BLOCKDRIVE

"A DECENTRALIZED PEER TO PEER
CAR SHARING SYSTEM "

PROJECT SYNOPSIS

OF MAJOR PROJECT

BACHELOR OF TECHNOLOGY
CSE

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INTRODUCTION

A centralized car sharing system is a software-driven ecosystem that centrally controls and administers access to a fleet of vehicles, enabling authorized users to reserve, access, and utilize shared vehicles for their transportation needs.

Centralized car sharing systems are employed by organizations or businesses that own and manage a fleet of vehicles, making them available for short-term use by registered members. These systems provide environmentally friendly alternative to car ownership for users, as they promote the efficient utilization of vehicles and reduce the number of cars on the road.

Shortcomings of centralized car sharing system:

1.Data Security:

a. Personal Information: Car sharing services collect and store personal information of users, such as names, addresses, and payment details. Data breaches can expose this sensitive information to malicious actors [1].

b. Financial Data: Credit card information is often linked to user accounts for payment purposes. Unauthorized access to this data can lead to financial fraud.

2.Access Control:

a. Vehicle Access: Ensuring that only authorized users gain access to the shared vehicles is essential. Issues with access control mechanisms can result in unauthorized use or theft of vehicles.

b. User Authentication: Weak authentication methods or vulnerabilities in the login process can lead to account hijacking and misuse.

3. Privacy:

a. Location Data: Continuous tracking of vehicle location can raise concerns about user privacy. Unauthorized access to this data can have privacy implications [1].

b. User Profiles: Sharing user data with third parties without consent or inadequate privacy policies can lead to privacy breaches.

4.Membership and Fees: Users typically need to pay membership fees and usage charges. While cost-effective for many, this may be a barrier for some potential users, especially those with infrequent car-sharing needs.

A decentralized car-sharing system is a peer-to-peer (P2P) approach to sharing vehicles that eliminates the need for a central authority or intermediary. Traditional data servers provide us CRUD interface, so we are able to create, read, update and delete data. This suggests that some people might change users' data without further notification of the users. On the contrary, blockchain as immutable, public ledger allows us only to create and read data. If we want to update some information in blockchain, we have to notify every single user in the network that we have changed data. As a matter of course, it is also impossible to delete data from blockchain. It can be concluded that blockchain as unchangeable method increases transparency and ensures data protection [2]

In this system, individuals who own or have access to cars can directly connect with others who need a ride, thereby sharing their vehicles without the involvement of a centralized platform or company.

Block Drive, a groundbreaking initiative, emerges as a beacon of change in the realm of

transportation. It represents a vision realized through a decentralized peer-to-peer car sharing system that harnesses the power of blockchain technology to create a seamless, efficient, and eco-friendly solution.

PROJECT OVERVIEW:

Block Drive stands as a testament to the possibilities of decentralized systems. By leveraging the principles of peer-to-peer networks and blockchain, Block Drive facilitates a car sharing ecosystem where individuals can seamlessly connect, share rides, and contribute to a sustainable future. At its core, Block Drive envisions a community-driven platform that not only promotes responsible usage of resources but also revolutionizes the way we perceive shared mobility. This platform boasts an intuitive user interface developed using modern web and mobile technologies. Users can effortlessly find available rides, schedule journeys, and track shared routes, enhancing the overall user experience.

TECHNOLOGY UTILIZED:

Blockchain Technology: Blockchain is often used to record and validate transactions. Each car-sharing transaction is recorded on a distributed ledger, providing transparency and security. This ledger ensures that the details of each transaction, such as the duration of the ride, cost, and participants, are securely recorded.

Smart Contracts: Smart contracts, which are self-executing agreements with the terms of the car-sharing arrangement, are deployed on the blockchain. These contracts automatically execute when predefined conditions are met. For example, once the ride is completed, the payment is automatically transferred to the car owner based on the agreed-upon terms in the smart contract.

