INTRODUCTION TO CYBERSECURITY, BLOCKCHAIN TECHNOLOGY, AND INTERNET OF THINGS (IOT) FOR BEGINNERS

Exploring Emerging 10 Tech Fields for Career Growth In 2025

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Topics

Topic one: Cybersecurity: For Early Learner

Topic two: Blockchain Technology: For Early Learner

Topic three: Internet of Things (IoT): For Early Learner

Introduction to Cybersecurity?

What is Cybersecurity?

- **Definition: Protection of internet-connected systems, including hardware, software, and data, from cyber threats.**

Why is Cybersecurity Important?

i. Protection of Data

- **Protects sensitive personal data (e.g., NI numbers, bank accounts).**
- **Example: In 2017, the Equifax data breach compromised personal data of over 147 million people.**

Why is Cybersecurity Important?

ii. Preventing Financial Loss

- Cyberattacks can lead to significant financial losses for companies and individuals.
- Example: The WannaCry ransomware attack in 2017 caused an estimated $4 billion in damages.

iii. Critical Infrastructure Security

- Protects essential services such as healthcare, energy, and transportation.

iv Enabling Innovation: Establishes trust in technologies like cloud computing, AI, and IoT.

- Fact: Cybercrime is expected to cost the world $10.5 trillion annually by the end of 2025 (Cybersecurity Ventures)

Key Areas of Cybersecurity

- Application Security: Protecting software applications from threats.
- Network Security: Securing networks from unauthorized access and attacks.
- Information Security: Protecting data integrity, confidentiality, and availability.
- Cloud Security: Ensuring secure usage of cloud-based services and platforms.
- Endpoint Security: Safeguarding devices connected to networks (e.g., laptops, mobile phones).

The Growing Need for Cybersecurity

- With the rise of remote work, cloud computing, and IoT, the attack surface is expanding.
- Daily cyberattacks are increasing at an alarming rate.
- Global organizations experience over 2,200 cyberattacks daily (University of Maryland study).

Current Trends and Applications

- Growth of ransomware and phishing attacks.
- Adoption of Zero-Trust Architecture.
- Increased focus on AI and machine learning in threat detection.
- Applications: Banking, healthcare, government, e-commerce.
- Fact/Stat: Global cybersecurity market projected to grow from $202 billion in 2023 to $266 billion by 2027 (Statista).

Areas of Specialization

- ❑ Ethical Hacking and Penetration Testing
- ❑ Incident Response and Digital Forensics
- ❑ Network Security
- ❑ Cloud Security
- ❑ Security Governance and Compliance

Job Roles

- ❑ Ethical Hacker
- ❑ Cybersecurity Analyst
- ❑ Security Architect
- ❑ Incident Responder
- ❑ Chief Information Security Officer (CISO)

Knowledge Required for Mastery

- Networking and Operating Systems (Linux, Windows).
- Cryptography fundamentals.
- Programming (Python, JavaScript, etc.).
- Cybersecurity frameworks (NIST, ISO 27001).

Job Prospects and Future Projections

- Fact: Cybersecurity jobs are expected to grow 35% from 2023 to 2030 (Bureau of Labor Statistics).
- Demand for over 3.5 million unfilled cybersecurity positions worldwide by 2025.

Salary Levels

- Entry-level: £60,000–£80,000/year.
- Mid-level: £90,000–£120,000/year.
- Expert (CISO): £200,000–£400,000/year.
- Future Projections: Salary growth fueled by demand for skilled professionals.

Blockchain Technology: For Beginners

Definition & Core Concept

i. Definition: Blockchain is a decentralized, distributed digital ledger that records transactions across a network of computers.

- ❑ Invented by Satoshi Nakamoto in 2008, originally for Bitcoin.

