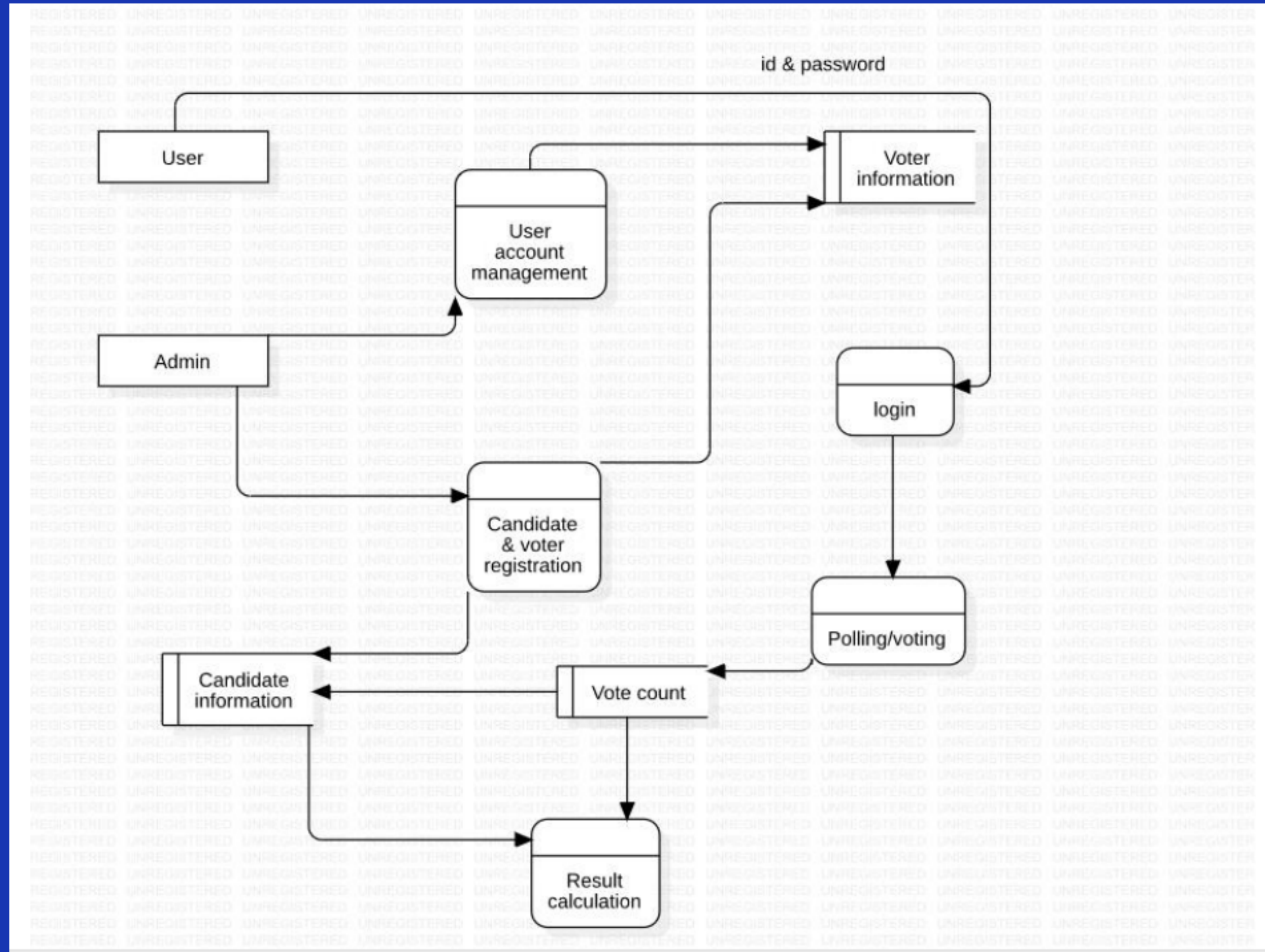
In this research [5] by Satoshi Nakamoto, the concept of a purely peer-to-peer electronic cash system is introduced. It enables online payments to occur directly between parties without the need for intermediaries. To address the issue