

Smart Effects of Car-Sharing Services on Community Transportation Using Mobile Application Framework

Muhammad Kashif Shaikh¹, Asif Raza², Muhammad Tahir¹, Muzammil Ahmad Khan³, and Hasan Zaki¹

¹ Department of Software Engineering, Sir Syed University of Engineering and Technology Karachi Pakistan

² Department of Computer Science, Sir Syed University of Engineering and Technology Karachi Pakistan

³ Department of Computer Engineering, Sir Syed University of Engineering and Technology Karachi Pakistan

Corresponding author: Muhammad Kashif Shaikh (e-mail: mkshaikh@gmail.com).

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Abstract— The world is facing man-made dilemmas among which transportation is a matter of interest in massive metropolitan communities of many maturing nations today. Because of the vast population in these metropolitan areas, there is constant traffic clog and contamination. One promising strategy to reduce the fraction of transport-connected emissions is ridesharing. This approach is formulated that gives the customer the same satisfaction and amenity while paying less fare. This research paper aims to provide an application that allows the user to share their rides and split the fares which makes it more extraordinary and manageable to afford for every ordinary man who aims to save as much as earnings he can while carrying out his daily commutes. This article recommends a Portable application that is conducted utilizing JAVA for the Android stage with the employment of FIREBASE DATABASE and will be deployed to the Google Play Store first. The application can interface with Google maps to give proficient data about a ride's pinpoint. In the sections to follow we present the results and analysis of our application with the focus of this article, which is to make such an application that a user finds affordable, Comfortable, and quickly available on the doorstep and to explore the social and economic implications of sharing economy digital platforms in Pakistan. This ride-sharing application has some key features which target affordability and makes it stand out among all the others operating apps nowadays paragraph.

Index Terms— Transport, Ride Sharing, Mobile Application, Android, Affordable

I. INTRODUCTION

The Smartphone applications have changed consumers' lives completely [1]. From ordering food to online shopping and from social networking to ride-sharing all these are benefits of smartphone applications. Among these apps, ride-sharing applications are also growing and expanding tremendously [2]. Around the world in all the developed cities, at least one such multinational application is working to make commuting quick and relaxed [3]. It provides an easier and cheaper way of transport with luxury and comfort. It helps the developing world's need for commuting by reducing the burden n on public transport [4][5].

The motivation of this paper stems from the idea to reduce the burden of public transport, to help people in achieving their goal to save money and sociability i.e., to have new experiences by meeting others. Moreover, the motivation comes from the revolution of the private taxi or ride-hailing app development through which everyone is earning productive revenue. Therefore, it is essential to develop such an app that is appealing to both, the users and the drivers.

II. RELATED WORK

Fig. 1 shows the matching of vehicle owners, non-vehicle owners, public or private vehicle owners, and the benefits of Uber ridesharing as a potential travel route, sharing travel costs, and tentative schedules. The Uber cell phone application is accessible on every single forum & associates' traveler with drivers in a locality [6]. At the point when a traveler is in the vehicle, one can send a connection of an online map to a friend, who can follow their whole trip through GPS [7]. Careem is another well-known taxi administration that works in Pakistan.

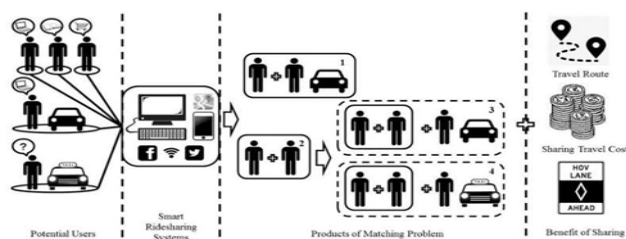


FIGURE 1. Uber ridesharing.

Propelled in April 2017, Swvl plans to improve and concern the mass transportation scene by altering open transportation with a moderate, sensible, innovation-based alternative in distinction to driving through jammed, emerging markets. This exceptional framework enables clients to "pool" together on a solitary vehicle, to and from the regular get and drop-off



focuses, for example, tourist spots, shopping centers, offices, and bus stations [8].