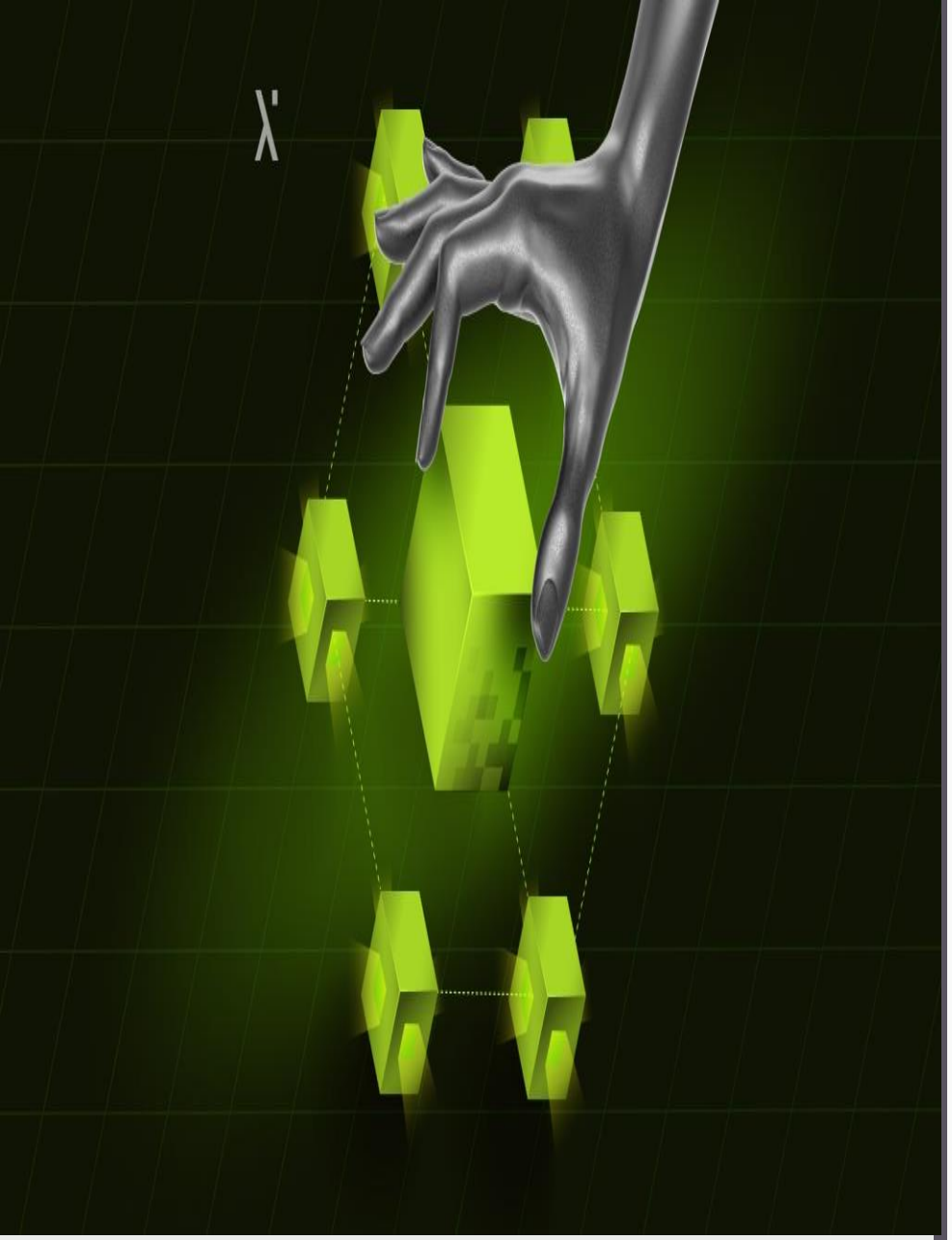
ii. Key Characteristics

- ❑ Decentralization: No single authority or intermediary.
- ❑ Immutability: Once data is recorded, it’s nearly impossible to alter.
- ❑ Transparency: Transactions are visible to authorized participants in the network.

Blockchain Technology: For Beginners

How It Works (High-Level)

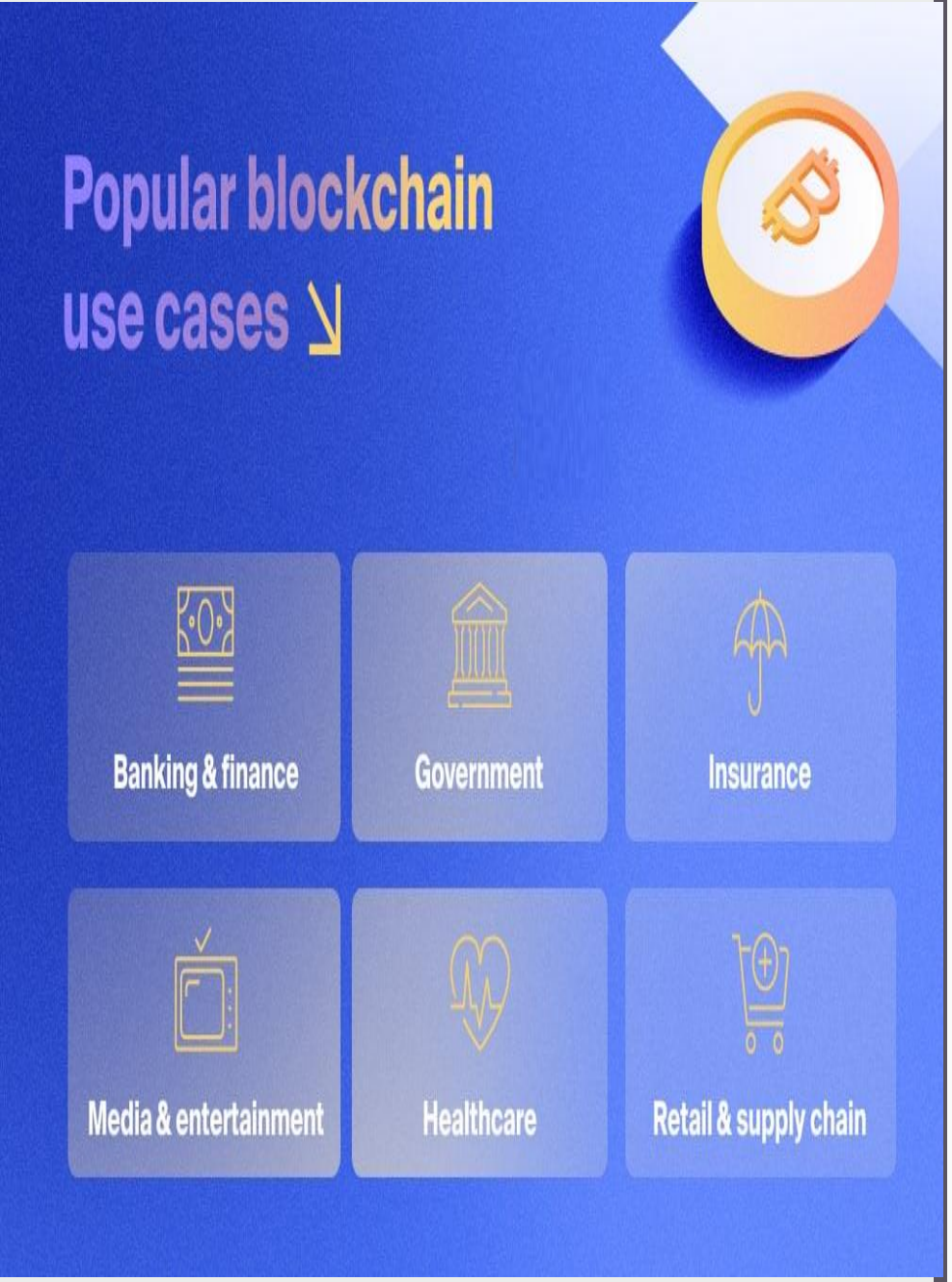
- Blocks: A block is a container of data (e.g., transaction details).
- Chain: Blocks are linked chronologically, forming a chain secured through cryptographic methods (hashes).
- Consensus Mechanisms: Methods like Proof of Work (PoW) or Proof of Stake (PoS) used to agree on the validity of transactions.