Ethereum Blockchain: Ethereum is a popular choice for developing decentralized applications and smart contracts. It supports Solidity, a language specifically designed for creating smart contracts.

Cryptography: Utilize cryptographic techniques for secure communication and data storage. Payments are typically made using cryptocurrency tokens or digital currency, which is secured and managed by the blockchain. This eliminates the need for traditional payment processors and reduces transaction fees.

RATIONALE

The primary goals and advantages of the suggested project are encapsulated in the title "BLOCKDRIVE: A Decentralized Peer-To-Peer Car Sharing System" Here is a thorough justification for this title:

Reduced Costs: With no centralized platform or intermediary, users can negotiate prices directly leading to potentially lower costs for both car owners and renters.

Increased Privacy and Security: Personal and financial data are more secure as they are not stored on a central server. Data is distributed across the blockchain, reducing the risk of data breaches.

Efficiency: Smart contracts and blockchain technology streamline the process, automating many aspects of car sharing, including payment and booking.

Empowerment of Individuals: Decentralization puts more control in the hands of car owners and users, reducing dependency on centralized companies.

Innovation in Blockchain and Smart Contracts: The project serves as a real-world application of blockchain technology, demonstrating its potential in creating secure, transparent, and efficient systems.

OBJECTIVES

1. To design different modules for the system promoting sustainability and optimizing resource utilization.

2. Building a smart contract on solidity language for ride sharing.

3. To implement robust data security measures, including encryption and decentralized storage, to ensure the privacy and integrity of user data and ride history.

4. To reduce the overall carbon footprint and promote eco-friendly transportation methods by encouraging carpooling and shared rides.

LITERATURE REVIEW

[1]: Blockchain Based Car Sharing Platform.

In this paper, we find out ways to overcome hacker attacks and data leaks.
How?
Tokenization of assets using ERC-20 and ERC-721 tokens. This paper guide us to overcome some shortcomings which are lack of Real-World Implementation i.e. no evidence of real-world implementation or practical testing of the platform. Lack of Real-World Implementation: No evidence of real-world implementation or practical testing of the platform.

[2]: Unpacking Sharing In Peer -To-Peer Economy: The Impact Of Shared Needs And Backgrounds On Ride-Sharing

This research paper enables us to know professionals daily routine ride-sharing needs based on their daily commute, while students arranged rides to return home for school breaks and also shared needs and backgrounds are influenced depending on how carpoolers treated each other. In this paper, some drawbacks are their study was in the diversity of the carpool groups that were studied. It also do not focuses more on the logistical challenges facing by student carpool groups

[3]: B-Ride: Ride Sharing With Privacy - Preservation, Trust And Fair Payment Atop Public Blockchain

The proposed decentralized ride-sharing service, B-Ride, aims to address the limitations of existing central third party-based services. A pay-as-you-drive methodology based on distance is introduced for fair payment. The method here is having insufficient privacy considerations: it does not elaborate on other privacy concerns such as the protection of personal data and trip information stored on the blockchain. The platform needs trusted infrastructure to run it, and hence may fail in case one service node is compromised which in turn will lead to inherent problems in the client-server model.

[4]: An Online Ride-Sharing Path-Planning Strategy for Public Vehicle Systems

This paper examines studies on the proposed path-planning strategy for online ridesharing in public vehicle (PV) systems which is based on a greedy algorithm. By reducing the global search to a local search, the proposed strategy aims to improve computational efficiency. The impact of the proposed path-planning strategy on important factors, such as vehicle utilization, waiting times for passengers, and system efficiency, is not discussed. The reliance on a greedy algorithm may result in suboptimal solutions, and it does not discuss the potential trade-offs or limitations associated with this approach.

FEASIBILITY STUDY

The feasibility for the Block Drive project stems from the pressing challenges faced in modern transportation systems. Traditional models of car ownership and transportation contribute significantly to environmental pollution, traffic congestion, and resource wastage. Block Drive addresses these challenges by introducing a decentralized peer-to-peer car sharing system, promoting sustainable practices, reducing individual carbon footprints, optimizing resource utilization, and enhancing community connectivity.

