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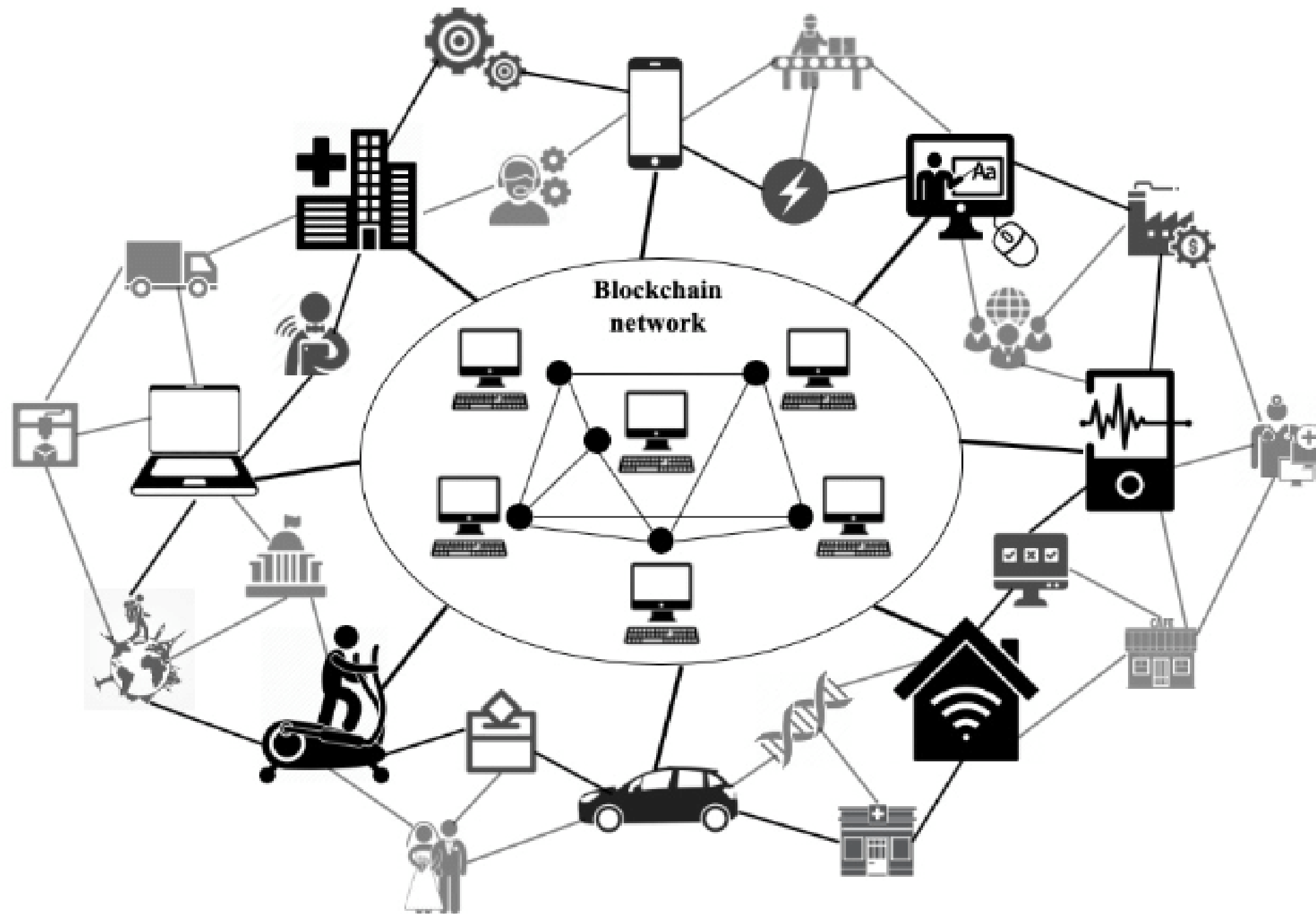
DEPARTMENT OF COMPUTER SCIENCE AND TECHNOLOGY

