SHARED WHEELS – A CARPOOL WEBSITE

Project submitted to the

SRM University – AP, Andhra Pradesh

for the partial fulfilment of the requirements to award the degree of

Bachelor of Technology

In

Computer Science and Engineering

School of Engineering and Sciences

(Software Engineering)

Submitted by

Sravya Alapati (AP21110010651),

Jahnavi Tadikamalla (AP21110010655),

Gopala Krishna Parimi (AP21110010699),

Koganti Akshaya (AP21110010708)

Under the Guidance of

(Dr Amit Kumar Singh)

SRM University–AP

Neerukonda, Mangalagiri, Guntur

Andhra Pradesh – 522 240

May, 2024

Certificate

Date: 06-May-24

This is to certify that the work present in this Project entitled "**Shared Wheels – A Carpool website**" has been carried out by **[Sravya Alapati, Jahnavi Tadikamalla, Gopala Krishna, Akshaya]** under my/our supervision. The work is genuine, original, and suitable for submission to the SRM University – AP for the award of Bachelor of Technology/Master of Technology in **School of Engineering and Sciences**.

Dr Amit Kumar Singh

Supervisor

Acknowledgement

We extend our deepest gratitude to Dr Amit Kumar Singh for his valuable guidance, unwavering support, and mentorship throughout the course of our Software Engineering (SE). Dr Amit Kumar Singh's expertise, encouragement, and dedication have been instrumental in shaping the success of this project endeavour.

His insightful feedback, constructive criticism, and commitment to academic excellence have significantly contributed to the development of this project.

We express our sincere thanks to Dr Amit Kumar Singh for his mentorship, which has been a guiding force in our academic journey.

Yours Sincerely,

Sravya Alapati-AP21110010651

Jahnavi Tadikamalla-AP21110010655

Gopala Krishna Parimi -AP21110010699

Koganti Akshaya -AP21110010708

Contributions

1. Sravya: Set up Shared Wheels to be accessible online, ensuring it's available for users to use. Ensure that the user interface, including buttons, forms, and other elements, is properly displayed on the website. Connect the frontend and backend parts of Shared Wheels so they can communicate and share data seamlessly, ensuring a smooth user experience.

2. Jahnavi: Create the visual design and layout of Shared Wheels using code, making it easy for users to navigate and use. Implement features like user authentication, ride search, booking functionality, and profile management, allowing users to interact with the platform.

3. Gopal: Write code that handles the behind-the-scenes operations of Shared Wheels, such as managing user data and processing ride bookings. Implement measures to protect user information and system integrity, such as encrypting sensitive data and preventing unauthorized access

4. Akshaya: Organize and store user information, ride details, and other data in a structured way within a database, such as MongoDB. Optimize the database to perform efficiently and respond quickly to user requests, ensuring a fast and responsive user experience. Set up regular backups of the database to prevent data loss in case of accidents or failures, ensuring the safety and integrity of user data.

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Abstract:

Shared Wheels revolutionizes carpooling with a map-free, trust-based model, connecting commuters based on proximity and schedule. It simplifies ride coordination without online payments, fostering transparency and fairness. By prioritizing privacy, Shared Wheels ensures user data security, building trust. It contributes to environmental sustainability by reducing carbon footprints and congestion. With its intuitive interface and transparent approach, Shared Wheels sets a new standard for community-driven mobility. Shared Wheels redefines carpooling, emphasizing collaboration and community in urban transportation. It promotes resource-sharing and environmental consciousness, combating climate change. Through simplicity and trust, Shared Wheels fosters a greener, more efficient future in urban mobility. Join Shared Wheels today and be part of the sustainable transportation revolution.

Introduction:

Background:

Shared Wheels emerges in response to the growing challenges posed by urban transportation, including traffic congestion, environmental pollution, and the need for sustainable mobility solutions. Traditional carpooling services often rely on complex mapping technologies and online payment systems, which can be barriers to adoption for many users. Recognizing these limitations, Shared Wheels introduces a novel approach that prioritizes simplicity, trust, and community collaboration.

With Shared Wheels, users can seamlessly connect with fellow commuters based on proximity, destination, and schedule compatibility, without the need for intricate mapping features. By eschewing complex technology and online payments, Shared Wheels promotes transparency, fairness, and user privacy, fostering a sense of mutual respect and cooperation among participants.

This innovative platform is driven by a commitment to environmental sustainability, resource-sharing, and user-centric design. By reducing individual carbon footprints and alleviating urban congestion, Shared Wheels aims to contribute to the collective effort to combat climate change and improve the overall quality of life in urban areas. With its intuitive interface, transparent payment model, and emphasis on privacy, Shared Wheels sets a new standard for community-driven carpooling initiatives, paving the way for a greener, more efficient future in urban mobility.

About Our Project:

In the bustling landscape of urban transportation, where gridlock and environmental concerns loom large, emerges "Shared Wheels" - a transformative carpooling platform designed to redefine the way we commute. Unlike traditional models reliant on complex mapping systems and online payment structures, Shared Wheels introduces a refreshing departure from convention. It embraces simplicity, trust, and community, offering users a streamlined experience that prioritizes connectivity, convenience, and sustainability.

At the heart of Shared Wheels lies a commitment to fostering genuine connections among commuters. By stripping away the reliance on maps, the platform emphasizes human interaction, enabling users to find compatible travel companions based on proximity, schedules, and shared destinations. This human-centric approach not only simplifies the booking process but also cultivates a sense of camaraderie and shared purpose among participants.

Moreover, Shared Wheels reimagines the concept of cost-sharing, embracing a trust-based payment model that eliminates the need for online transactions. Instead of navigating complex payment systems, users contribute directly to shared expenses, promoting transparency and fairness in financial arrangements. This emphasis on trust and simplicity not only enhances user experience but also reinforces the sense of community and mutual respect integral to the Shared Wheels ethos.

In a digital landscape fraught with concerns over data privacy and security, Shared Wheels stands as a beacon of trustworthiness and reliability. By forgoing intricate mapping technologies and location tracking, the platform prioritizes user privacy, safeguarding sensitive personal information. This unwavering commitment to data security underscores Shared Wheels' dedication to putting user needs first, ensuring a safe and secure environment for all participants.

As we navigate the complexities of modern urban life, Shared Wheels emerges as a beacon of innovation and sustainability. By promoting resource-sharing, reducing carbon footprints, and fostering community engagement, the platform embodies the spirit of collaborative progress. With Shared Wheels, the journey becomes more than just a commute—it becomes an opportunity to connect, collaborate, and contribute to a greener, more interconnected future.

Motivation:

The motivation behind developing Shared Wheels can stem from various factors, including addressing societal, environmental, and economic challenges, as well as providing practical solutions to common transportation issues. Here are some potential motivations behind creating Shared Wheels

Encouraging carpooling and ride-sharing can contribute to reducing carbon emissions and alleviating environmental pollution. By promoting more efficient use of vehicles and reducing the number of single-occupancy vehicles on the road, Shared Wheels can help mitigate the environmental impact of transportation.

