Indian Institute of Technology, Roorkee

CSC 303: Computer Networks

Project Proposal

BlockRide – Decentralized Ride Sharing

Collaborators (Team 10)

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Project Title: BlockRide – Decentralized Ride Sharing

What issue is resolved by the system, and why is this significant?

Those who rideshare frequently have to deal with ambiguous regulations, additional costs, and less control over their personal information. Everyone may be impacted by outages and privacy concerns when everything is hosted on the servers of a single business. Additionally, there is no shared record that drivers and passengers may rely on.

This is resolved by BlockRide, which maintains a small public record of what is available while decentralizing the storage of comprehensive ride and profile data. Users create offers or requests, authenticate in real time, and sign in using a wallet. The design reduces expenses while increasing control and transparency.

What will the system do?

- Permit drivers to post ride offers that include the price, route, and seats.
- Allow riders to include their source and destination when submitting requests.
- Only little hints should be kept in a shared public record; all other information should be kept in decentralized storage.
- Use a straightforward distance-based route ranking system to recommend appropriate drivers to riders.
- Instantaneously notify both parties so they can confirm a ride.
- Offer a user-friendly web interface that allows users to manage rides and sign in using a wallet.

Why is this an appropriate level of difficulty for a 3–5 student team in one semester?

- It integrates real-time messaging, a web client, decentralized storage, and a public record.
- We need to maintain different components in sync and clearly separate the shared record from the larger data.
- Route-matching, confirmations, and secure handling of user data and sign-in flows require careful planning and testing.
- Completing the full loop from post → match → confirm is ambitious yet achievable within a single semester.

Scope of Work (high-level)

- Maintain the most recent lists of user profiles, driver offers, and passenger requests in a minimally shared public record.
- Keep comprehensive ride and profile data in a decentralized location; when new information is added, update the shared record.
- Create a web client with basic forms for offers and requests, wallet sign-in, and map-based route selection.
- Use a distance-based metric to rank drivers for a rider and display the best matches.
- Include real-time alerts so that drivers and passengers can verify one another.
- Put safety first: verify user input, prevent publicly storing sensitive information, and adhere to standard practices.

Expected User Workflow (non-technical view)

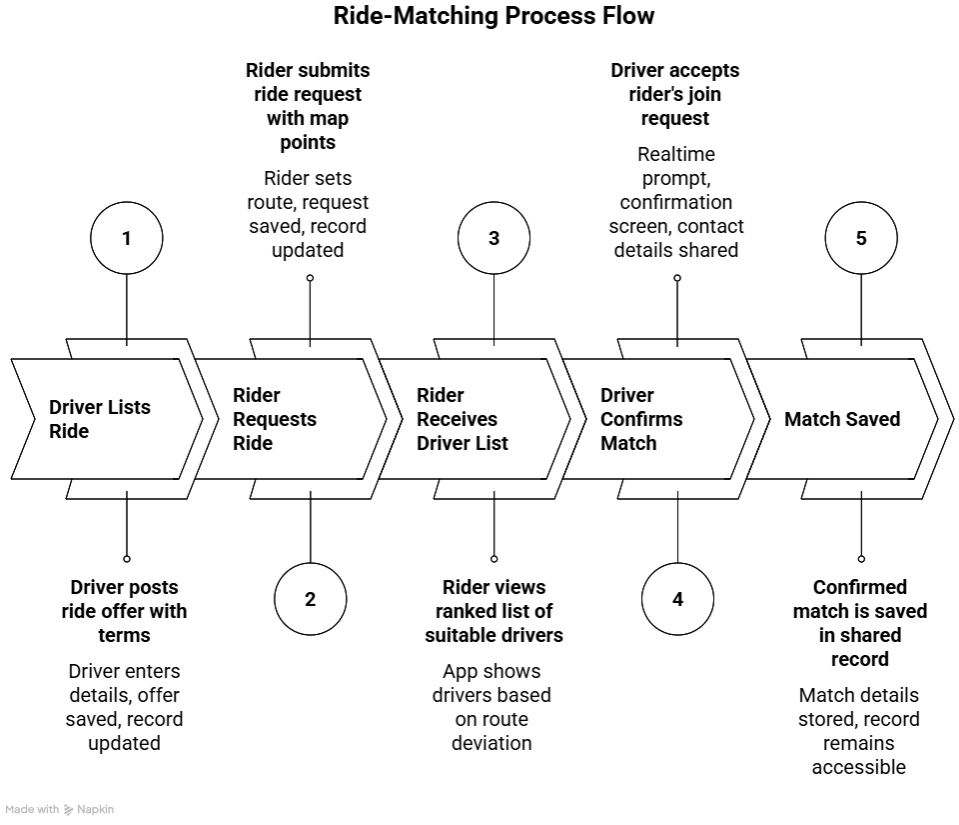

Illustration: Visual selection flow after workflow steps

Out of Scope (to keep focus on What/Why)

- Payment escrow, token transfers, and on-chain settlement.

- KYC and identity verification in the real world.
- Intricate arbitration and dispute settlement.
- Native apps for mobile devices.
- Sophisticated algorithms for surge pricing and route optimization.

Tech Stack (detailed)

- **Field:** Distributed systems, blockchain/web3, smart contracts, real-time systems, computer networks, and network security.
- **Ethereum-compatible contract:** Root-hash registry (users, driver offers, rider requests) solidity smart contract.
- **Decentralized storage:**IPFS for ride and profile JSON data through the Infura gateway.
- **Frontend:** MetaMask integration in a React application.
- **Realtime backend:** Google Maps API for location input; Web3/ethers.js.