

Online Medicine Application with Personalized Blockchain Wallet and AI-Based Doctor Consultation System

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Abstract—The "Online Medicine Application with Personalized Blockchain Wallet and AI-based Doctor Consultancy System" presents a visionary approach to address the evolving healthcare landscape by integrating cutting-edge technologies. This initiative encompasses an intuitive online medical application facilitating seamless healthcare service access, alongside a secure and personalized blockchain wallet for confidential health record management. Additionally, it features an AI-driven doctor consultancy system for intelligent diagnosis and treatment recommendations. Emphasizing digital transformation, accessibility, and data security, the project aims to enhance healthcare convenience and patient-centricity. Successful implementation promises to revolutionize healthcare delivery, empowering individuals while addressing regulatory challenges. This report delineates the project methodology, utilized technologies, system architecture, data privacy measures, implementation phases, and testing processes. Moreover, it discusses user training, support strategies, deployment plans, and future directions. By amalgamating these components, the project endeavours to redefine healthcare accessibility and quality, transforming the delivery and experience of healthcare services.

Keywords: Blockchain Healthcare, Medical Records Security, Medication Catalog, Personalized Blockchain Wallet, AI Chatbot, Smart Contracts, Patient Privacy

I. INTRODUCTION

In recent years, the integration of technology into healthcare systems has revolutionized the way medical services are accessed and delivered. The convergence of digital platforms, blockchain technology, and artificial intelligence (AI) has paved the way for innovative solutions that address the challenges of traditional healthcare systems. This research paper explores the development and implementation of an online medicine application equipped with a personalized blockchain wallet, an AI-based doctor consultation system, and doctor appointment functionality.

A. Background:

The traditional healthcare delivery model often faces hurdles such as accessibility barriers, inefficiencies in service delivery, and concerns regarding data security and privacy. To overcome these challenges, there is a growing need for technological interventions that streamline healthcare processes, enhance patient experience, and ensure the integrity and security of sensitive medical data.

B. Objectives:

The primary objective of this research paper is to present a comprehensive framework for an online medicine application that leverages cutting-edge technologies to offer a seamless and secure healthcare experience. The specific objectives include:

1. Development of an Online Medicine Application: Designing and implementing a user-friendly platform for ordering medicines online, facilitating secure payments, and tracking delivery status.

2. Integration of Personalized Blockchain Wallet: Incorporating blockchain technology to provide users with a secure and transparent storage solution for medical records, prescriptions, and payment information.

3. Implementation of AI-Based Doctor Consultation System: Building an intelligent system that enables users to consult with healthcare professionals remotely, leveraging AI algorithms for preliminary diagnosis and triage.

4. Inclusion of Doctor Appointment Functionality: Introducing features for scheduling virtual appointments with licensed doctors or specialists, managing appointment calendars, and sending reminders for follow-up consultations.

II. LITERATURE REVIEW

The integration of blockchain technology and AI into healthcare systems has garnered significant attention in recent years due to its potential to revolutionize various aspects of healthcare delivery, including medical records management, supply chain management, and patient care. In this literature review, we explore key works in the field to understand the

current state of research and development in online medicine applications with personalized blockchain wallets and AI-based doctor consultation systems.

Bitcoin: A Peer-to-Peer Electronic Cash System by Satoshi Nakamoto This seminal paper introduced Bitcoin, the first decentralized cryptocurrency, and laid the foundation for blockchain technology. While not directly related to healthcare, its principles of decentralization, transparency, and security have inspired numerous applications in various domains, including healthcare.

Ethereum White Paper: A Next-Generation Smart Contract Decentralized Application Platform by Vitalik Buterin Ethereum introduced the concept of smart contracts, which are self-executing contracts with the terms of the agreement directly written into code. Smart contracts facilitate the development of decentralized applications (DApps), providing a framework for building blockchain-based systems, including those in healthcare.

Ethereum: A Secure Decentralized Generalized Transaction Ledger by Gavin Wood This paper delves into the technical details of Ethereum's blockchain architecture, highlighting its security features and potential use cases beyond simple currency transactions. Ethereum's flexibility and programmability make it an attractive platform for implementing complex healthcare systems.

Zerocash: Decentralized Anonymous Payments from Bitcoin by E. Ben-Sasson et al. Privacy is a critical concern in healthcare systems, especially regarding sensitive patient data. Zerocash proposes a protocol for anonymous payments, which could be adapted to ensure privacy in online medicine applications where preserving patient confidentiality is paramount.