Blockchain Technology: For Beginners

Why Blockchain Matters

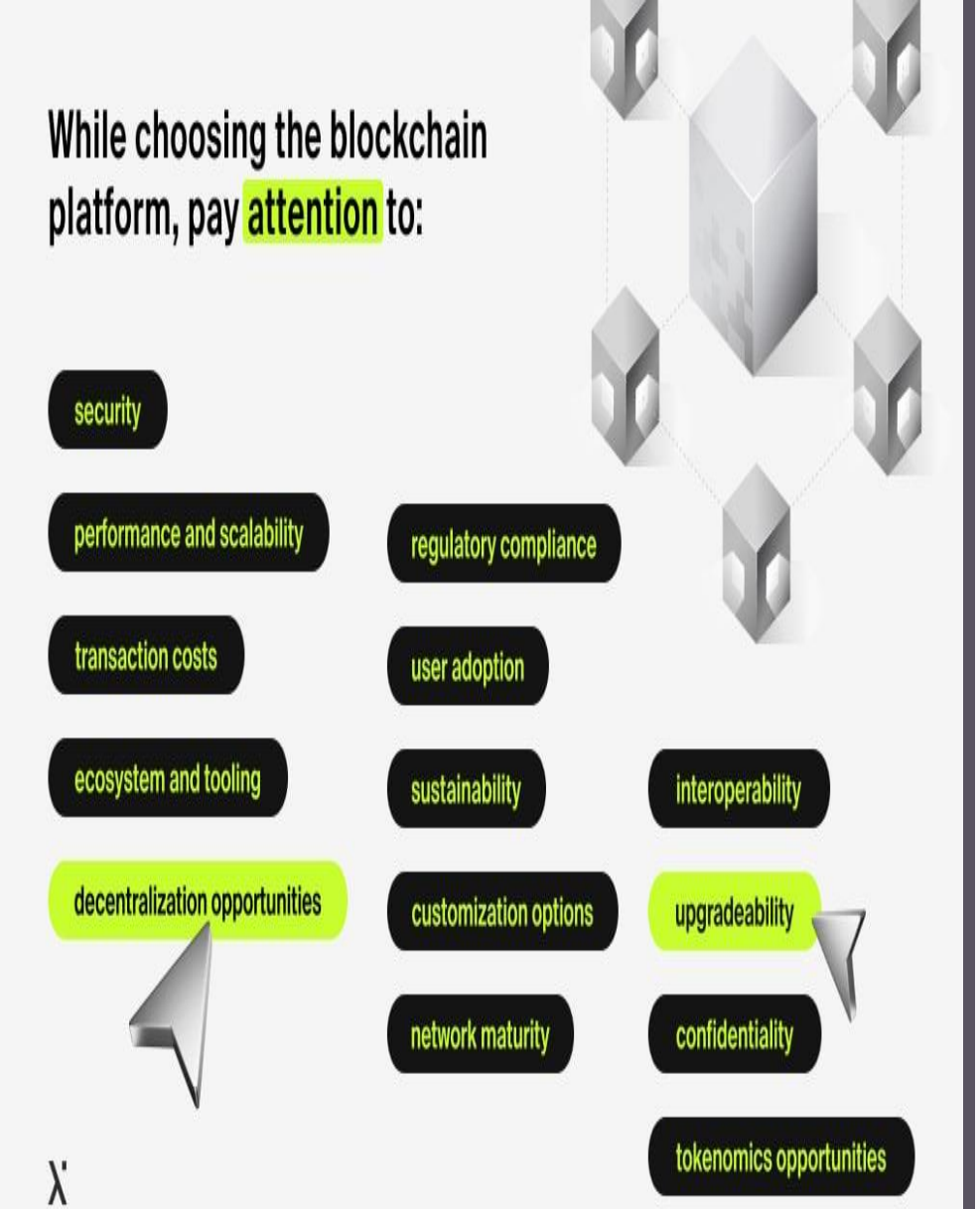
- Trust & Security: Removes the need for a central authority by enabling a trustless environment.
- Efficiency: Automates processes and reduces intermediaries, cutting costs and time.
- Data Integrity: Cryptographic hashing ensures data cannot be tampered with easily.



Blockchain Technology: For Beginners

Early Use Case: Cryptocurrency

- Bitcoin (BTC): First successful implementation of blockchain, introduced in 2009
- Ethereum (ETH): Expanded blockchain functionalities to include smart contracts and decentralized applications (DApps).
- Fact/Stat: Bitcoin network processes millions of transactions daily (CoinMarketCap).