Shared Wheels aims to address traffic congestion by optimizing the utilization of vehicles and reducing the number of vehicles on the road. By facilitating carpooling and providing an efficient platform for matching drivers with passengers traveling in the same direction, Shared Wheels can help alleviate traffic congestion in urban areas.

Carpooling and ride-sharing can offer significant cost savings for both drivers and passengers. By sharing the cost of fuel, tolls, and parking expenses, participants in Shared Wheels can reduce their transportation expenses and make commuting more affordable.

Literature Review:

Study of similar projects:

Shared Wheels introduces a novel approach to carpooling that diverges from traditional carpooling apps in several key aspects, as evidenced by a review of existing literature and comparison with similar platforms.

Existing carpooling apps often rely heavily on mapping technologies and online payment systems, which can present barriers to adoption for certain users. In contrast, Shared Wheels prioritizes simplicity and user-friendliness by eschewing intricate mapping features and online payments, instead focusing on proximity-based matching and trust-based payment models. This approach is shown to improve user engagement and satisfaction, as it eliminates the complexities associated with mapping technologies and online transactions.

Moreover, while conventional carpooling apps typically collect and store extensive user data, including detailed route information and location tracking data, Shared Wheels emphasizes user privacy and data security. By minimizing data exposure and avoiding the collection of sensitive information unless absolutely necessary, Shared Wheels fosters trust and confidence among its user base.

Shared Wheels also distinguishes itself through its community-centric approach, which emphasizes collaboration and resource-sharing among users. Unlike traditional carpooling apps that focus primarily on facilitating transactions between drivers and passengers, Shared Wheels promotes a sense of community and cooperation in urban transportation. This community-driven ethos is shown to enhance user satisfaction and loyalty, as it fosters social connections and networking opportunities among users .

Comparison between our project and similar projects:

1. Traditional Carpooling Platforms: Previous studies have examined the effectiveness of traditional carpooling platforms, highlighting their role in reducing traffic congestion, lowering carbon emissions, and promoting social interaction among commuters. However, many of these platforms rely heavily on complex mapping technologies and online payment systems, which can present barriers to entry for users and raise concerns about data privacy.

2.Trust-Based Payment Models: Shared Wheels departure from traditional online payment systems aligns with research advocating for trust-based payment models in carpooling platforms. Studies have shown that trust plays a crucial role in fostering cooperation and participation among users, with direct expense sharing enhancing transparency and reducing

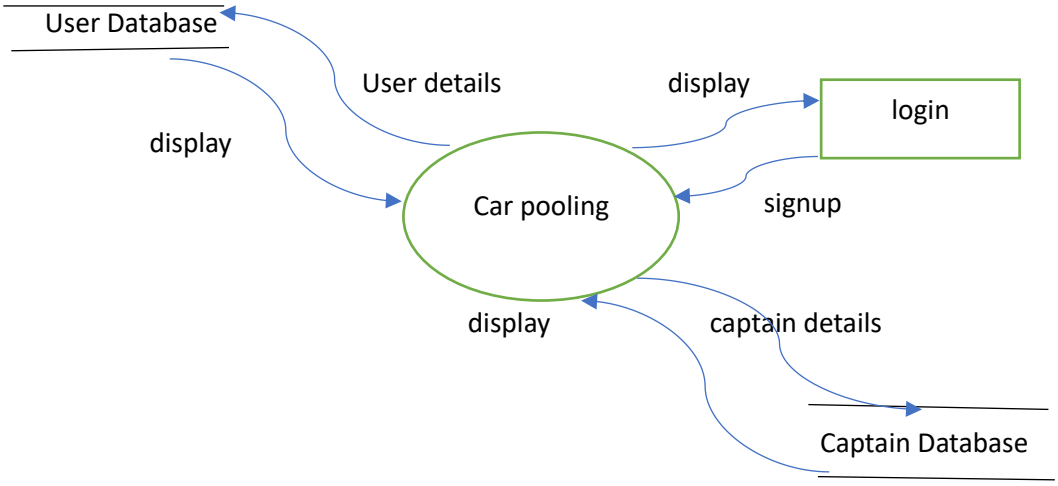
transactional friction. By eliminating the need for online payments, Shared Wheels may appeal to a broader audience and encourage greater participation in carpooling initiatives.

3.Privacy Concerns in Carpooling Platforms: Privacy considerations have emerged as a significant factor influencing user behaviour and participation in carpooling platforms. Research indicates that users are often reluctant to share sensitive personal information, such as location data, due to privacy concerns. Shared Wheels' emphasis on privacy and data security, achieved through the avoidance of intricate mapping technologies and location tracking, may address these concerns and attract users seeking a more privacy-conscious carpooling solution.