Escrow Protocols for Cryptocurrencies: How to Buy Physical Goods Using Bitcoin by Sarah Azouvi et al. Escrow protocols are essential for ensuring trust and security in online transactions. This paper explores various escrow mechanisms for cryptocurrencies, which can be adapted to facilitate secure transactions in online medicine applications, such as purchasing medications or medical devices.

Scalable Privacy-Preserving Query Processing Over Ethereum Blockchain by Shlomi Linoy et al Privacy-preserving techniques are crucial for protecting sensitive medical information stored on blockchain networks. This paper proposes scalable privacy-preserving query processing methods specifically designed for Ethereum blockchain, offering insights into how to maintain confidentiality while querying medical data stored on a blockchain.

Challenges Beyond Blockchain: Scaling, Oracles, and Privacy-Preserving by Stanislav Kruglik et al.: This work discusses challenges associated with blockchain technology, including scalability, integration with external data sources (oracles), and privacy preservation. Addressing these challenges is essential for the successful implementation of online medicine applications with personalized blockchain wallets and AI-based doctor consultation systems.

AI-Based Doctor Consultation Systems: While not directly cited in the provided references, the development of

AI-based doctor consultation systems has gained momentum in recent years. These systems leverage machine learning algorithms to provide personalized medical advice, improve diagnostic accuracy, and streamline healthcare delivery. Integrating AI-based consultation systems with blockchain technology can enhance data security and patient privacy while enabling seamless access to medical records across different healthcare providers.

By synthesizing insights from the aforementioned literature, it becomes evident that the convergence of blockchain technology, AI, and healthcare holds immense promise for transforming the delivery of medical services. However, significant technical and regulatory challenges must be overcome to realize the full potential of these innovative solutions in improving patient outcomes and healthcare accessibility.

III. DESIGN AND IMPLEMENTATION

A. MODULES

1. User Authentication

This module handles the process of user registration, login, and password reset. It ensures that only authorized users can access the application and maintains session management to keep track of user interactions securely.

1. User Profile Management

User Profile Management allows users to create and update their profiles. It includes features like uploading profile pictures, managing personal information such as name and contact details, and ensuring the integrity and security of user data.

2. Medicine Ordering

This module facilitates the ordering process for medicines. Users can browse a catalog of available medicines, search for specific items, add them to their shopping cart, and place orders securely. It also manages payment processing and sends order confirmation emails to users.

3. Prescription Management

The Prescription Management module enables users to upload, store, view, and delete their prescription documents securely. It ensures that only authorized users can access and manage their prescriptions, providing a seamless experience for medication management.

4. Blockchain Wallet

This module integrates blockchain technology to provide users with secure storage for their healthcare records and transaction history. It generates a personalized blockchain wallet for each user, ensuring confidentiality and integrity of medical data.

5. AI-Based Doctor Consultancy

The AI-Based Doctor Consultancy module leverages artificial intelligence to provide users with medical advice and

guidance. It includes features like a chatbot for symptom description, consultation scheduling, and text, voice, and video chat functionalities for virtual consultations with healthcare professionals.

6. Search and Recommendation Engine

This module enables users to search for medicines and healthcare professionals efficiently. It incorporates search functionality for finding specific medicines or professionals and recommendation algorithms based on user history and preferences to enhance the user experience.

7. Payment Processing Module

The Payment Processing module integrates various payment methods such as digital wallets, and cryptocurrency securely. It ensures smooth and secure payment processing, generates invoices for transactions, and maintains compliance with regulatory requirements.

8. Reporting and Analytics

The Reporting and Analytics module generates reports on various aspects of the application, including order history, user activity, and consultation sessions. It gathers insights from analytics data to improve user experience and formulate effective business strategies.

