**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)
AND
COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)**

CIP67/CYP67: MINI PROJECT   TERM: March - June 2024

PROJECT SYNOPSIS

Pharmaceutical Products Supply Chain Management Using Blockchain

Under the guidance of

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Title of the Project: Pharmaceutical Products Supply Chain Management Using Blockchain.

Project Stream: Blockchain, Cryptography, Cyber Security

Problem Statement: In the pharmaceutical industry, ensuring the authenticity and safety of medicines throughout the supply chain presents significant challenges. The current system relies heavily on manual paperwork and legacy processes, leading to inefficiencies, lack of transparency, and vulnerabilities to counterfeit drugs. These issues compromise patient safety and erode trust in the healthcare system. To address these challenges, we are developing a supply chain management system using blockchain technology with efficient tracking of medicines at each stage to deliver traceability

Objectives:

To address these challenges, our project aims to leverage blockchain technology to revolutionize the pharmaceutical supply chain.

Our objectives are as follows:

1. Develop a blockchain-based decentralized application to provide transparent and immutable records of medicine transactions and movements throughout the supply chain.

2. Implement mechanisms to authenticate medicines using unique identifiers and tamper-evident packaging, ensuring patients receive genuine products.

3. Enable real-time tracking of medicines' journey through the supply chain, allowing stakeholders and patients to monitor their status accurately.

Scope of the Project:

To achieve our objectives, the project encompasses the following components:

Societal Impact:

Patient Safety: The supply chain management system contributes to patient safety by ensuring the authenticity and integrity of pharmaceutical products throughout the supply chain. This reduces the risk of patients receiving counterfeit or substandard medicines, ultimately safeguarding their health and well-being.

Trust and Transparency: By enhancing transparency and traceability, the supply chain management system fosters trust among stakeholders, including healthcare providers, regulatory agencies, and patients. This trust is crucial for maintaining the integrity of the pharmaceutical supply chain and ensuring the delivery of safe and effective medicines.

Reduced Counterfeiting: The implementation of medicine authentication systems and blockchain technology helps combat the proliferation of counterfeit medicines, which pose significant risks to public health. By providing verifiable proof of product authenticity, the supply chain management system helps mitigate the impact of counterfeit drugs on society.

Sustainability:

Scalability: The supply chain management system is designed to scale with the growing demands of the pharmaceutical industry, accommodating increased transaction volumes and expanding supply chains. This scalability ensures the long-term viability and effectiveness of the solution.

Cost-effectiveness: Through automation and streamlining of supply chain processes, the supply chain management system reduces administrative costs, minimizes errors, and improves operational efficiency. This cost-effectiveness benefits all stakeholders involved, including manufacturers, distributors, and patients.

Environmental Impact: By promoting the use of tamper-evident packaging and real-time tracking technologies, the supply chain management system helps minimize waste and environmental impact associated with counterfeit medicines and inefficient supply chain practices. This contributes to sustainable development and environmental stewardship.

Market Analysis:

Competitive Landscape: Conduct a thorough analysis of the competitive landscape to identify existing solutions and competitors operating in the pharmaceutical supply chain management space. Assess their strengths, weaknesses, market positioning, and potential impact on the adoption of the supply chain management system.

Market Trends: Stay abreast of market trends, regulatory developments, and emerging technologies shaping the pharmaceutical industry and supply chain management. This enables the supply chain management system to adapt and innovate in response to changing market dynamics and consumer preferences.

Opportunities for Collaboration: Identify opportunities for collaboration with key stakeholders, including pharmaceutical companies, regulatory agencies, healthcare providers, and technology partners. Collaborative initiatives can accelerate the adoption of the supply chain management system and drive innovation in the pharmaceutical supply chain ecosystem.

What contribution to the society, would the project make?

Our project's implementation offers significant contributions to society:

Patient Safety: By ensuring the authenticity of medicines and providing transparent supply chain records, we contribute to patient safety and reduce the risk of harm from counterfeit drugs.

Trust in Healthcare: Transparent and verifiable information fosters confidence in the healthcare system, leading to better health outcomes and patient satisfaction.

Efficient Supply Chain: Digitizing and streamlining supply chain processes improve efficiency, reduce errors, and facilitate timely delivery of medicines, ultimately benefiting patients and healthcare providers.

Global Health Impact: The project's scalable and adaptable framework can be implemented globally, addressing pharmaceutical supply chain challenges and improving access to safe and genuine medication worldwide.

Hardware & Software to be used:

Hardware:

- High-performance computing systems
- Processor: AMD Ryzen 5 or Intel core i5
- Disk Space: SSD of 20GB or more
- Memory: DDR5 4GB RAM
- Active internet connection of more than 512Kbps

Software:

- Development Environment: VSCode
- Node.js: Required for running JavaScript applications and managing dependencies.
- Blockchain Network: Access to a blockchain network (e.g., Gode Testnet) for deploying smart contracts and recording transactions.
- MetaMask Wallet: A browser extension wallet for interacting with Ethereum-based blockchain networks.
- Web3.js: JavaScript library for interacting with blockchain networks and smart contracts.

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Guide Comments: **(to be included on the last Page)**

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