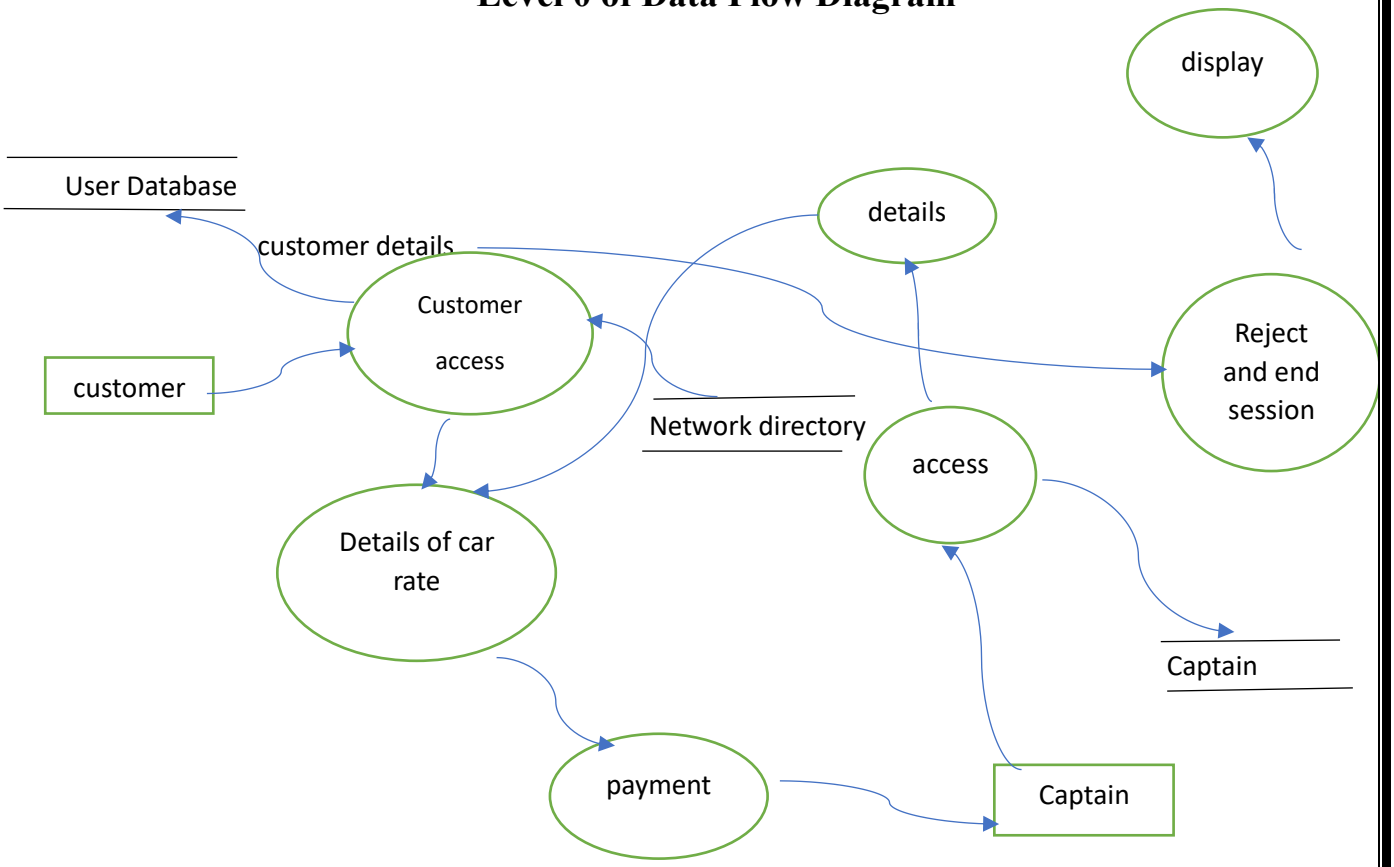
In summary, the existing literature underscores the potential of carpooling platforms to address urban transportation challenges while promoting sustainability and community engagement. Shared Wheels' departure from conventional models, through its trust-based payment system, privacy-conscious approach, and emphasis on community building, aligns with key findings and recommendations from previous studies. By drawing on insights from the existing literature, Shared Wheels aims to offer a user-friendly, inclusive, and sustainable carpooling solution that resonates with modern commuters.

Data Flow Diagram (DFD):