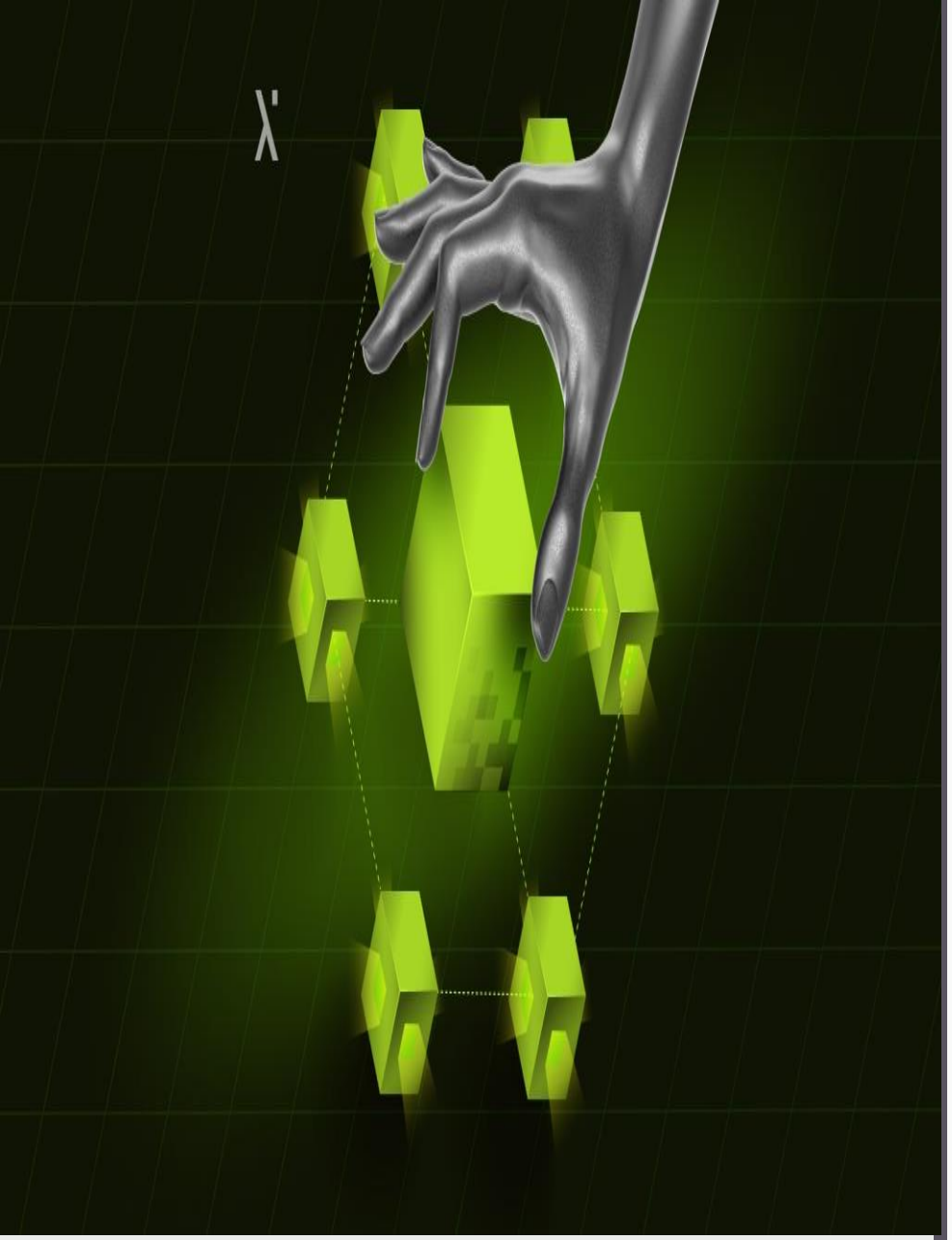


Real-World Applications of Blockchain

Government and Public Sector Use Cases

- Land Registries: Countries like Sweden and Georgia use blockchain to record property ownership, minimizing property fraud.
- Voting Systems: West Virginia tested blockchain-based voting to ensure secure, tamper-proof votes for overseas military personnel.
- Healthcare: Estonia leverages blockchain to secure patient health records, ensuring data privacy and integrity.

Fact: Estonia's e-health record system has cut administrative costs by over 50% (Government of Estonia).



Current Trends and Applications

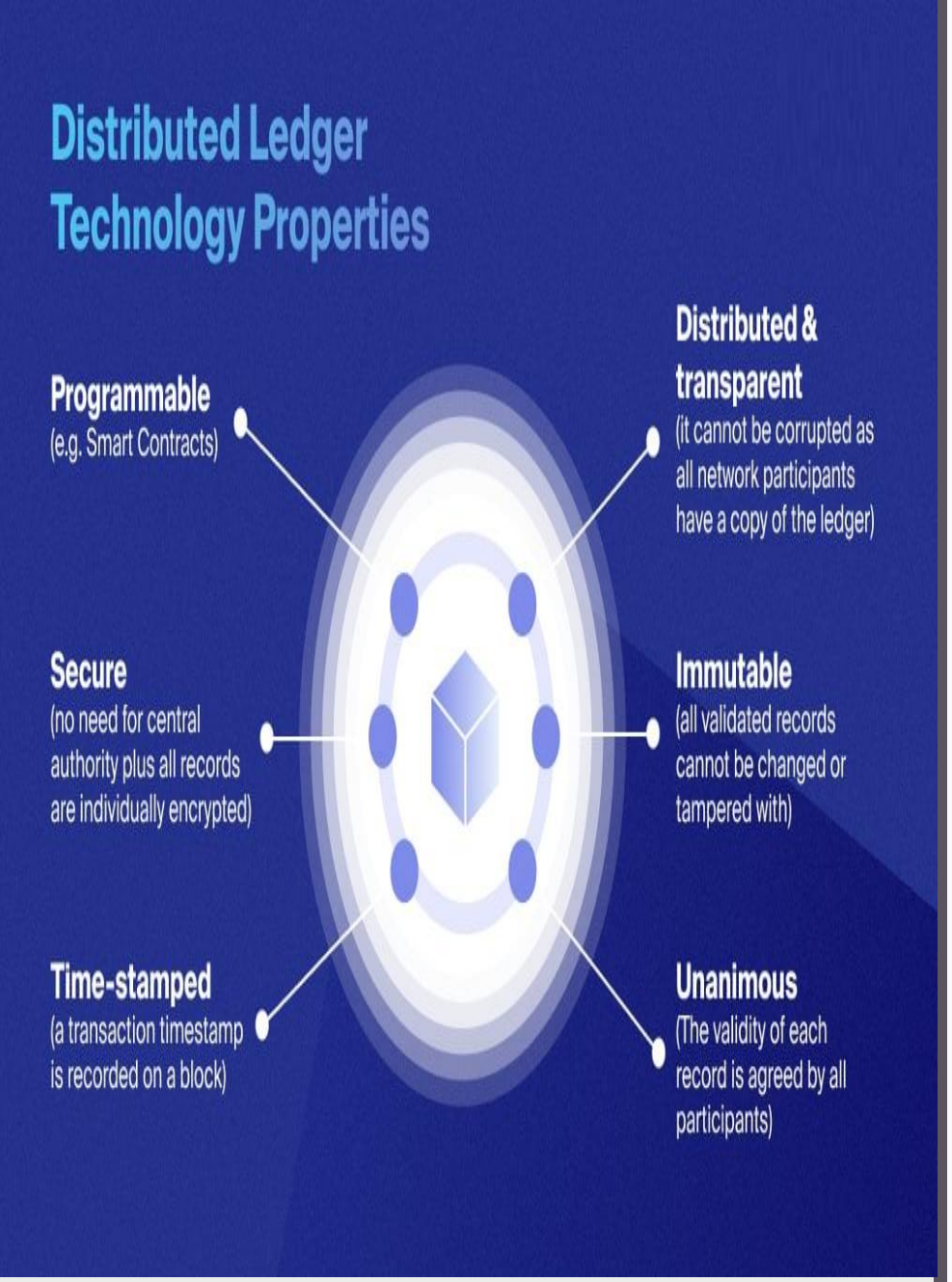
- Growth in cryptocurrency adoption (Bitcoin, Ethereum).
- Enterprise blockchain solutions in supply chain and healthcare.
- NFTs and Decentralized Finance (DeFi).
- Fact/Stat: Blockchain market projected to reach $163 billion by 2027 (Market Research Future).

Areas of Specialization

- ❑ Blockchain Development
- ❑ Smart Contract Development
- ❑ Blockchain Architecture
- ❑ Decentralized App (DApp) Development
- ❑ Blockchain Security

Job Roles

- ❑ Blockchain Developer
- ❑ Blockchain Solution Architect
- ❑ Smart Contract Engineer
- ❑ Cryptocurrency Analyst
- ❑ Blockchain Project Manager