of double spending, the research proposes a peer-to-peer network that timestamps transactions through proof-of-work, creating an immutable transaction record. The longest proof-of-work chain, backed by the majority of CPU power, serves as proof of the transaction history's authenticity, making the network resilient to attacks and adaptable to node dynamics. Messages are distributed with minimal structure, allowing nodes to join and leave the network as needed.
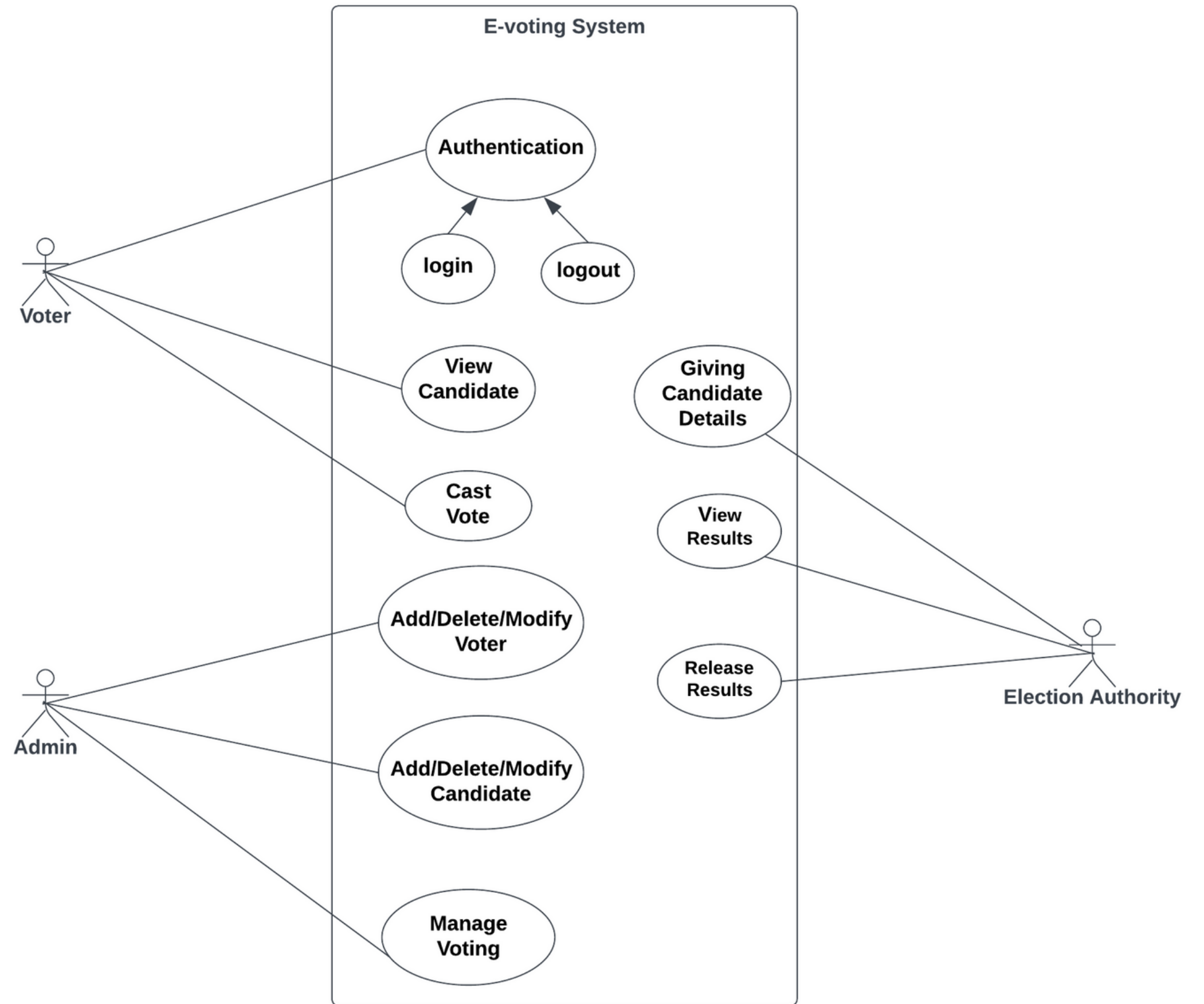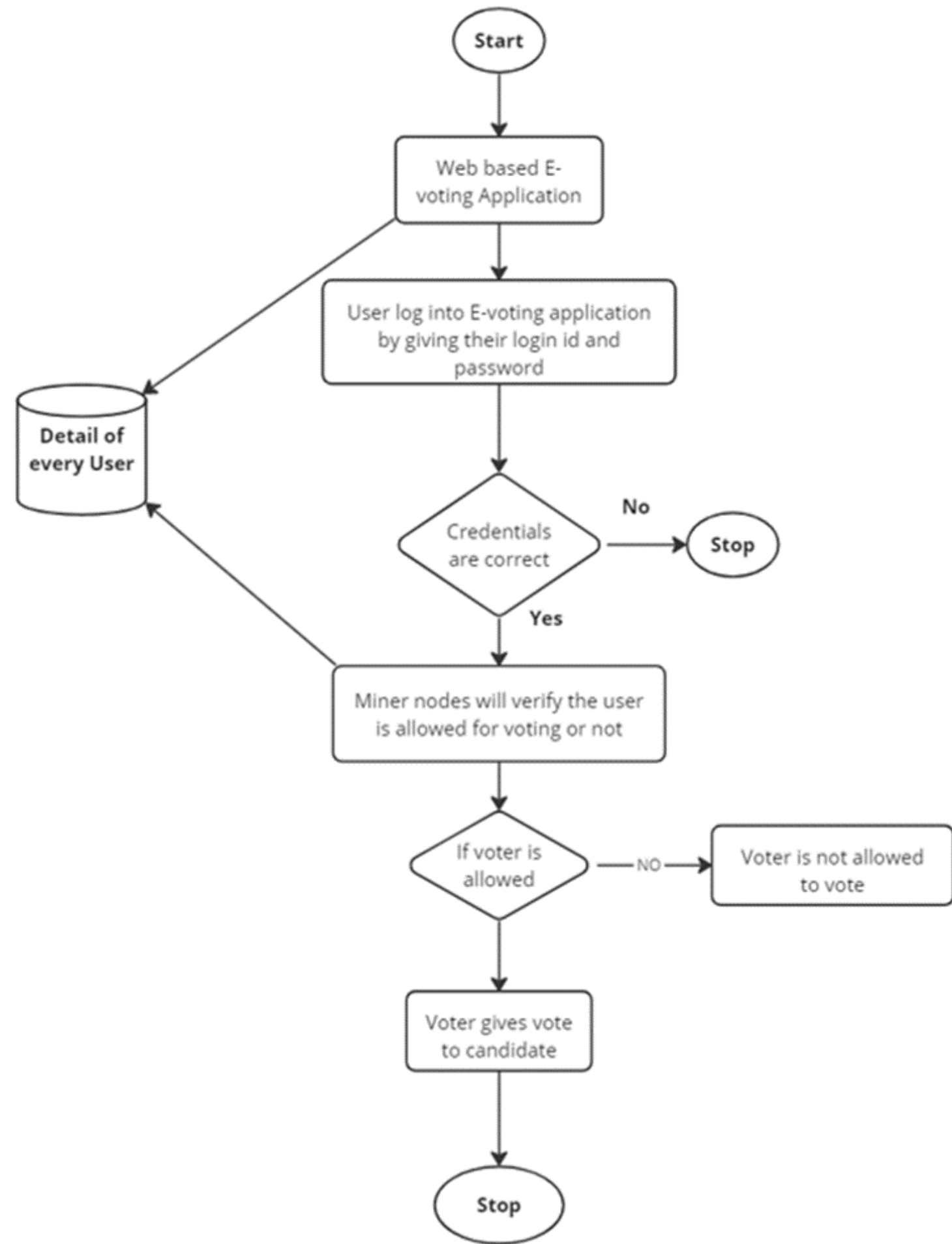
DIAGRAMS