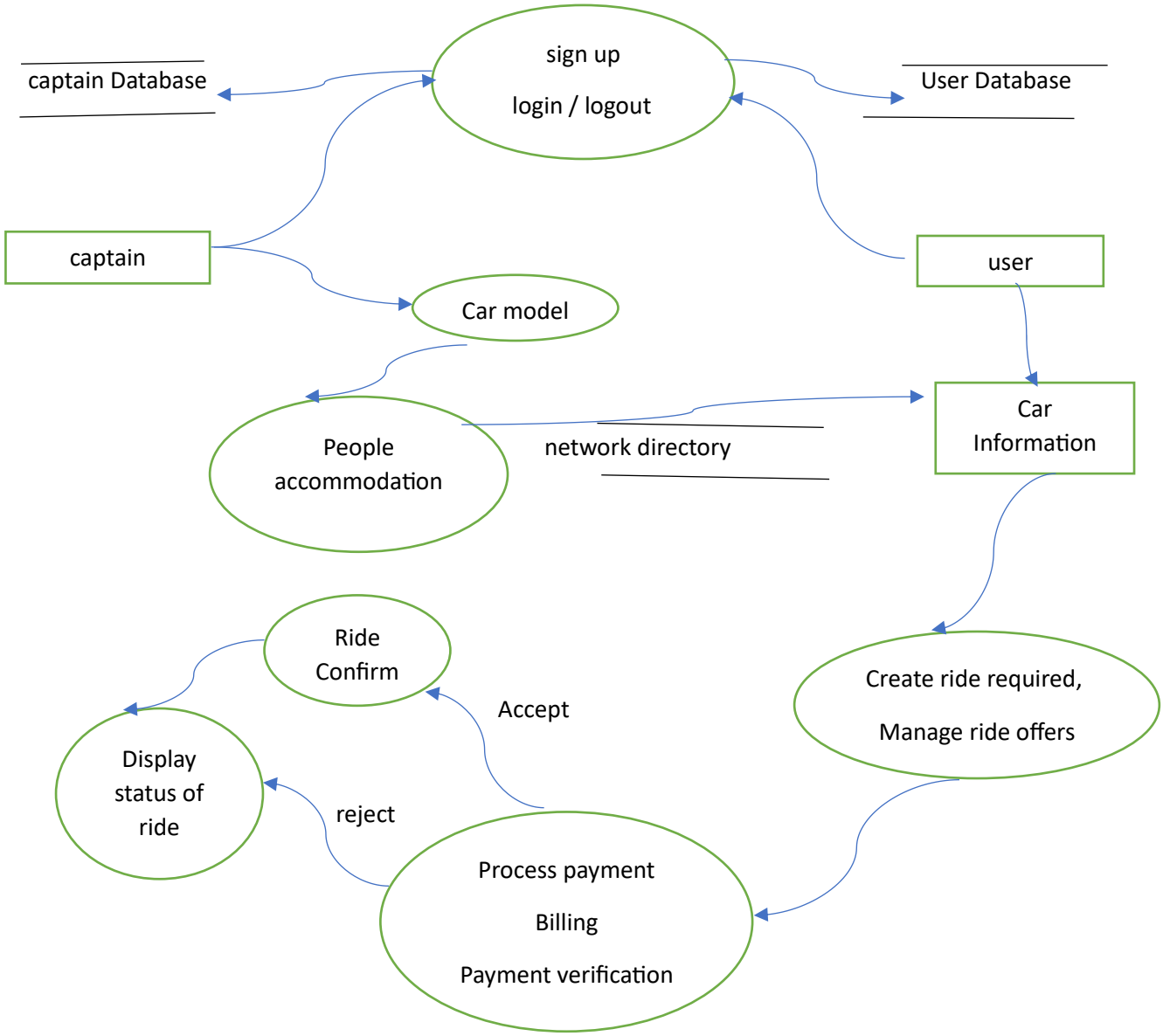
Context Diagram- DFD Car Pooling



Level 0 of Data Flow Diagram

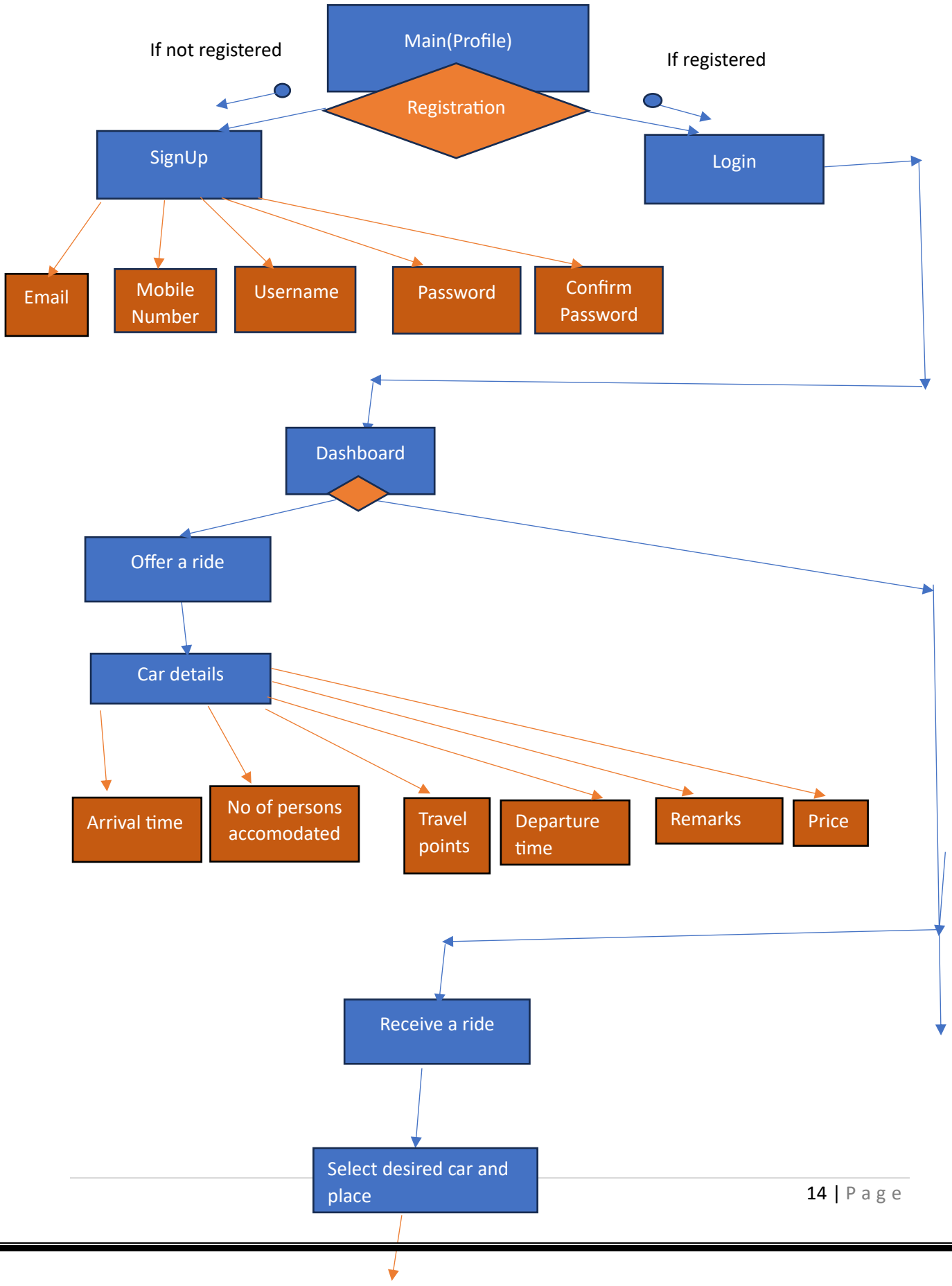


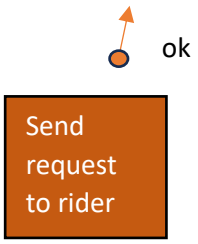
Level 1 of Data Flow Diagram



DFD and Structured Chart:

:




ok
Send request to rider

System Requirements:

1. Operating System: Windows, Linux

2. Text Editor: VS Code

3. Web Browser: Google Chrome

4. Version Control System: Git hub repository to post our project

5. Programming Languages and Frameworks:

- Frontend: JavaScript (React.js)
- Backend: Node.js

6. Database Management System (DBMS): Mongo DB (Atlas)

Proposed System:

1. Frontend Application:

Technologies: React.js, HTML, CSS to create a visually appealing and interactive user interface.

Features: User authentication and registration ensure secure access to the platform, while the ride search and booking functionality provides convenience and ease of use. Profile management allows users to personalize their experience and manage their information effectively. Moreover, React.js enables the development of dynamic and responsive user interfaces, enhancing the overall user experience with seamless interactions and smooth transitions.

2. Backend Application:

Technologies: Utilizing Node.js and MongoDB for efficient backend operations and data storage.

Features: MongoDB's document-based storage facilitates the flexible management of user data and ride details. The backend ensures data integrity through robust error handling and data validation processes, enhancing the reliability and security of the application. Node.js offers non-blocking, event-driven architecture, enabling the handling of multiple concurrent requests efficiently, thus optimizing performance and scalability.

3.Database:

Technologies: Employing MongoDB for its scalability, flexibility, and performance.

Features: MongoDB collections organize user and ride data efficiently, while indexing enhances query performance. Backup and recovery mechanisms ensure data resilience and integrity, safeguarding against potential data loss or corruption. Additionally, MongoDB's support for horizontal scaling enables seamless expansion of database resources to accommodate growing data volumes and user traffic, ensuring optimal application performance under varying load conditions.

4.Deployment and Hosting:

Options: Choosing VS Code for streamlined development and deployment workflows.