TABLE I. Techniques and technologies for fuel reduction of vehicles

Reduction Parameter	Reduction Type	Attribute	Techniques	Technologies
Fuel Reduction	Importance of Reduction of Fuel Consumption for Green Driving	Vehicles	Improvement of Fuel The efficiency of Vehicle by Upgrading Mechanical Properties	Upgrading Mechanical Properties
		Roadways	Improvement of Highways	Upgrading Civil Properties
	Reduction of Fuel by Intelligent Driving	Green Driving Behavior	Maintain Optimum Tire Pressure Adjust Drive Technique Maintain The Ride Get Rid of Weight and Reduce the Drag Avoid Unnecessary Idling Use Latest Technology in Car	
		Traffic Flow	Intelligent Management of Highways	Traffic Light Control Collision Avoidance Intelligent Navigation System Electronic Toll Collection
Shortest Distance	Traffic Reduction by Navigation	Increase Transportation Efficiency	Occupancy Increase	Car Sharing, Car Pool
		Other Effective Factor For Transportation	Multi-Modality	Public Transportation
	Traffic Reduction by Transportation Reduction	Minimization Of Transportation	Demand Management Road Pricing Parking Strategies	Communication
No Transportation				

Unlike other public vehicle options, Airlift ensures you a seat that can be reserved ahead of time, guaranteed AC, and a life following that enables you to stay side by side with your vehicle's actual growths. Since the news came out, there've been a few Swvl types of transport out and about with the close network eager to employ the stage to drive at a value point that is altogether lower than other comparable alternatives in the market. Ridesharing enormous organizations like Careem and Uber have declared openly in another interval of movement, that another ridesharing activity called Airlift has increased critical concern. Car Sharing Services signify the usage of private vehicles for the mutual privilege of commute or journey to a destination reach [9]. Furthermore, there are particular apps other than Uber, Careem & not very popular, that are offering

sharing use of the private vehicle of the person via location-based journey-mates. Car sharing can be done nowadays by serving the Job Captain of Uber, Careem via offering services of the transporter.

- Location is matched with the course of the journey of the car owner.
- Whose major journey is alike to that of the car owner.

A. Contributions

The above-related work motivates the research in this paper to deal with the ride experience and associated problems of ride-sharing applications by developing a Community Transport Mobile Application that offers comfort and security to its users. It contributes to gaining family trust by making the ride available at the doorstep, and visibility of the trip throughout the journey [10-12]. This paper mainly contributes to driver earnings, society spending, and boosted mobility choices, whether it's a rider or a driver who is using this app is having a considerable impact on the economy.

B. Paper Organization

The paper is organized as follows,

Section 1 presents the introduction. Section 2 formulates the ride-sharing problems and presents the architectural design of this Community Transport Mobile Application. Section 3 presents the state of the art. Section 4 summarizes the discussions and concluding remarks.

I. Problem formulation and architectural design

In this section, we formulate the problem of the development of ride-sharing applications and give our architectural design for this application.

A. Problem Statement

The traffic crisis around the world is still unsolved although various strategies are used regarding travel behavior change sustainable solutions are still skipped which can shift an individual's means of transport effectively. The following research questions are formulated:

- How to overcome the burden of transportation on roads?
- How to make an online ride-booking service more budget-friendly?
- What are the social and economic implications of sharing economy?

B. Solution

To fulfill our research, a ride-sharing app is formulated so that the passengers of one particular route can share the ride, split the fare and make it a pocket-friendly trip. This model serves as a creative application to deal with all the ride-sharing problems and helps in providing social and economic sustainability as well. This work aids to suggest ridesharing as an attractive mode of transport and expanding single-occupancy driving.

C. Architectural Design of the Mobile Application

Before developing the application, some valuable collaborators, clients, and teams in the organization are discussed and some relative existing apps are investigated so that the performance of our application will be competent. Riders can also track the driver’s route, check the arrival of the ride and coordinate for sharing rides anytime through their smartphones after downloading this app. The drivers can view the ride requests and accept or reject the requests.

- A module for enrolling/registration on the application.
- A module that enables a user to maintain one's profile.
- A module to check the routes already scheduled.
- A module for putting a request for a seat in the desired route.
- A module for calling & finding the bus driver.
- A module for reviewing & rates the ride.

D. Application Functionality Principle

Application Community Transport integrates guide discourse input entrusting consumers to book instant rides and share the ride with another passenger. At the goal, once discourse has been distinguished application opens in association with Google's map and begins to book a ride by selecting a pickup and drop-off location.

They are summarized as:

- It lowers the carbon output due to fuel consumption for petrol, diesel, and gas engines.
- When such services become sustainable input thereby satisfying a source of fuel price lower or deviations.
- It shares the journey that is a form of combined consumption and bearable transportation.
- It curtails fuel consumption thereby a derivation of economy & combined Consumption.
- In case they have awful mutual experiences, the IDs will allow them to decide on a further mutual journey.
- The aim of Location-Based services will provide the freedom of choice for the car-sharing services offered as well as user groups. Multiple Car-fuel usage capabilities of cars can be productive for the car owner to enjoy the fuel-price fluctuations for cost savings.

