

Web Based Blockchain Empowered Ridesharing Application

Srushti Parlikar, Avantika Butle, Nikita Modle, Sakshi Umratkar, Prof. A. P. Bakshi
Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, India

Abstract: *We define a method of Ride Sharing System consisting of a web portal from which one can easily book and share the rides or vehicle in an efficient manner. Ride sharing has seen a step rise in popularity in metropolitan cities to avoid wastage of resources, traffic jams, and congestions. This gave birth to a whole new trend which ride aggregator services went on to capitalize by providing the option of sharing cabs to its users at a lower prize.[1] To reduce ill effect of the private vehicle this technology is very necessary now a days. In this there are new services and facilities by which the effect on the environment like pollution can be reduce and to provide support to the needy at the earliest. Ride sharing is one of the emerging technology adopted all over the world, in which users with same origin-destination and time of travel share the ride.*

Although conventional ride sharing methods have proven to be quite effective, there is always scope for improvement in certain fields. This idea can be revolutionized by implementing concept of blockchain for secure peer to peer transactions and minimize third party involvement. So, in this project there is a responsive website which users technology of frontend and backend along with database management system. Blockchain algorithm are also implied by which one can share or book ride in an efficient way..

Keywords: ride, peer to peer, transactions, secure, third party, hashing

I. INTRODUCTION

The idea behind Ride Sharing is the popular mode of transportation which aims to increase vehicle usage with similar itineraries and time schedules. They do a very justified approximation. It is a service that arranges one-time shared rides on very short notice. This type of technology always generally makes use of three technological: GPS navigation devices to determine a driver's location, smartphones for a traveller to request a ride, social networks to establish trust and accountability between drivers and passengers. Currently, cab service aggregators are using a centralized methodology to carry out their day-to-day operations. The advent of blockchain technology has revolutionized various industries, offering decentralized, transparent, and secure solutions to longstanding challenges.[2] One such sector ripe for disruption is the realm of ride-sharing, where conventional centralized platforms often struggle with issues of trust, security, and intermediary fees. In response to these challenges, a new breed of ride-sharing applications empowered by blockchain technology has emerged, promising to redefine the way we commute in the digital age. The policies, rules and regulations, terms and conditions that both user and driver must follow vary from company to company. Further booking of cabs require third party to carryout payment process.

Blockchain:

To ensure security of payment blockchain technology can be implied into this system. Blockchain is the public, distributed peer to peer ledger for storing and tracking the records. Because of its multiple features like transparency, immutable nature, consistency, security of data a secure payment system, decentralization and user's privacy can be achieve. In a rapidly evolving digital landscape, the fusion of cutting-edge technologies with traditional services has the potential to bring about revolutionary changes.[3] This project introduces a novel approach to ridesharing, harnessing the power of blockchain technology in unique manner.

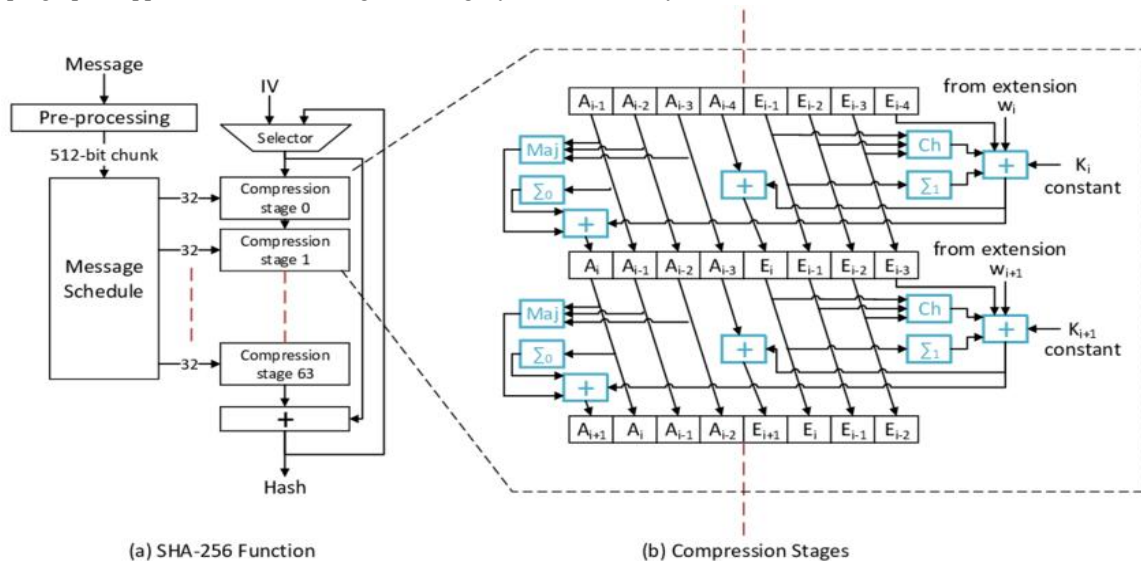
Rather than employing the typical smart contract or Ethereum blockchain this project primarily leverages one of the fundamental components of blockchain technology: Hashing. More specifically, it utilizes the SHA-256 hashing algorithm to securely store payment related information and all details on a blockchain -inspired ledger, thus enhancing

the trustworthiness and immutability of transaction record. Hashing, in the context of this project serves as the backbone of data security providing tamper-proof layer safeguards transaction details.

