

RIDE SHARING ON BLOCKCHAIN

BlockRider Application Prototype

Buğra Meriç DEĞİRMENÇİ

Department of Computer Science Engineering
Istanbul Kültür University
Istanbul, Turkey
1800003317@stu.iku.edu.tr

Gizem TURAN

Department of Computer Science Engineering
Istanbul Kültür University
Istanbul, Turkey
1800002414@stu.iku.edu.tr

Abstract— The popularity for ride sharing applications such as Uber and Lyft are rising globally every day. Instead of conventional taxis, people are preferring these apps due to their lower cost and convenience. These platforms give the customer the illusion of connecting directly with the driver, however, all of the services are being controlled and owned by the shareholders and the companies such as Uber or Lyft. By having this centralized system, the companies oversee the prices and the general ecosystem of the applications. The possibility for a one point of failure also occurs. The blockchain technology can disrupt this bussies model and create a decentralized system in which customers and drivers can connect directly.

Keywords—ride-sharing; blockchain; decentralized;

I. INTRODUCTION

The term carpooling was firstly made popular in the mid-1970s, which meant people sharing a single vehicle for traveling, which reduced the fuel and toll costs. This usually meant that the travel expenses would split equally between the driver and the passengers. In the late 1990s, with the spreading of the Internet, ridesharing programs began to appear, which would potentially turn carpooling into a business [1]. In 2009, the mobility service provider company Uber was founded. With this service, the ride sharing term grew in popularity. Using these services, customers can pay to travel in drivers' personal vehicles while Uber takes a percentage of the said payment.

With over 20 billion cumulative Uber trips taken since launch, the convenient way of transportation is still high on demand [2]. But, with 16 million daily Uber trips, some challenging points appear in existing platforms [3]. In 2018, Over 9 murders, 60 deaths and 4.000 sexual assault cases were opened linked to Uber trips, result in a crash in stocks up to 5 percent [4]. This lack of security along with having a centralized system causes a central point of failure which endangers the platform and leaves it vulnerable to regulatory action. By having a centralized entity, the companies oversee and control the operations and service agreements giving the full control over the ecosystem.

The blockchain technology has the potential to undermine Uber's and other ride sharing companies' economic models. Blockchain provides a decentralized ledger of chained transactions that are secured with cryptic hash functions. With

this data structure, every driver's and customer's data would be a part of a blockchain, which would create a peer-to-peer connection platform without a controlling middleman like Uber.

II. RELATED WORK

The number of projects that implement the blockchain technology are in the rise. But the projects which include a ride sharing services are limited. However, there are products in the prototype and development phases that imply such a service.

I. Arcade City

Arcade City is a ride sharing, blockchain-based platform. Arcade City planned to use blockchain to build an Uber-like system that allows drivers to connect with customers peer-to-peer within the Ethereum platform [5].

II. RideX

RideX is a community-based Taxi Booking app built on Ethereum Blockchain which allows drivers to bid on various nearby ride requests with an optimal amount within the RideX recommended price range. Users can make payments with popular crypto tokens which in turn gets swapped into stable tokens. RideX is focused on giving back their old-fashioned independent taxi service along with the touch of the latest technology [6].

III. METHODOLOGY

For creating a ride sharing application, a platform needed to be built first. Our application was coded using JavaScript and React along with numerous other libraries as a web application. After the initial creation of our app's framework, a MetaMask login, destination selector, and a MetaMask checkout systems were implemented. After, a connection to a Sanity database was established in order to store the individual login and trip information.

The pricing for the rides is calculated according to each ride's price multiplier and the base price. Each ride's price multiplier differs from one another, and it is stored in the Sanity

database. The base price for the ride is based according to the calculated duration of the trip, which is retrieved from the map API that our project uses. Afterwards, an equation is calculated and displayed as the trip's fee (1).

$$\left(\frac{Base\ Price}{10}\right)^5 \times Price\ Multiplier = Price$$

(1)

After the customer pays for the trip, the references are stored in the Sanity database and a valid transaction contract deploys on the Rinkeby test network.

IV. CONCLUSION

A successful attempt at creating a ride sharing app prototype on a blockchain network has been made with custom destination

selector, ride selector and a MetaMask connection. However, some advanced and crucial systems such as alert systems and GPS tracking are not yet implemented.

REFERENCES

- [1] Chan, Nelson D.; Shaheen, Susan A. (November 4, 2011). "Ridesharing in North America: Past, Present, and Future" (PDF). University of California, Berkeley. Archived (PDF) from the original on February 4, 2014.
- [2] <https://www.sec.gov/Archives/edgar/data/1543151/000119312519103850/d647752ds1.htm>
- [3] Uber <https://investor.uber.com/home/default.aspx>.
- [4] The New York Times <https://www.nytimes.com/2019/12/05/technology/uber-sexual-assaults-murders-deaths-safety.html>
- [5] <https://cointelegraph.com/tags/arcade-city>
- [6] <https://uxplanet.org/ridex-taxi-service-on-ethereum-blockchain-adb077fc818c>