B. Flowchart

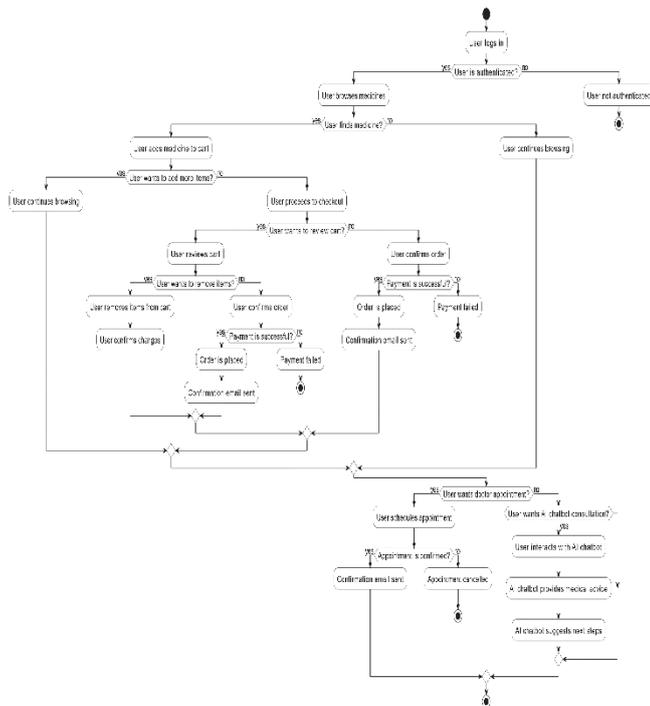
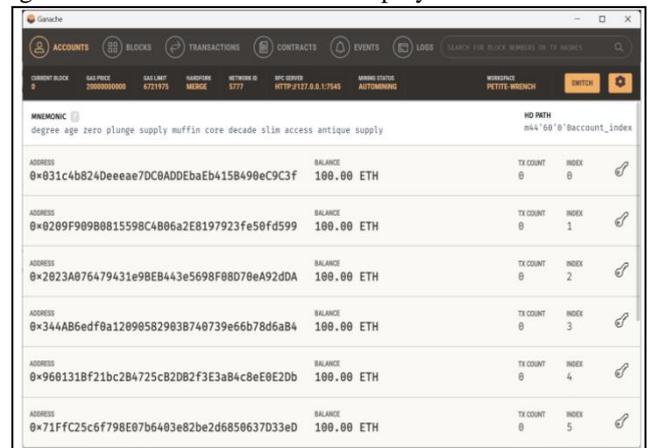


Fig 1. Flowchart

C. Diagrammatic Representation:

Ethereum: On the Ethereum platform, the cryptocurrency used here is Ether (ETH). It uses proof of work as a consensus algorithm, where anyone who can quickly solve a problem with computing power can add a new block to the network. The blockchain arrangement solves the vote tampering problems. It used the Ethereum blockchain network for the online voting application. In the blockchain, each block is linked to its next and previous block. Therefore, if hackers try to access block N then they will be notified at block N+1 and the changes made to block N+1 will also be reflected in block N+2, etc.

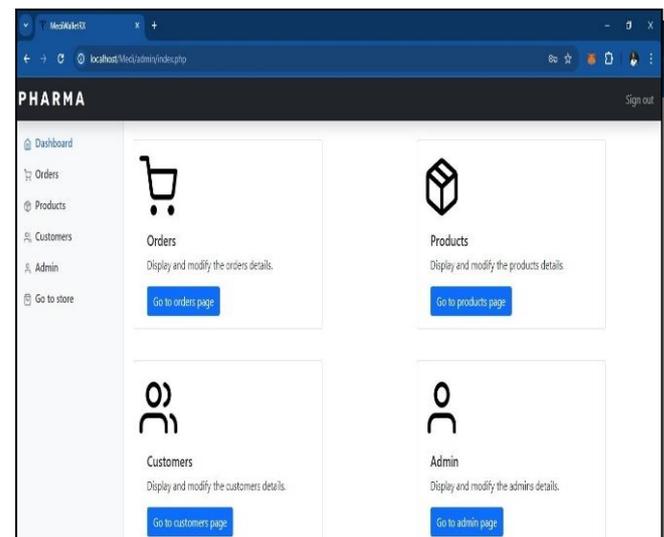
Ganache: Ganache is used to create the Ethereum blockchain network in the local machine, and the smart contract is deployed in the network using the Truffle framework. Ganache provides 10 accounts with 100 fake ethers that can be used to test the working of the developed application. Figure 2 shows smart contracts deployed in Ganache. The



truffle configs.js file automatically loads the test blockchain network on localhost and gives a blockchain account with 100 ETH for testing the contract