SHA-256:

SHA-256 (Secure Hash Algorithm 256-bit) is a cryptographic hash function that produces a 256-bit (32-byte) hash value from an input data of arbitrary size. It is widely used in various security applications and protocols such as SSL/TLS, PGP, SSH, and Bitcoin. The hash function takes an input message and produces a fixed-size output hash value, which is typically represented as a hexadecimal number.

SHA-256 is part of the SHA-2 (Secure Hash Algorithm 2) family of cryptographic hash functions, which also includes SHA-224, SHA-384, SHA-512, SHA-512/224, and SHA-512/256. It's considered secure and is widely used in various cryptographic applications for ensuring data integrity and authenticity



II. LITERATURE REVIEW AND RELATED WORK

The authors, Mohamed Baza and their collaborators [1], have developed a ridesharing system aimed at enhancing privacy, trust and equitable payment. Data of the ride is encrypted using the riders public key to prevent data from misuse. They enable users to select drivers, establish trust through a time-lock deposit protocol and ensure fairness by recording ride details on Ethereum blockchain. Limitation of this system was it requires initial time lock deposit which can be a barrier to potential users.

The authors, pal and Ruj [2] have combined the fundamental elements of a ride sharing network with blockchain technology to fortify data security. Their implementation encompasses various user-friendly features, including feedback mechanisms, the ability to abort rides, user account management, and digital wallets. They have taken notable step towards achieving pricing fairness and transparency by decentralizing the Route fair database, accessible to both riders and drivers. Limitation is that only ride data is decentralized.

The authors Richard Josseph, Pratik Rane [3] implemented system on Ethereum blockchain where user can book rides and pay charges using digital wallets. System uses Geolocation api and directions api. Limitation is that payment can be possible only if both drivers and rider have digital wallet. This system is not user friendly.

III. ANALYSIS OF PROBLEM

Currently, the existing ridesharing ecosystem is predominantly centralized, relying on the third-party intermediaries where third party govern the entire process from rider- driver matching to fare determination. This raises concerns regarding user privacy, data security and fairness in pricing.

In this context, the problem to be addressed is to develop a decentralized and blockchain based ridesharing system that eliminates the need for central control, enhances user privacy, secure payments and establishes a transparent and equitable pricing thus revolutionizing industry and offering an alternative to the traditional centralized model

IV. PROPOSED WORK AND OBJECTIVE

Objective:

1. To develop a secure peer to peer ridesharing system, that will allow secure , fare and direct payment between riders and drivers by leveraging advantage of blockchain's hashing concept ,replacing need for third party.
2. To ensure data security and privacy and
3. To allow multiple riders to share the ride.

Proposed Work:

Architectural Design- Real time ridesharing will be beneficial if the matching is done instantly and on demand. For that, a model will be prepared using software in which riders with approximately similar origin-destination and travel time will be selected from the database generated from user interface. The proposed methodology includes data collection regarding existing traffic conditions and inventory of areal conditions, providing a GIS technology-based ridesharing application. Inventory data like population, land use, vehicular composition as well as road network will be collected in study area.