Knowledge Required for Mastery

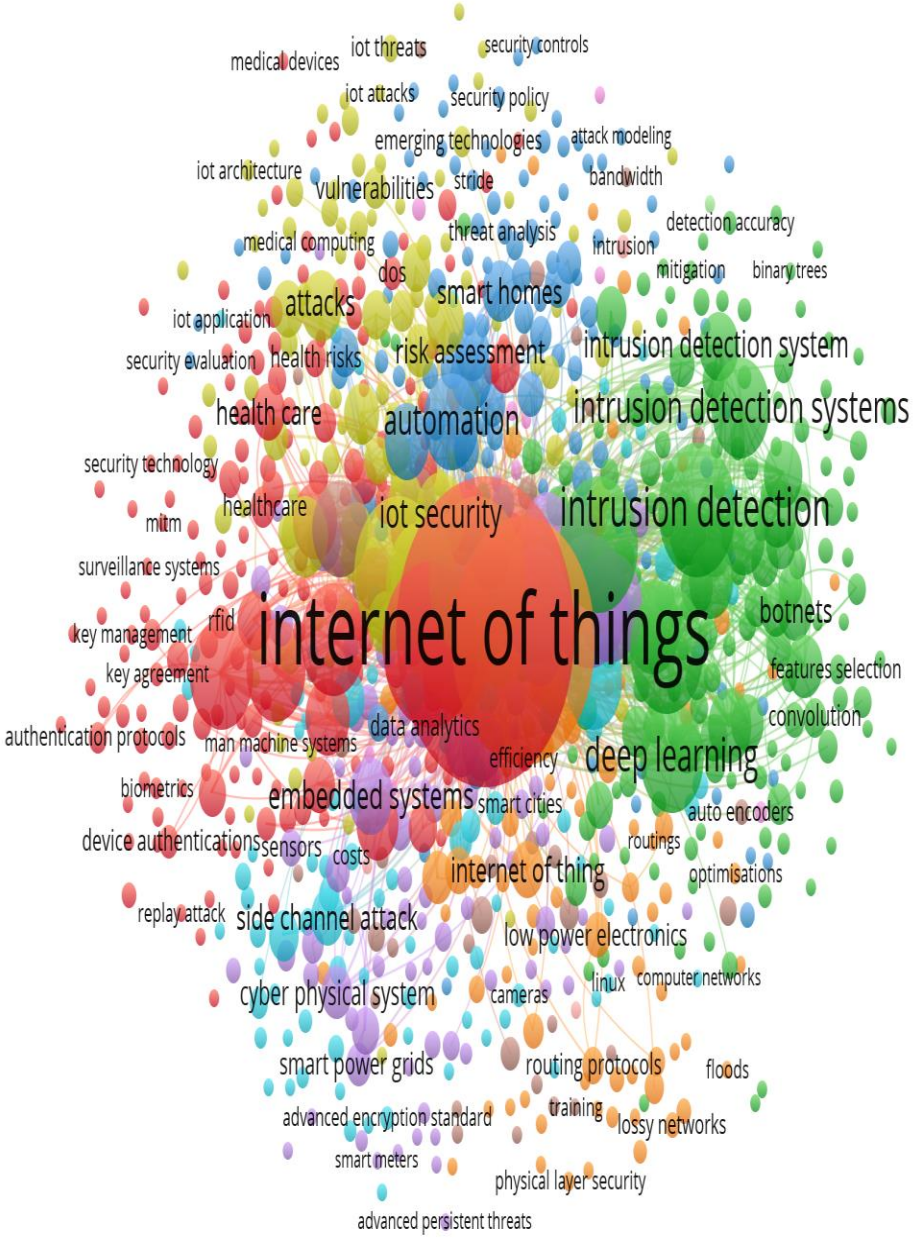
- Cryptography and consensus algorithms.
- Programming languages (Solidity, JavaScript, Python).
- Understanding blockchain platforms (Ethereum, Hyperledger, etc.).
- Familiarity with decentralized finance (DeFi).

Job Prospects and Future Projections

- High demand in sectors like finance, logistics, and healthcare.
- Increasing role in global digital transformation initiatives.
- Fact: Blockchain-related jobs have grown by 500% since 2020 (LinkedIn Jobs Report).

Salary Levels

- Entry-level: $75,000–$120,000/year.
- Mid-level: $120,000–$180,000/year.
- Expert: $200,000–$300,000/year.
- Projected growth in salary with increased adoption of blockchain tech.



Internet of Things (IoT): For Beginners

i. Introduction to IoT

- **Definition and Concept: The "Internet of Things" (IoT) refers to a network of interconnected physical objects—devices, vehicles, appliances—that collect and exchange data using embedded sensors and software.**

ii. Key Characteristics:

Connectivity, data collection, automation, and remote control.

Internet of Things (IoT): For Beginners

iii. Origin and Evolution

- **Kevin Ashton (1999): Described a system where the internet is connected to the physical world.**
- **Rapid Growth: Technological advancements (e.g., affordable sensors, improved network infrastructure) fuel IoT adoption.**

iv. Importance and Impact

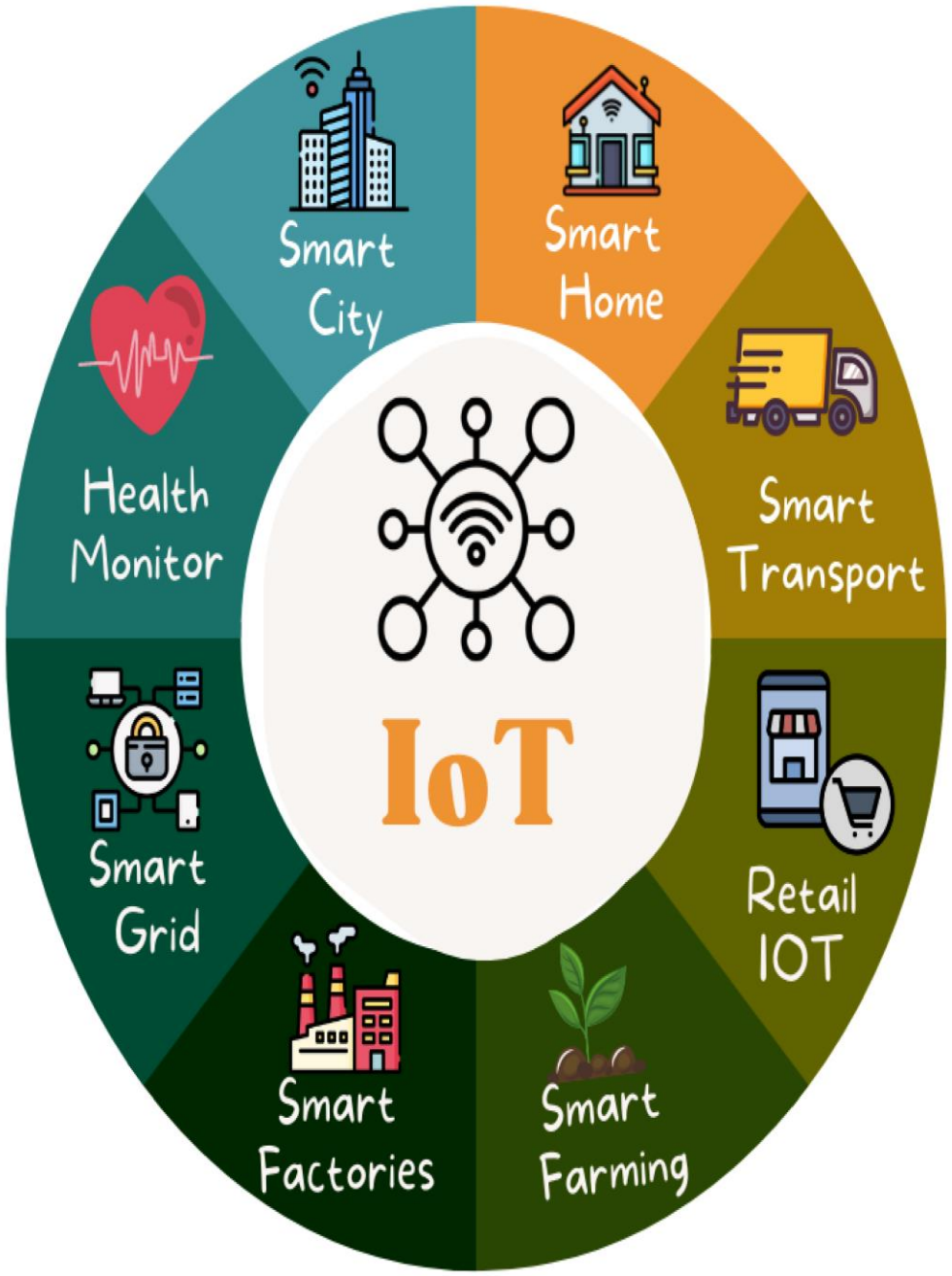
- **Efficiency and Automation: Streamlines processes by automatically gathering and analyzing real-time data.**