Fig 2. Ganache

Fig 4. Registration Page Interface
Fig 5. Sign IN Page Interface



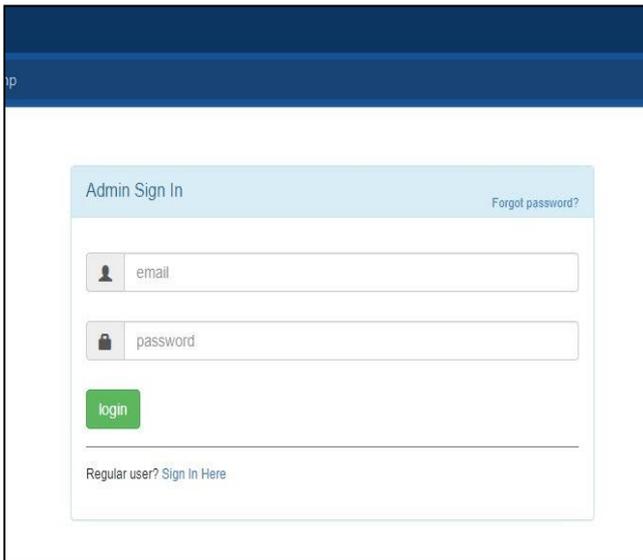


Fig 6. Admin Dashboard

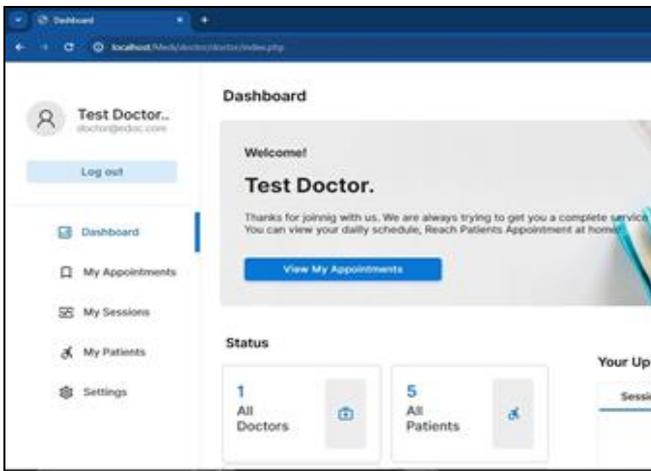


Fig 7. Doctor Dashboard Page Interface

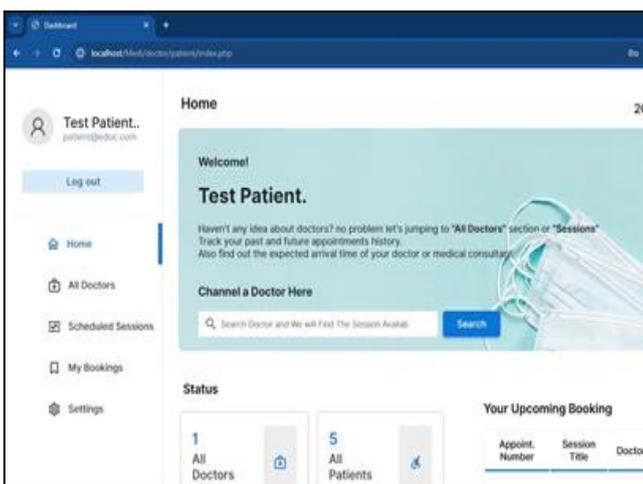


Fig 8. Patient Dashboard Page Interface

IV. CONCLUSION

The development of an online medicine application with a personalized blockchain wallet and an AI-based doctor consultancy system presents a significant opportunity to revolutionize the healthcare industry. By integrating cutting-edge technologies, such as blockchain and artificial intelligence, into a user-friendly platform, this application has the potential to enhance access to healthcare services, streamline medicine procurement, and improve patient-doctor interactions.

Through careful planning, rigorous development, and adherence to regulatory standards, this project can deliver a secure and efficient solution that meets the needs of both patients and healthcare providers. By prioritizing user experience, data security, and continuous improvement, the application can establish itself as a trusted and indispensable tool in the healthcare ecosystem.

As technology continues to advance and consumer expectations evolve, ongoing innovation and adaptation will be key to maintaining the application's relevance and effectiveness. With a commitment to excellence and a focus on improving health outcomes for all users, this project can make a meaningful impact on the way healthcare is delivered and experienced in the digital age.

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