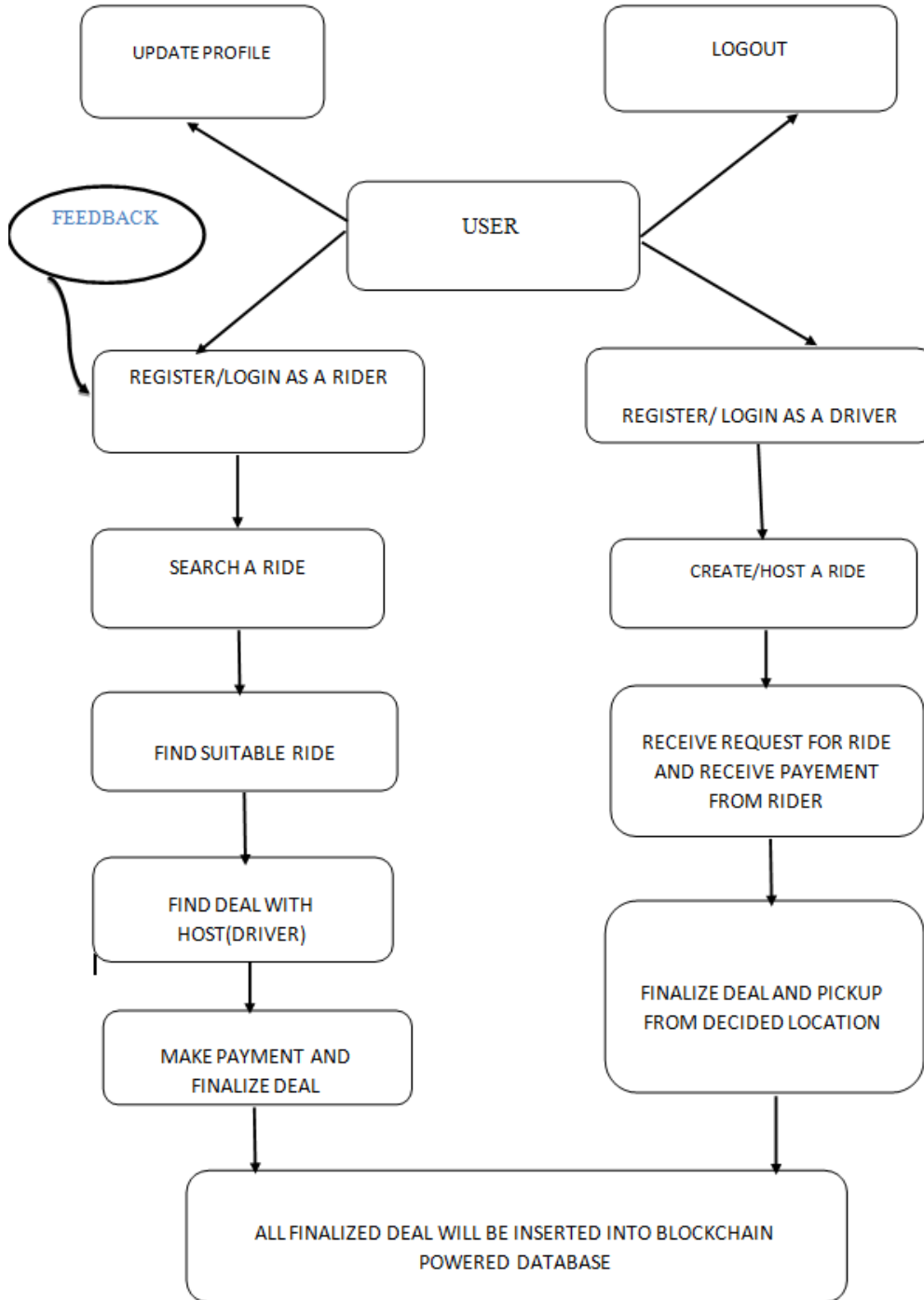
In this project we are using the technology of full stack web development. We are fully exploiting the potential of these techniques. It is exiting to learn about how to create a responsive website. Web portals has made its way into exiting compression methods. Real time ride sharing promotes a better way to utilize the empty seats in most passenger cars, thus lowering fuel usage and transport costs. Ridesharing is also capable of serving one- time trips.

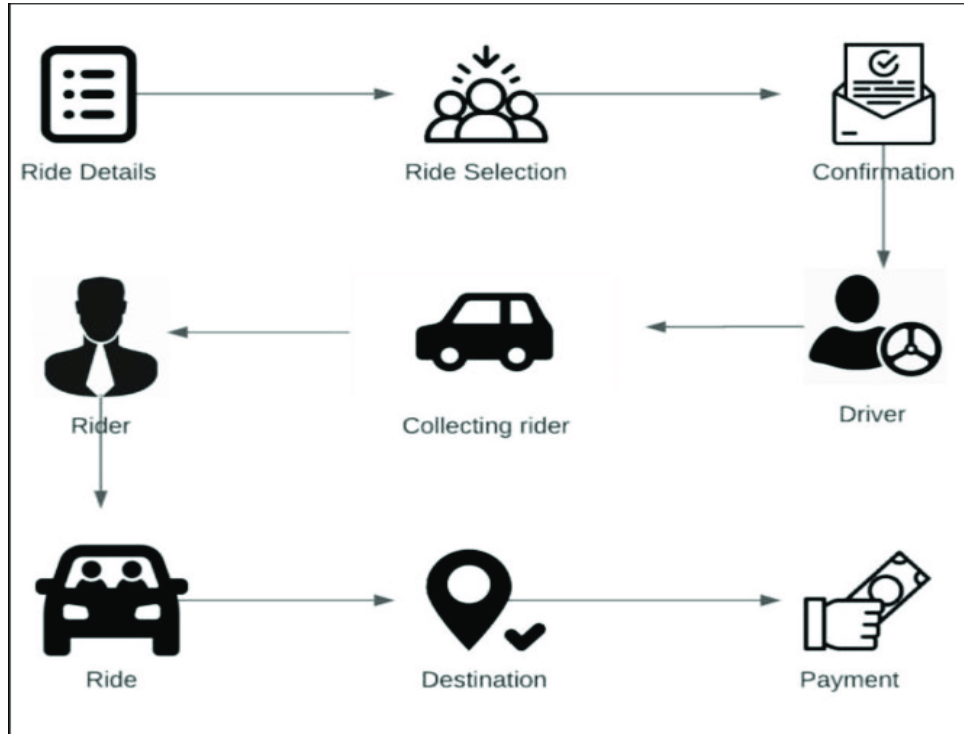
How to take a rideshare and rider and as certain whether they are compatible. Checking for age and gender preferences is simple enough. But schedule and route compatibility are a different story. To do this we need to find out the best way of ordering the riders, so as to minimize route length.

