**Title: P2P Bike Rental Platform**

**Abstract**

The P2P Bike Rental Platform is an online marketplace that enables individuals to list their bikes for rent on their own terms. The platform connects bike owners with users looking to rent bikes for short durations, ensuring transparency, security, and ease of transaction. By leveraging modern web and mobile technologies, this system allows seamless booking, secure payments, and an efficient rental process, ultimately promoting shared mobility and cost-effective transportation.

**Introduction**

**Frontend Technology:**

* **React.js / Next.js** (for web)
* **React Native / Flutter** (for mobile app)
* Tailwind CSS / Bootstrap (for UI styling)

**Backend Technology:**

* **Node.js with Express.js** or **Django/FastAPI**
* **PostgreSQL / MongoDB** (for database management)
* **Firebase for authentication** (optional)

**Aim and Objectives:**

* To create a decentralized bike rental marketplace.
* To allow users to list and rent bikes on their own terms.
* To ensure secure payments and rental agreements.
* To provide real-time availability and GPS tracking.

**Problem Statement**

Traditional bike rental systems are either controlled by centralized companies (Uber, Bounce) or require physical presence to rent. This project aims to solve the following problems:

* Lack of peer-to-peer (P2P) rental options for individuals.
* High rental costs due to centralized ownership.
* Limited availability of bikes in certain areas.
* Trust and security concerns in direct transactions.

**Literature Review**

Existing services like Uber Moto and Bounce focus on ride-sharing rather than direct rentals. Spinlister was one of the few P2P bike rental services, but it lacked security and widespread adoption. This project aims to overcome these gaps by integrating secure payments, user verification, and automated contract agreements.

**Proposed Methodology**

1. **User Registration & Verification** - Users and owners register, verify identity, and upload bike details.
2. **Bike Listing & Search** - Owners list bikes with terms, renters browse by location, price, and availability.
3. **Booking & Payment System** - Renters book bikes, owners approve requests, and payments are secured.
4. **Real-time Tracking & Notifications** - GPS tracking ensures security, and both parties receive updates.
5. **Review & Feedback System** - Users rate experiences to enhance trust and credibility.
6. **Admin Dashboard** - Centralized platform management for disputes, listings, and security monitoring.

**Project Modules**

**1. User Module:**

* User Registration/Login
* Profile Management
* Search & Filter Bikes
* Rental Requests & Payments
* Reviews & Feedback

**2. Bike Owner Module:**

* List Bike for Rent
* Set Pricing & Availability
* Approve/Reject Rental Requests
* Manage Earnings

**3. Booking Module:**

* Instant Booking or Request-Based Booking
* Payment Integration
* Rental Agreements

**4. Admin Module:**

* User & Bike Verification
* Transaction Monitoring
* Dispute Resolution
* Analytics & Reports

**Use Case Diagram**

(A diagram showing interactions between users, bike owners, and the system.)

**ER Diagram**

(Entity Relationship Diagram displaying the database schema.)

**Flow Diagram**

(A flowchart illustrating the end-to-end rental process.)

**Hardware and Software Requirements**

**Hardware Requirements:**

* Minimum 8GB RAM, SSD Storage
* Server with high bandwidth (AWS/GCP/DigitalOcean)

**Software Requirements:**

* Windows/Linux/macOS for development
* Node.js/Django Framework
* Database: PostgreSQL/MongoDB
* Firebase Authentication
* Payment Gateway (Stripe/Razorpay)

**Expected Outcome of the Project**

* A fully functional P2P bike rental platform.
* Secure and automated booking process.
* Transparent and user-friendly interface.
* Enhanced user trust through verification and reviews.

**Limitations**

* Potential trust issues among users.
* Dependency on user verification and security features.
* Requires marketing efforts for user adoption.
* Legal and insurance considerations for bike rentals.

**Conclusion and Future Work**

This project provides a practical solution for decentralized bike rentals, making bike-sharing accessible to individuals without relying on centralized businesses. Future improvements can include AI-based pricing suggestions, blockchain-based rental contracts, and international scalability.

**References**

* Uber Moto, Rapido, Spinlister case studies
* Research papers on shared mobility models
* API documentation for Stripe, Firebase, and Google Maps