Such use of vehicles can trap the car owner in obvious risks or a part of negative activities as the car owner is not aware of the journey-mates just prior as well as post-dropping robberies or nasty deeds.

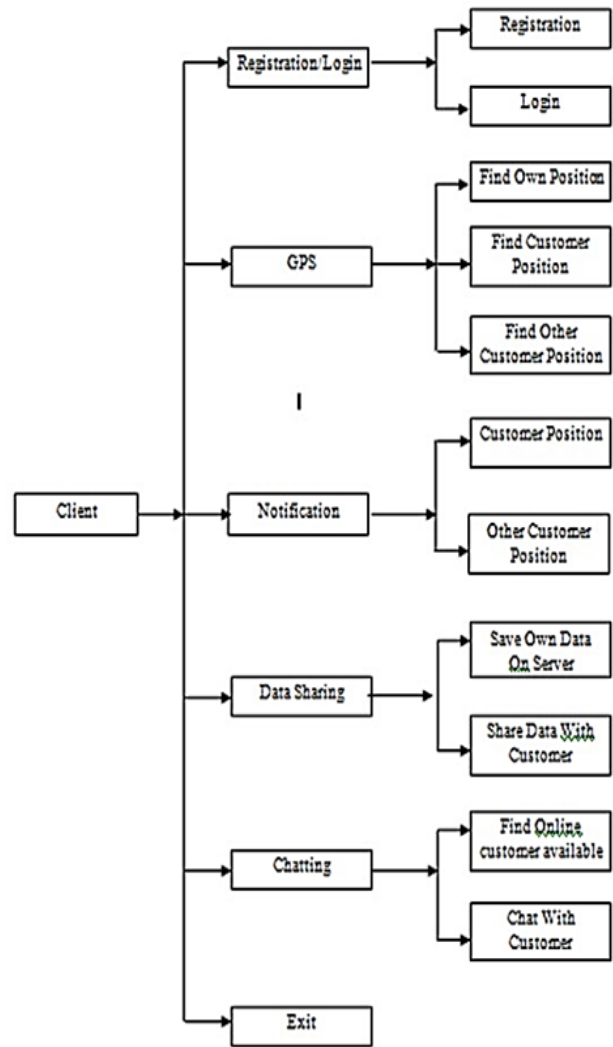


FIGURE 2. The flow of the application

E. Implementation of the Mobile Application

The Portable application is conducted utilizing JAVA for the Android stage with the assistance of FIREBASE DATABASE and is deployed to the Google Play Store first. In any case, the iOS version of the application is getting looked at too and is in working capable once things specified with this android variant fall effectively into the market.

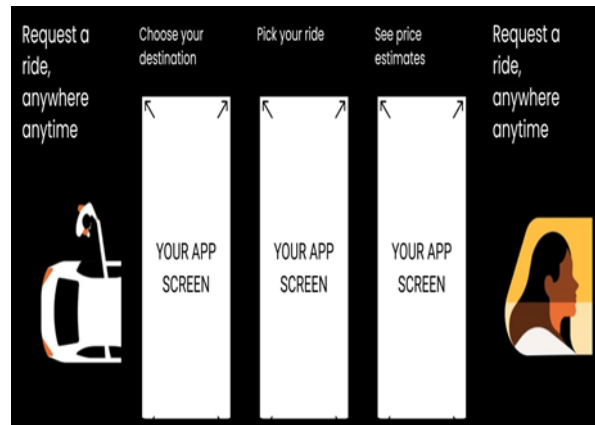


FIGURE 3. Screenshot of the application

TABLE II. Use case narrative

Community Transport Android Application	
Brief Description	The application mainly focuses on providing the same luxurious service to its users by reducing the ride cost as the ride can be shared by multiple numbers of users going to the same destination at one time
Actor	The mobile application user.
Flow of Events	The actor chooses the current location and the desired location The actor selects a suitable route and taps on Book A Ride B ride request to that specific bus (route) driver. Upon ride confirmation by the bus driver, a notification is popped up on the actor's cell phone showing booking confirm
Pre-Conditions	The actor should carefully fill in all the requirements to book a ride i.e. select the desired route and request a ride.
Post Conditions	A message or a notification shall be popped up on the user's cell phone letting him know his seat confirmation.