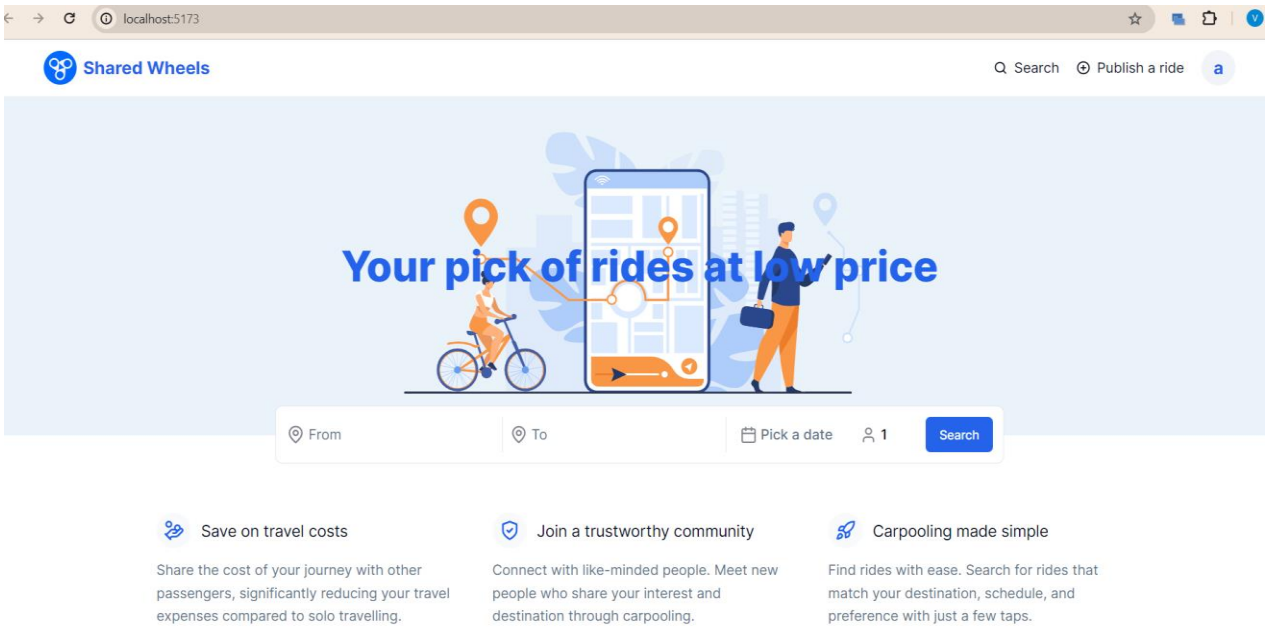
Features: VS Code simplifies the deployment process, eliminating the need for complex server configurations. Hosting platforms offer scalability features, ensuring the application can handle increasing traffic without compromising performance or reliability. Moreover, leveraging continuous integration and deployment (CI/CD) pipelines automates the deployment process, reducing deployment times and minimizing the risk of human errors, thereby enhancing the overall efficiency and reliability of the deployment workflow.

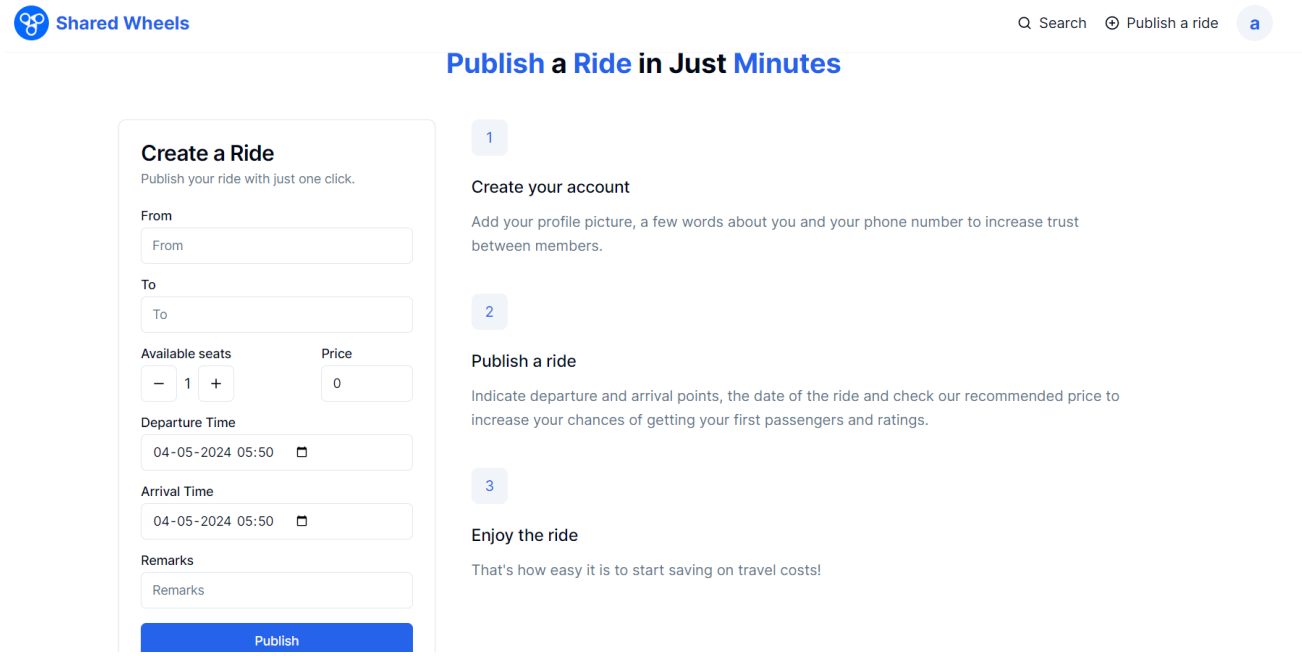
5. Security:

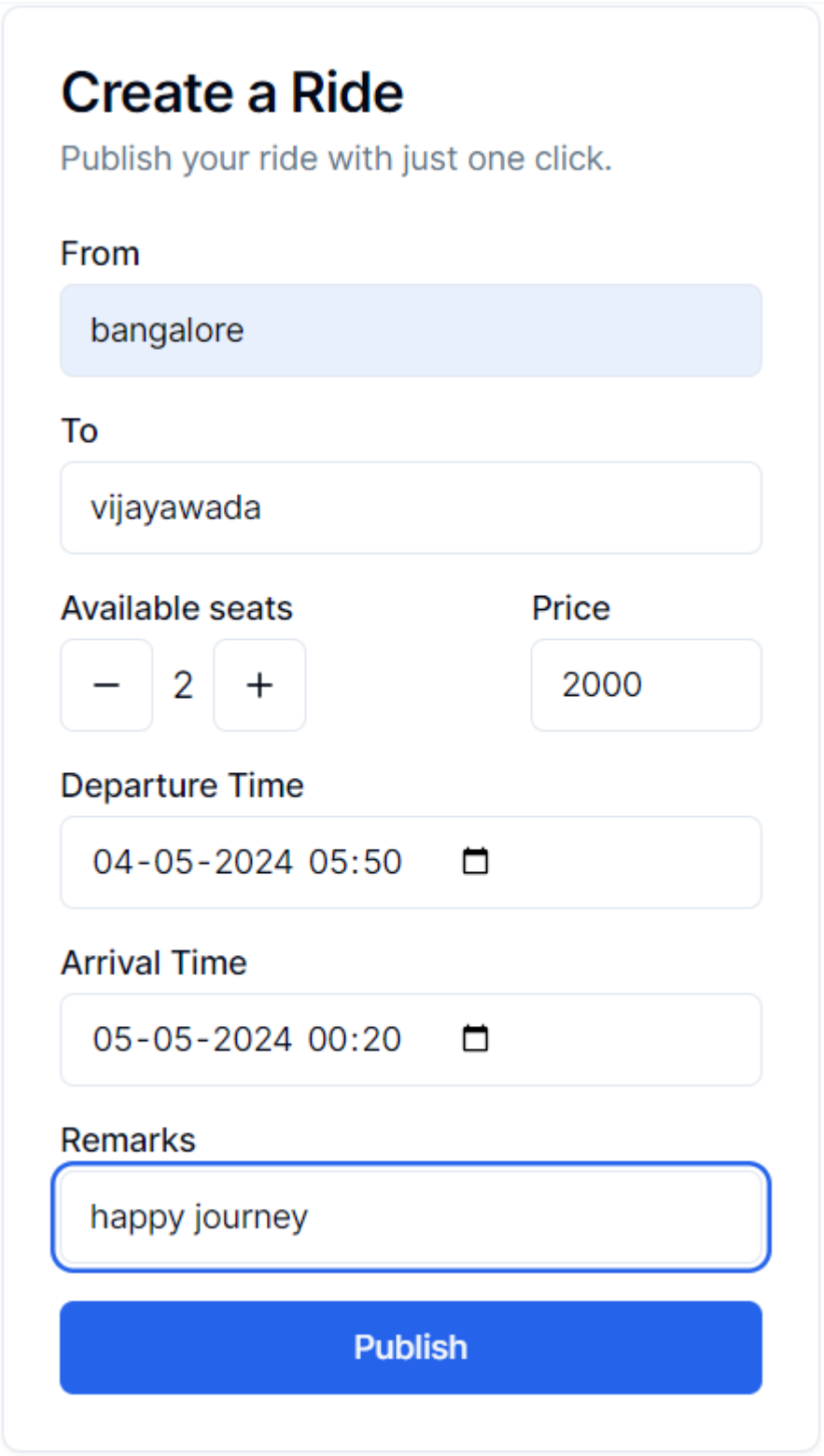
Features: Input validation safeguards against common security threats such as injection attacks. Minimizing data exposure reduces the risk of unauthorized access to sensitive information. Secure password handling through encryption enhances user account security, while user education promotes awareness of security best practices, fostering a culture of security-conscious behaviour. Additionally, implementing role-based access control (RBAC) restricts access to sensitive functionalities based on user roles, further enhancing the overall security posture of the application. Regular security audits and penetration testing help identify and remediate potential vulnerabilities, ensuring continuous protection against evolving security threats.