Internet of Things (IoT): For Beginners

- Transformational Potential: From smart homes and wearables to industrial automation (Industry 4.0).
- Data-Driven Decisions: Organizations harness IoT data for predictive analytics and operational insights.

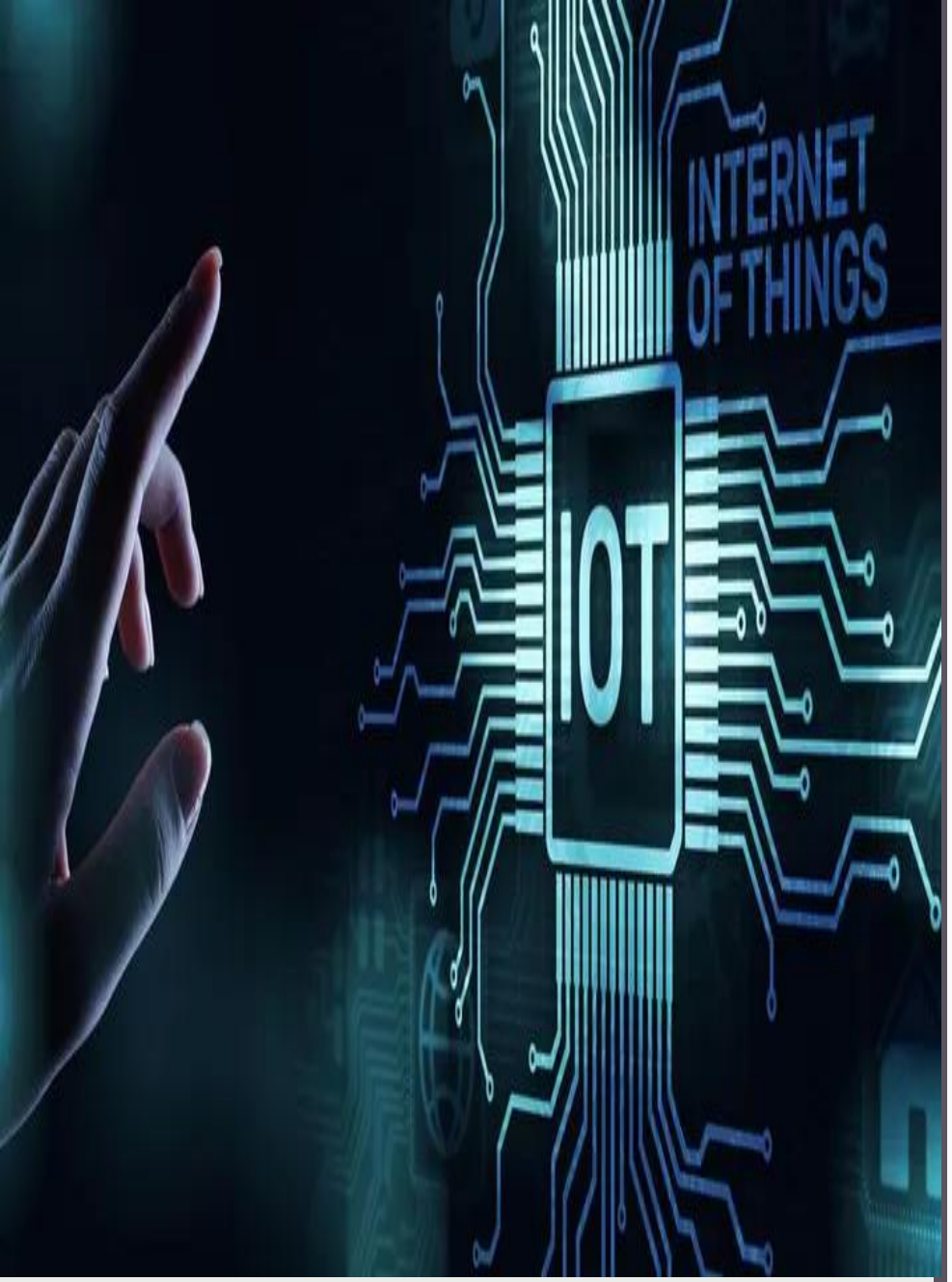
Why Learn IoT?

- High Demand: Constant need for IoT solutions across various industries.
- Innovation Ecosystem: Opportunities for startups, research, and collaboration.
- Future-Proof Skill: Foundation for emerging technologies like AI, robotics, and blockchain integrations.