In the proposed system there will be predefined pickup location set by drivers. For hashing SHA-256 algorithm is used. Following are the modules in proposed system.

- **User:** User can be a 'Driver' or a 'Rider'.
- **Register:** If a user is new he/she have to register by entering few credentials. User can register as a driver (Host a ride) or as rider.
- **Login:** Once user is registered, user can login by entering login details.
- **User as Rider:** If user is a rider, he/she will search for a suitable ride, if found, user will request for a ride, make a payment and finalize a deal. And wait for host to pick-up from selected location.
- **User as Host/Driver:** If user is a driver, he/she will accept the request for pickup from appropriate location already entered by user. Receive the payment and will finalize deal. Now, user will pick-up a rider from location
- **Update Details:** If users want they can update their details like personnel details, pickup locations, vehicle details according to need.
- **Payment:** This module is responsible for peer to peer payment between users. When rider make a payment all payment details will be hashed using blockchain algorithm called as "SECURE HASH ALGORITHM-SHA256".After successful transaction all transaction details will be stored in block format. SHA-256 is a widely used cryptographic hash function that takes an input irrespective of length and produces a fixed size 256bit output.
- **FeedBack:** FeedBack module is also there to analyze the performance of drivers

Fig.1 FLOW CHART





Technology Used for working System-
Minimum Hardware Requirement:
System : core i5 1.80 Ghz processor
Hard disk : 500 GB
Ram : 4GB

Software Requirement:
Operating system : windows 7
Technology Used :
Frontend – HTML, CSS3, JavaScript , bootstrap, jQuery
Server Side- PHP
Database used : MySQL
Blockchain Algorithm used : SHA-256

V. CONCLUSION

In this paper, we have proposed to decentralize ride sharing services using the revolutionary public blockchain named B-Ride. Analysis, and experiments were conducted to evaluate B-Ride. The results indicate that B-Ride is practical in terms of both on-chain and off-chain overheads. Moreover, it shows the practicability to resolve two main objectives in the use-case of the decentralized ride sharing atop public blockchain: one between the transparency and privacy and the other one between the accountability of system users' and anonymity. The proposed time-locked deposit protocol ensures security against malicious behaviours of both dishonest drivers/riders. In addition, the proposed reputation management system tracks drivers' behaviour in B-Ride, allowing them to behave honestly in the system. Otherwise, they will not be selected for future trips. Finally, the rider will have a trip and the driver get the fare in a trust-less environment using the pay-as-you-drive methodology.

ACKNOWLEDGEMENT

This research work was financially supported in part by NSF grant 1618549. In addition, parts of this paper were made possible by NPRP grants NPRP10-1223-160045 from the Qatar National Research Fund (a member of Qatar Foundation). The statements made herein are solely the responsibility of the authors

REFERENCES

- [1] Mohammad Baza, Gautam Shrivastava, Mohammad Abdullah “B-Ride: Ride Sharing with Privacy-preservation”, IEEE International Conference 2019.
- [2] Panchalika pal, Sushmita Raj “BlockV: A Blockchain Enabled peer-peer Ride sharing service”, IEEE International Conference on Blockchain 2019.
- [3] Richard Joseph, Pratik Rane, “Blockwheels: A peer to peer Ride sharing Network”, Fifth International conference on Intelligent computing and control system IEEE 2021.
- [4] Milica Selmic, “Ride Matching Using K-means Method: Case Study of Gazela Bridge in Belgrade, Serbia”, Journal of transportation engineering, January – 2012, 138, 132- 140.
- [5] Gauresh Pandit et al, “Dynamic ridesharing using social media”, International Journal on AdHoc Networking Systems (IJANS) Vol. 2, No. 4, October – 2012.
- [6] Khanji , Salam , Assaf, “ Boosting Ridesharing efficiency through Blockchain: Green Ride Application case study”, International conference on Intelligent computing and control system IEEE 2020.