NEED:

1. Carpooling and shared rides significantly reduce the number of individual vehicles on the road, leading to lower carbon emissions.

2. Carpooling and shared rides provide cost-effective transportation solutions for users, reducing individual commuting expenses.

3. Block Drive aims to create a responsible and conscious car sharing community.

SIGNIFICANCE:

1. Block Drive is not just a car sharing platform; it is a transformative journey towards a future where shared mobility is sustainable, efficient, and accessible to all.

2. The project offers cost-effective transportation solutions for users.
Car owners can monetize their unused seats, and riders can access affordable and convenient transportation options.

3. Block Drive serves as a practical application of cutting-edge technology, contributing to the evolution of decentralized systems and blockchain-based applications.

4. Block Drive fosters a sense of community by encouraging shared responsibility and interaction among users.

METHODOLOGY/ PLANNING OF WORK

Certainly! Developing a decentralized peer-to-peer car sharing system like Block Drive involves a systematic approach. Here is a methodology outlining the steps to achieve the project objectives:

1. Select appropriate blockchain platforms, programming languages, and frameworks for development (e.g., Ethereum, Solidity, React.js).

2. System Architecture: Design the decentralized system architecture, including peer-to-peer networking, smart contract integration, and decentralized storage using technologies like IPFS.

3. Database Design: Plan the database structure, ensuring efficient data storage and retrieval for user profiles, ride history, and feedback.

4. Design Smart Contracts: Define the logic and functionalities of smart contracts, including ride requests, payment processing, and dispute resolution.

5. Code Smart Contracts: Write and test smart contracts using Solidity or other compatible languages, ensuring security and reliability.

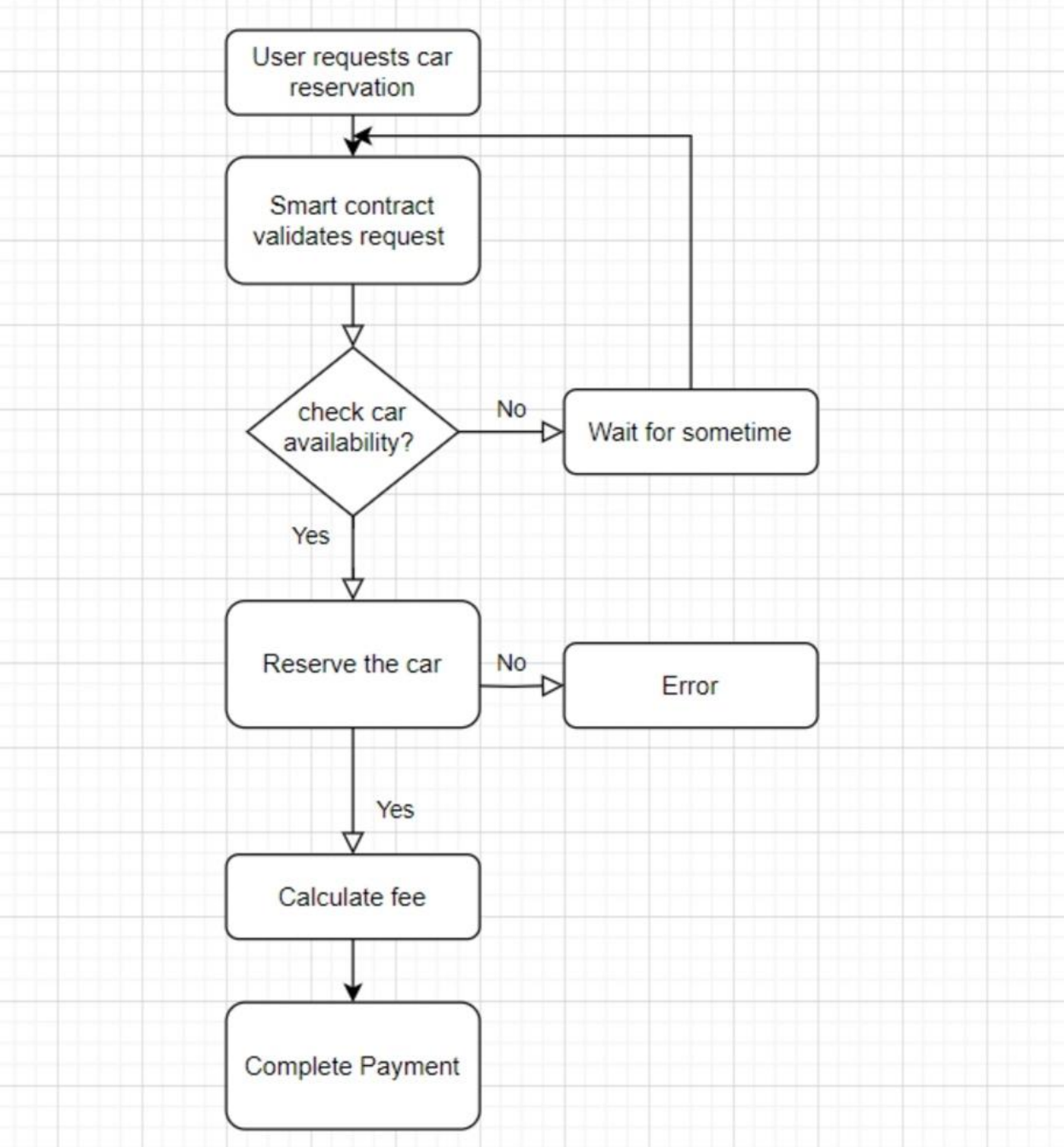
6. Integration: Integrate smart contracts into the Block Drive platform, linking them with user interactions and system events.