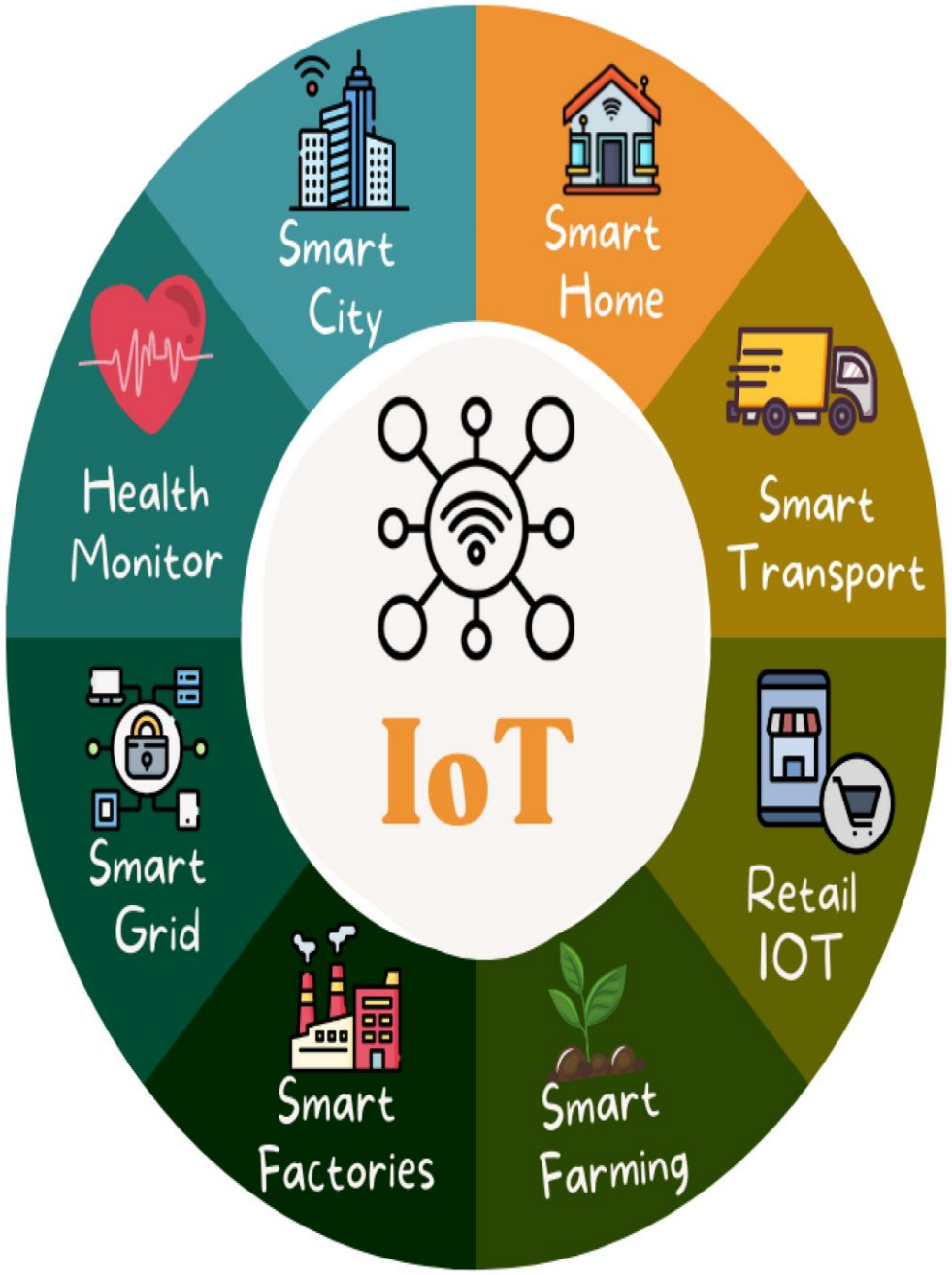
Examples of IoT in Daily Life

- Smart Home Devices (e.g., thermostats, security cameras, voice assistants like Amazon Alexa).
- Wearable Technology (e.g., fitness trackers, health monitors).
- Smart Cities (e.g., traffic management systems, waste management sensors).
- Industrial Applications (e.g., predictive maintenance for factory equipment).