The modules of the mobile application for both panels are quickly clarified beneath:

a) Customer Panel

Travelers meanwhile can check traffic circumstances, track drivers' directions, and get information about assessed arrival times. The nearest transport in the region will be contacted once the request is produced according to the course. Travelers require to enroll their records with the applicable supplier to get this running.

i. Registration

Immediately after the cell phone number is entered the application filters the verified mobile number via code sent to the user's number via message. It gives a run that catches the name (surname), the cell phone number, the email, and the secret key for login into the application.

ii. Pick a Route

This module comes into work where clients are allotted accessibility rides (already scheduled) from the area near to user's location.

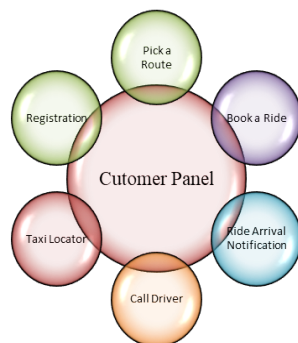


FIGURE 4. Customer Panel

iii. Book a Ride

The user builds a plea to verify the ride. When the user taps on 'book a ride', this activity prompts the nearest driver with a ride notification on his cell phone. The driver accepts or denies the request.

iv. Taxi Locator

This module is combined with Google Maps illustrating the region of the responsible driver on the map.

v. Call Driver

This module specifically allows the user to make a phone call to the driver who approved the ride request to inquire how much time it will take for the transportation to reach the user's area.

vi. Ride Arrival Notification

When the driver accepts the booking, clients are notified about their ride. Likewise, when the ride arrives at the pickup point, clients are again informed about the entrance of their vehicle.

b) Driver Panel

Drivers have a special UI that is straightforwardly connected with the administrator dashboard where every single activity is attended by the administrators. When the driver applies to get enlisted with the organization to drive a taxi under that brand name, he should follow the standards.

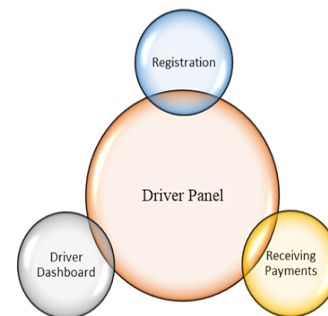


FIGURE 5. Driver Panel

i. Registration

During the registration process, the driver contains all paperwork components, and contract articles, and the driver has to prove his driving skills by accepting the official license copy along with the registration details of the car.

ii. Driver Dashboard

A common driver's dashboard contains insights about complete rides attempted, and cash earned, alongside the span spent with the ride-booking application itself.

iii. Receiving Payments

Drivers are entitled to get installments upon ride satisfaction. This installment comes either in the kind of money, in-application e-wallet installment from application customers, or by web banking which consists of charge and Visa installment, net banking, or other e-wallets.

III. METHODOLOGY

In this section, we formulate the problem of the development of ride-sharing applications and give our architectural design for this application.

A. Dynamic Ridesharing

Ridesharing is a means of transport in which people share a vehicle having the same destinations and split the travel costs like fuel costs, parking fees, etc.

B. Advantages of ridesharing

There are many economic, environmental, and social benefits of ridesharing as well as sharing community.

- The main benefit is reducing fuel consumption and emissions.
- If transportation lessens, the need for parking spaces will also be reduced.
- It improves social interactions and provides new experiences.



FIGURE 6. Ride-sharing market

C. Ride-sharing Applications Around the World

In France Hupp is a famous ride-sharing application that allows its customers to redeem the collected or saved points at local businesses [11]. In Asia, Ryde is a renowned ridesharing application that offers its customers split costs, allows them to make friends, and reduces traffic.

D. Sharing Economy

Today, sharing economy is a term that is known to everyone. It evaluates the concept of collaborative consumption [14]. In sharing economy people share goods and commodities rather than purchasing them. It has two kinds of,

- One is the commercial business models that are developed for profit motives.
- The other one has non-profit motives, in which people share or gift goods to each other.

Sharing economy leads to sustainability by showing a direction to follow a lifestyle that empowers those [15].

E. Social and Economic Implications of Sharing Economy

But with the evolution of sharing economy in the transport sector the culture of trust, family confidence, and women empowerment are developed [14]. Women were not allowed to travel alone in Pakistan because public transport was not safe and Comfortable for women[16-17].

IV. CONCLUSION

Through the planning and building of this versatile Community Transport Mobile Application, we contribute to the growth of the economy in Pakistan in several ways like as by conducting awareness seminars, providing job opportunities, analyzing cultural barriers, and giving solutions. For this purpose, many seminars are conducted so that people will get awareness to generate profits from sharing economy activities and build society properly by attaining sustainability.

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