7. Implement Decentralized Storage: Integrate decentralized storage solutions like IPFS to securely store user data and ride history.

8. Security Protocols: Implement robust security measures, including encryption, authentication, and authorization, to protect user information and transactions.

9. Regular Security Audits: Conduct regular security audits and penetration testing to identify and address vulnerabilities proactively.

10. Deploy the fully functional Block Drive platform on reliable hosting services, ensuring scalability and high availability.


User requests car reservation
Smart contract validates request
check car availability?
No
Wait for sometime
Yes
Reserve the car
No
Error
Yes
Calculate fee
Complete Payment

FACILITIES REQUIRED FOR PROPOSED WORK

On the software front, developers will require integrated development environments (IDEs) such as Solidity IDE for writing and testing smart contracts, JavaScript frameworks like React.js or Angular for frontend development, and version control systems like Git for collaborative coding. Additionally, software tools for designing user interfaces, such as Adobe XD or Figma, are necessary. Database management systems like MongoDB for storing user data and ride history are crucial, alongside decentralized storage solutions like IPFS. Security tools such as OpenSSL for implementing encryption protocols and testing frameworks like Selenium for automated testing are also essential.

On the hardware side, powerful computers with sufficient processing capabilities are necessary for smooth software development, and reliable internet connectivity is vital for collaboration and accessing cloud-based resources. Access to blockchain networks like Ethereum for deploying and testing smart contracts is also required.

EXPECTED OUTCOMES

Firstly, it will create a sustainable and eco-friendly transportation ecosystem by significantly reducing carbon emissions through optimized carpooling and shared rides.

Secondly, the project will promote resource conservation by maximizing the use of existing vehicles, reducing the need for manufacturing new ones and minimizing resource wastage.

Additionally, Block Drive will foster a sense of community by encouraging social interactions among co-riders and enhancing social connectivity. It will also provide cost-effective transportation solutions for users, reducing individual commuting expenses while offering supplementary income opportunities for car owners.

Moreover, the project's integration of blockchain technology ensures transparent, secure transactions, fostering trust among users and demonstrating the practical applications of blockchain in real-world scenarios.

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