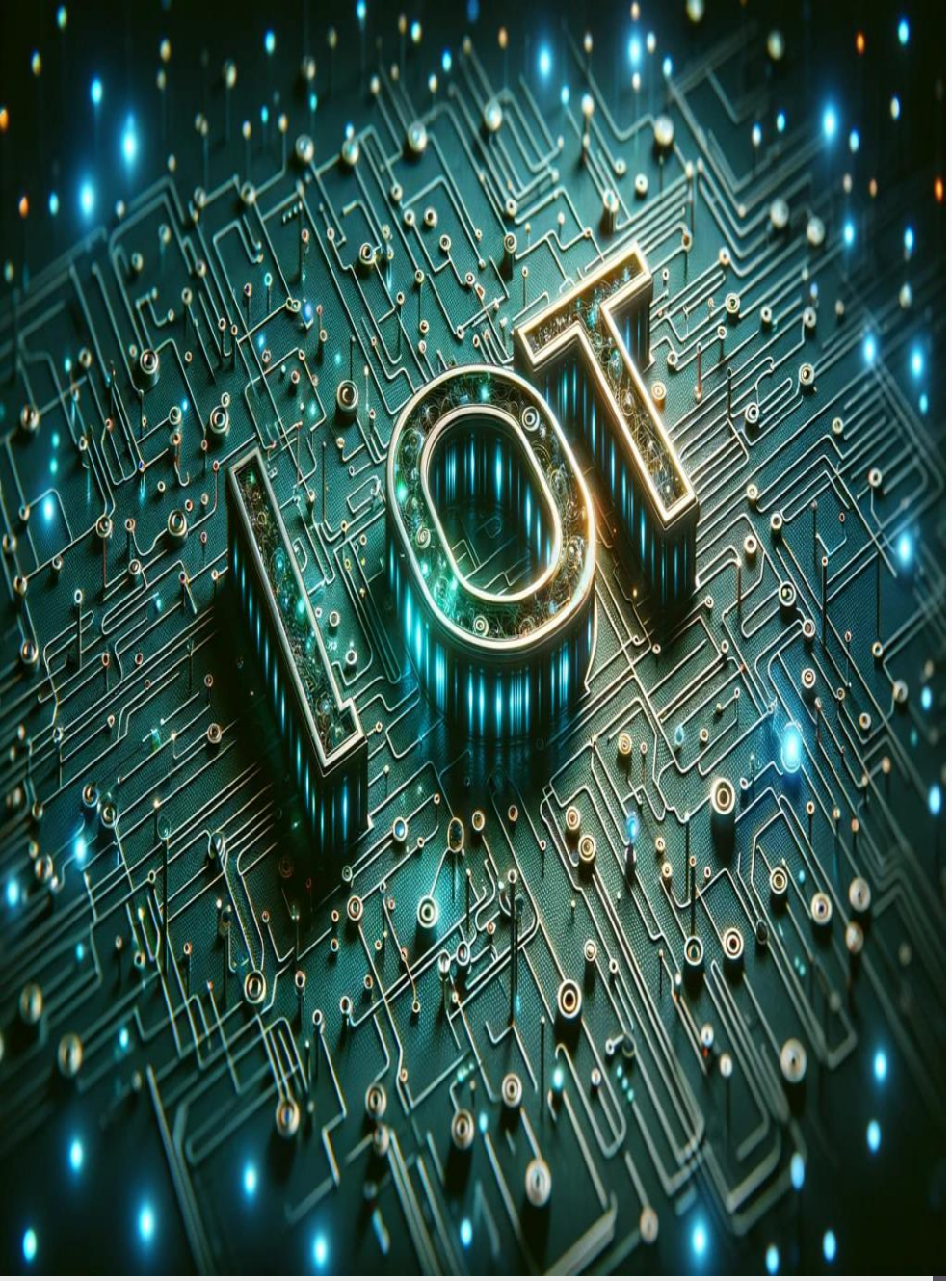
Key IoT Statistics

- Over 29 billion connected IoT devices projected worldwide by 2030.
- Global IoT market value expected to exceed $1.5 trillion by 2025.
- (Sources: Statista, IDC, Ericsson)



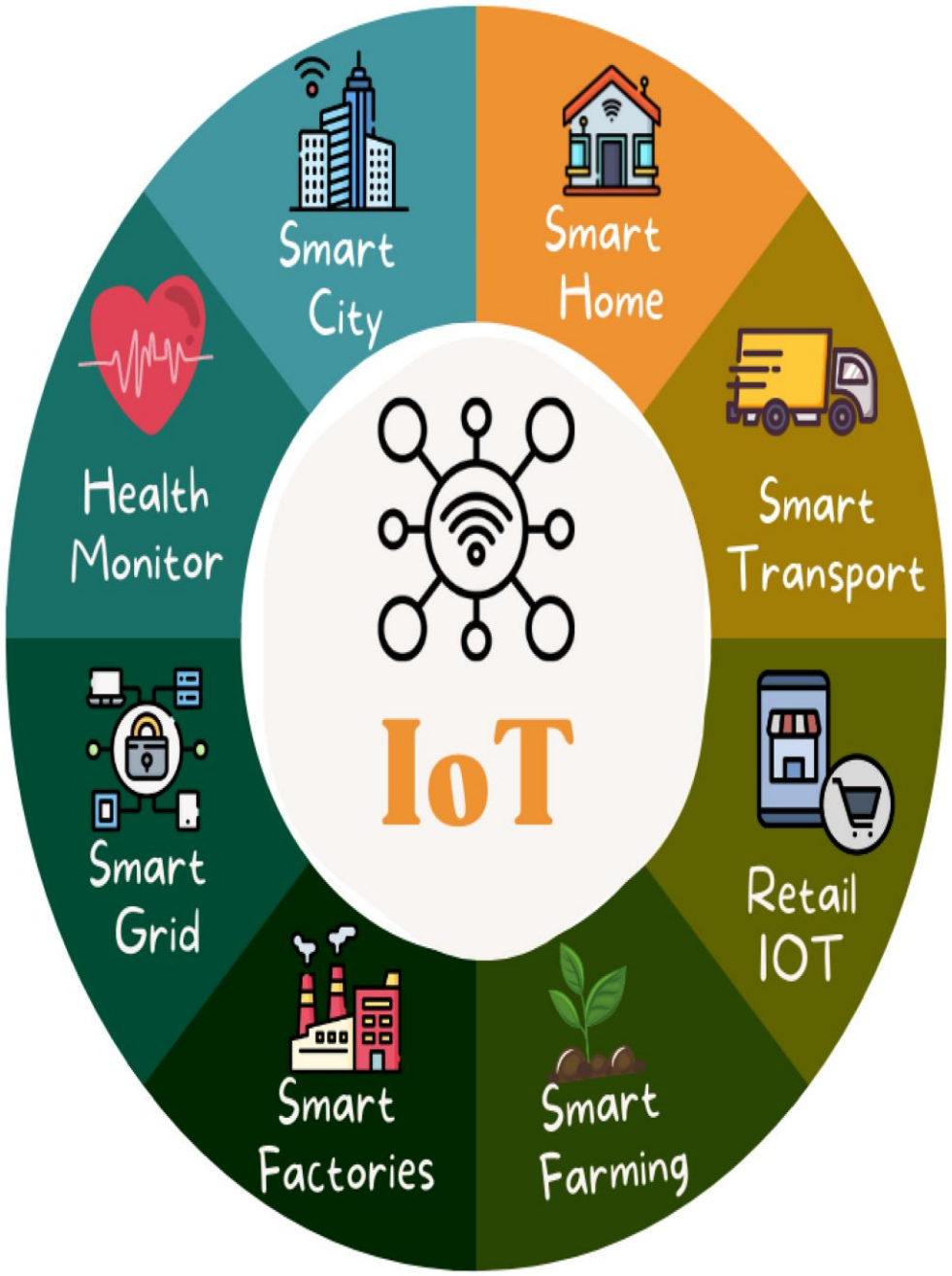
Areas of Specialization

- ❑ IoT Device Development
- ❑ IoT Security
- ❑ IoT Data Analytics
- ❑ Network and Connectivity Solutions
- ❑ Embedded Systems Engineering



Job Roles

- ❑ IoT Developer
- ❑ IoT Systems Architect
- ❑ IoT Data Analyst
- ❑ IoT Security Specialist
- ❑ Embedded Software Engineer



Knowledge Required for Mastery

- Understanding of sensors and embedded systems.
- Networking protocols (MQTT, CoAP).
- Programming languages (C++, Python, etc.).
- Data analytics and AI integration.

i. Job Prospects and Future Projections

- Rising demand across sectors: healthcare, agriculture, manufacturing, etc.
- Increasing focus on IoT security and privacy.
- Fact: IoT market expected to reach $1.6 trillion by 2025 (IDC).

Salary Levels

- Entry-level: $70,000–$100,000/year.
- Mid-level: $100,000–$150,000/year.
- Expert: $150,000–$250,000/year.

The Future is Bright

- Key Takeaway: Cybersecurity, Blockchain Technology, and IoT are at the forefront of the digital revolution.
- Each field offers vast opportunities for specialization, innovation, and growth.
- Action Point: Choose a field, start learning, and future-proof your career!

The Future is Bright

Thank You!

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