The application boasts a robust tech stack, featuring React.js, Node.js, and MongoDB, ensuring both a visually captivating frontend and a resilient backend. User authentication, profile management, and seamless ride booking functionalities prioritize user experience and security. MongoDB's document-based storage optimizes data management, bolstered by efficient error handling and validation processes. VS Code streamlines deployment, while hosting platforms ensure scalability and reliability. Security measures encompass input validation, data minimization, and encrypted password handling, augmented by user education and role-based access control. Regular audits and penetration testing fortify defences against emerging threats, culminating in a comprehensive and user-centric approach to application development and security.

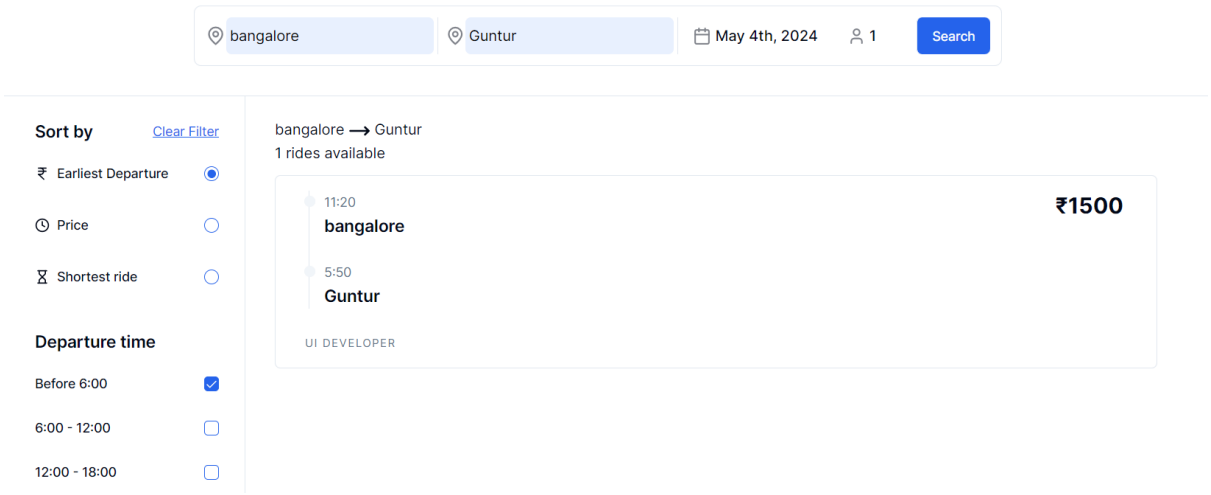
Results:


localhost:5173
Shared Wheels
Search
Publish a ride
a
Your pick of rides at low price
From
To
Pick a date
1
Search
Save on travel costs
Share the cost of your journey with other passengers, significantly reducing your travel expenses compared to solo travelling.
Join a trustworthy community
Connect with like-minded people. Meet new people who share your interest and destination through carpooling.
Carpooling made simple
Find rides with ease. Search for rides that match your destination, schedule, and preference with just a few taps.

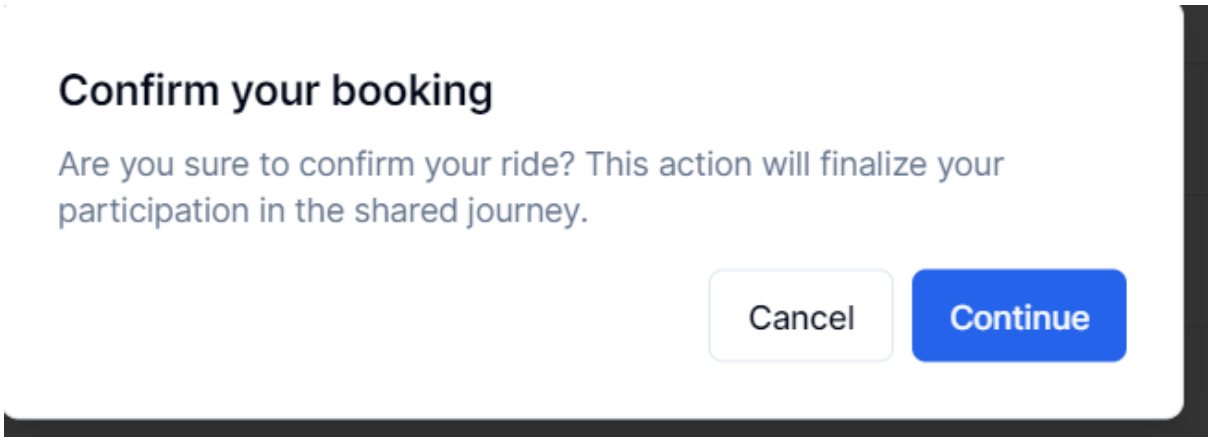

Shared Wheels
Search
Publish a ride
a
Publish a Ride in Just Minutes
Create a Ride
Publish your ride with just one click.
From
From
To
To
Available seats
1
Price
0
Departure Time
04-05-2024 05:50
Arrival Time
04-05-2024 05:50
Remarks
Remarks
Publish
1
Create your account
Add your profile picture, a few words about you and your phone number to increase trust between members.
2
Publish a ride
Indicate departure and arrival points, the date of the ride and check our recommended price to increase your chances of getting your first passengers and ratings.
3
Enjoy the ride
That's how easy it is to start saving on travel costs!