COURSE NAME: 19CS622-Blockchain Technology

III YEAR /VI SEMESTER

Unit 1- INTRODUCTION TO BLOCKCHAIN

Topic 5 :Decentralization in Block Chain

Blockchain network

Centralized vs. decentralized blockchain

	Centralized	Decentralized
INFORMATION FLOW	To and from center	Multiple routes
DECISION-MAKING	Usually hierarchical	Democratic
CONTROL	Central entity	Software code
PROS	Simpler decision-making, less expensive hardware, more control	Immutability, transparency, member-owned
CONS	Single point of failure, trust issues, data silos	Anonymity for criminals, more expensive hardware, user conflict
EXAMPLES	Binance, Coinbase	Bitcoin, Ethereum

DECENTRALIZATION

• Decentralization is the distribution of functions, control and information instead of centralizing them in a single entity.

• Blockchain decentralization refers to the distribution of power and authority across a network of computers or nodes that collectively maintain and validate a blockchain.

• In a decentralized blockchain network, each node has a copy of the entire blockchain and participates in the consensus mechanism to validate and verify transactions.

• This consensus mechanism ensures agreement among the nodes about the validity and order of transactions, promoting trust and security within the network.

Types of decentralization in blockchain

- **Fully centralized.** Entirely controlled and managed by a single, central authority.

- **Semi-decentralized.** Controlled and managed by multiple authorities.

- **Fully decentralized.** No middlemen or central authorities to manage or administer the network.

Advantage of Decentralization in Blockchain

- **Distributed Ledger**: The blockchain's ledger, which contains a record of all transactions, is replicated and stored across multiple nodes in the network.

- **Consensus Mechanisms**: Decentralized blockchains utilize consensus mechanisms to agree on the validity and order of transactions.

- **Peer-to-Peer Network :** Each node communicates with other nodes to propagate transactions and blocks, maintaining the integrity and consistency of the blockchain.

- **Decentralized Governance**: This allows stakeholders in the network to have a say in the governance of the blockchain, reducing the centralization of power.

- **Immutability and Cryptographic Security:** The use of cryptographic algorithms ensures the integrity and security of data stored on the blockchain.

Advantage of Decentralization in Blockchain

- **Security:** With no single point of failure, decentralized networks are more resilient to attacks and censorship attempts.

- **Transparency:** Blockchain's decentralized nature enables transparency as anyone on the network can view the transaction history and verify its integrity.

- **Trustlessness**: Decentralization reduces the need for trust between participants, as the consensus mechanism ensures the accuracy and validity of transactions.

- **Ownership and control:** By eliminating intermediaries, decentralization allows individuals to have direct ownership and control over their assets and data.

- It provides greater autonomy and reduces reliance on centralized institutions.

Disadvantages of Decentralization in Blockchain

Scalability: . As the network grows, the computational and storage requirements increase, which can lead to slower transaction processing times and increased resource demands.

Governance and Decision-Making: Decentralized blockchains typically involve a distributed community of participants who collectively make decisions through consensus mechanisms.

Network Security: Distributed networks may be susceptible to attacks such as 51% attacks, where an entity or group gains control of the majority of the network's computational power and potentially manipulates transactions.

User Experience and Responsibility: Decentralized blockchains often require users to manage their private keys and handle their own security. **Regulatory Challenges:** Decentralized blockchains can pose challenges for regulatory authorities as they lack a centralized governing body.

Energy Consumption: Some decentralized blockchain networks, particularly those that rely on proof-of-work consensus mechanisms, consume significant amounts of energy.

Upgrade and Protocol Changes: Implementing changes or upgrades in a decentralized blockchain can be challenging due to the need for consensus among network participants. This can result in slower development cycles and delays in adopting necessary improvements.

References

TEXT BOOKS

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Thank You