DATA FLOW DIAGRAM

USE CASE DIAGRAM

FLOW DIAGRAM

Patent Status

- **Submitted**

- **Approved by HOD**

2	21331	AKASH GOEL	CS	a.goel54@yahoo.com	Online Voting System using Blockchain	VIEW	—	VIEW

LEVEL	Status	Remark
HOD	APPROVED	Ok
RND	PENDING	—

Research Paper Status

Draft completed
Recommend to improve research paper

Project Status

Testing report

Test_Case_ID	Test Case Objective	Pre Requisite	Steps	Input Data	Expexted Output	Actual Output	Status
TC_01	Sign in using MetaMask	MetaMask wallet account	1. Click on the connect wallet button 2. Enter the password in the metamask popup	Account Password	Logged in	logged in	PASS
TC_02	Test Image upload to IPFS using API	System must be connected to internet	1. Click on the upload image button 2. Upload the image you want	Image	Image Uploaded	Image Uploaded	PASS
TC_03	Retrieving uploaded image from IPFS	System must be connected to internet	Upload the image and API will return image		Image Retrieved	Image Retrieved	PASS
TC_04	Registering Candidate & Connecting with Smart Contract	User must be logged in with admin account	1. Upload image of Candidate 2. Enter candidate details including unique account address on blockchain 3. Click authorise candidate & transaction through MetaMask	Details of candidate & unique address	Candidate registered	Candidate registered	PASS
TC_05	Registering Voter	User must be logged in with admin account	1. Upload image of Voter 2. Enter voter details 3. Click authorise voter & do transaction through MetaMask	Details of voter & unique address	Voter registered	Voter registered	PASS
TC_06	Registering using Non-admin account	.	Log in using unregistered account	login id & password	Not allowed	Not allowed	PASS
TC_07	Login as Voter account	Must be registered by admin	Login to application using MetaMask account	login id & password	Logged in	Logged in	PASS
TC_08	Voting as Voter	Must be registered by admin	1. Login to application 2. Go to the Homepage 3. Select the Candidate choice 4. Click the 'Vote' button		Voted	Voted	PASS
TC_09	Voting again	Must be voted already	1. Login to application 2. Go to the Homepage 3. Select the Candidate choice 4. Click the 'Vote' button		You have already voted	You have already voted	PASS

References

[1] Blockchain And The Future of the Internet: A Comprehensive Review by Fakhar ul Hassan, Anwaar Ali, Siddique Latif, Junaid Qadir, Salil Kanhere, Jatinder Singh, and Jon Crowcroft. March 2019.

[2] User-Perceived Privacy in Blockchain Simin Ghesmati, Walid Fdhila, and Edgar Weippl -2022.

[3] Blockchain Technology and its Impact on the Global Economy Dr. Burcu Sakız (Istanbul Aydın University, Turkey) Prof. Dr. Ayşen Hiç Gencer (Beykent University, Turkey) -2019

[4] Blockchain Research, Practice and Policy: Applications, Benefits, Limitations, Emerging Research Themes and Research Agenda. Laurie Hughes, Yogesh K. Dwivedi, Santosh K Misra, Nriprenda Rana-2019

[5] Bitcoin: A Peer-to-Peer Electronic Cash System. Satoshi Nakamoto 2009.

[6] Blockchain technology in the energy sector: A systematic review of challenges and opportunities. Merlinda Andoni, Valentin Robu, David Flynn, Simone Abram-2019.

Thank you!