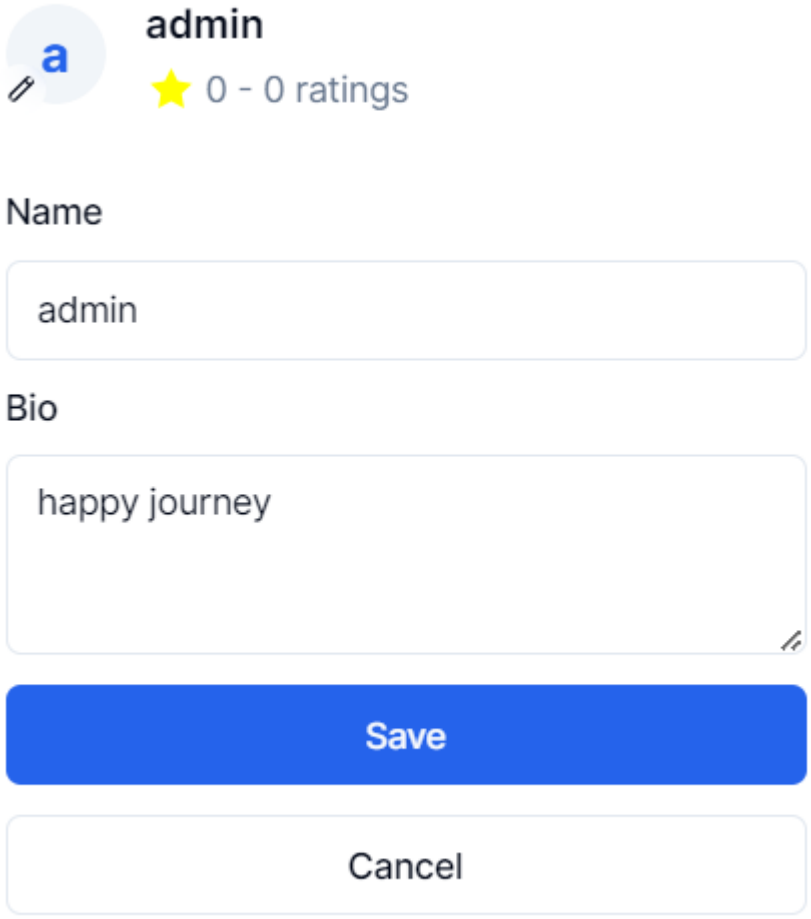


The ride has been Created


bangalore
Guntur
May 4th, 2024
1
Search
Sort by
Clear Filter
Earliest Departure
Price
Shortest ride
Departure time
Before 6:00
6:00 - 12:00
12:00 - 18:00
bangalore → Guntur
1 rides available
11:20
bangalore
5:50
Guntur
₹1500
UI DEVELOPER


bangalore
May 4, 2024, 11:20 AM
→
Guntur
May 5, 2024, 5:50 AM
BMW X5 (Black)
Duration: about 19 hours
Seats: 1
Total Price for 1 Passenger: ₹1500
Book Ride


Confirm your booking
Are you sure to confirm your ride? This action will finalize your participation in the shared journey.
Cancel
Continue



Published Rides

8:11
banglore

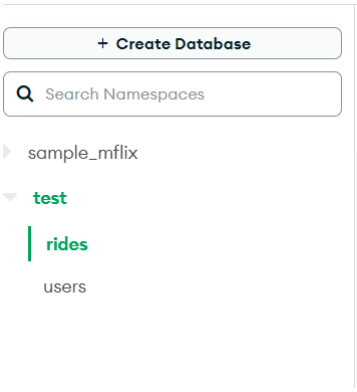
₹1500

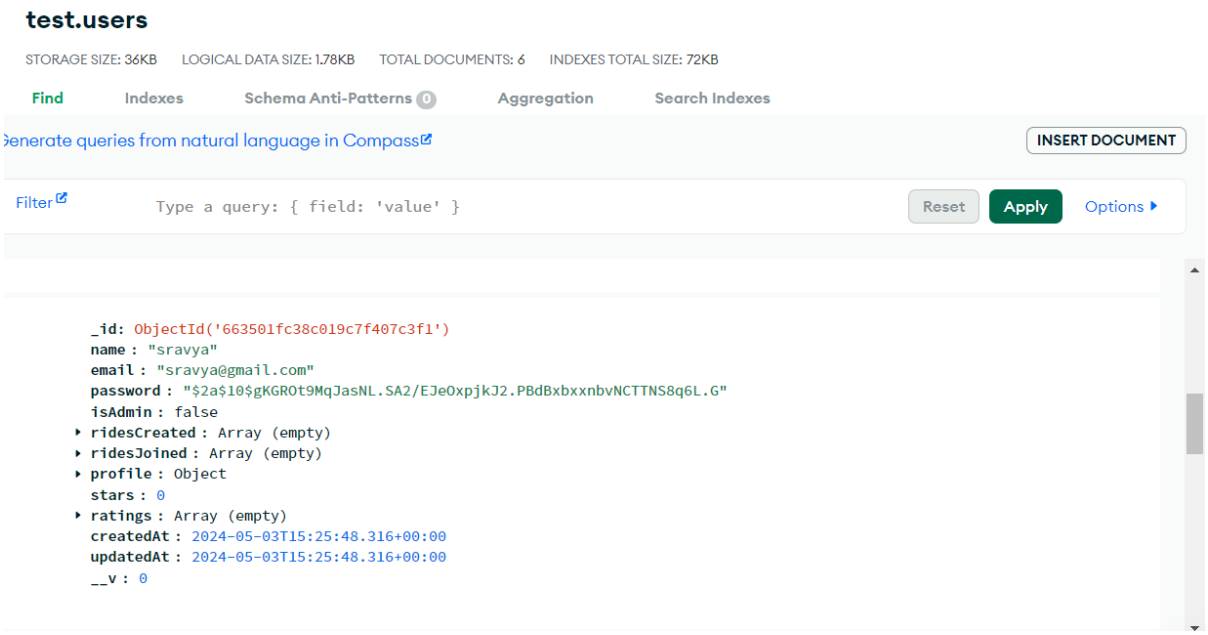
9:41
Guntur

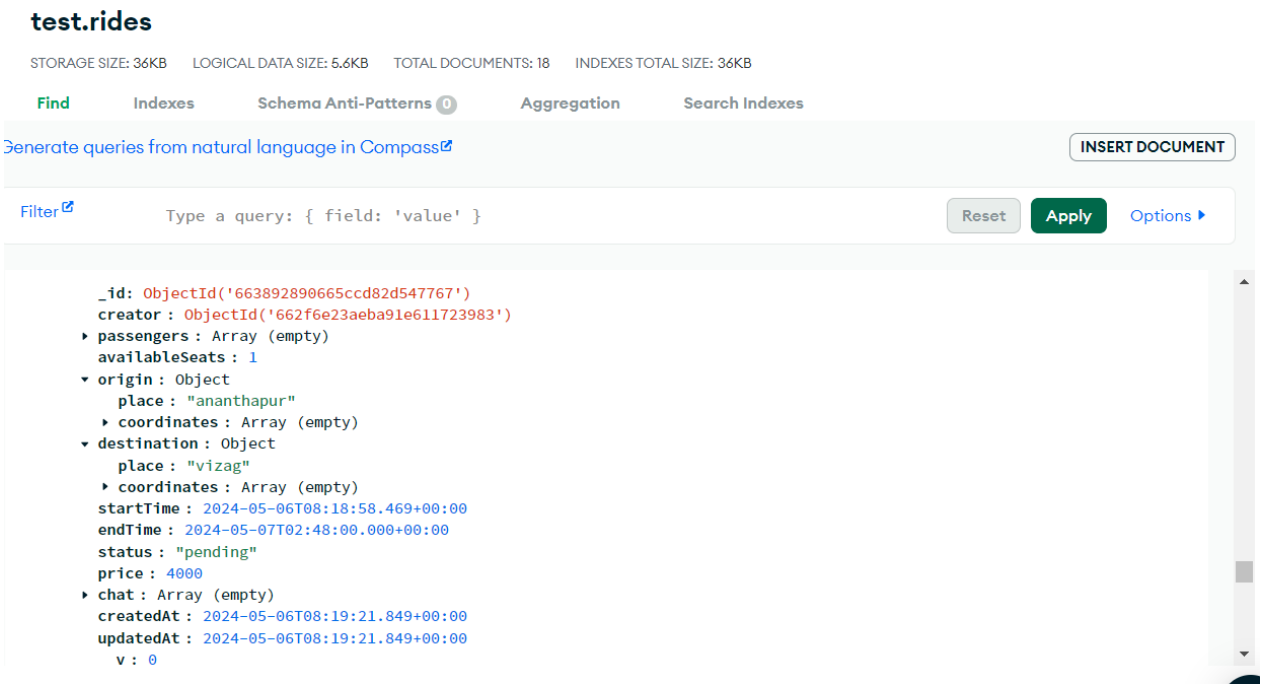
UI DEVELOPER

Recently joined rides

No rides


+ Create Database
Search Namespaces
sample_mflix
test
rides
users


test.users
STORAGE SIZE: 36KB
LOGICAL DATA SIZE: 1.78KB
TOTAL DOCUMENTS: 6
INDEXES TOTAL SIZE: 72KB
Find
Indexes
Schema Anti-Patterns 0
Aggregation
Search Indexes
Generate queries from natural language in Compass
INSERT DOCUMENT
Filter
Type a query: { field: 'value' }
Reset
Apply
Options
_id: ObjectId('663501fc38c019c7f407c3f1')
name : "sravya"
email : "sravya@gmail.com"
password : "$2a$10$gKGROt9MqJasNL.SA2/EJeOxpjkJ2.PBdBxbxxnbvNCTTNS8q6L.G"
isAdmin : false
ridesCreated : Array (empty)
ridesJoined : Array (empty)
profile : Object
stars : 0
ratings : Array (empty)
createdAt : 2024-05-03T15:25:48.316+00:00
updatedAt : 2024-05-03T15:25:48.316+00:00
__v : 0


test.rides
STORAGE SIZE: 36KB
LOGICAL DATA SIZE: 5.6KB
TOTAL DOCUMENTS: 18
INDEXES TOTAL SIZE: 36KB
Find
Indexes
Schema Anti-Patterns 0
Aggregation
Search Indexes
Generate queries from natural language in Compass
INSERT DOCUMENT
Filter
Type a query: { field: 'value' }
Reset
Apply
Options
_id: ObjectId('663892890665ccd82d547767')
creator : ObjectId('662f6e23aeba91e611723983')
passengers : Array (empty)
availableSeats : 1
origin : Object
place : "ananthapur"
coordinates : Array (empty)
destination : Object
place : "vizag"
coordinates : Array (empty)
startTime : 2024-05-06T08:18:58.469+00:00
endTime : 2024-05-07T02:48:00.000+00:00
status : "pending"
price : 4000
chat : Array (empty)
createdAt : 2024-05-06T08:19:21.849+00:00
updatedAt : 2024-05-06T08:19:21.849+00:00
v : 0

Conclusion:

In conclusion, Shared Wheels stands poised at the forefront of revolutionizing urban transportation through its innovative approach to carpooling. By prioritizing simplicity, trust, and community, the platform offers a refreshing departure from conventional models, addressing key challenges and concerns faced by commuters in today's fast-paced world.

Shared Wheels' commitment to facilitating genuine connections among users, fostering transparency and fairness in cost-sharing arrangements, and safeguarding user privacy sets it apart as a leader in the carpooling space. Through its user-friendly interface, advanced matching algorithms, and emphasis on trust and safety, Shared Wheels not only streamlines the process of arranging shared rides but also cultivates a sense of camaraderie and collaboration among participants.

Moreover, Shared Wheels represents more than just a transportation solution—it embodies a vision for a greener, more interconnected future. By promoting resource-sharing, reducing carbon emissions, and fostering community engagement, the platform contributes to the collective effort to combat climate change and alleviate urban congestion.

As Shared Wheels continues to evolve and expand, it holds the promise of reshaping the way people commute, making urban travel more efficient, affordable, and sustainable for generations to come. With its unwavering commitment to user needs and its dedication to driving positive change, Shared Wheels stands as a beacon of innovation and progress in the quest for a brighter, more interconnected future.

References:

Car Pool App – Bla Bla

You tube Videos For connecting front end and backend

(https://youtu.be/ZVyIIyZJutM?si=vj5Y9FjwO0s6-CYD)

(https://youtu.be/mIwSW94mXR4?si=PZ9-yphKbEmptdau)

Few Git hub repositories to get more idea and enhance our project.

(https://github.com/Amagnum/Car-Pooling-App)

(https://github.com/djbarrow)