

RIPHAH INTERNATIONAL UNIVERSITY



Faculty of Computing FINAL YEAR PROJECT PROPOSAL & PLAN

Parkalot (Smart Vehicle Parking) Project Team

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Project Proposal

Project Title: Parkalot (Smart Vehicle Parking)

Opportunity & Stakeholders:

1) Primary Stakeholders:

- Parking Seekers (User0): Individuals looking for convenient parking in urban areas.
- Property Owners (User1): Individuals or businesses offering their parking spaces for rent.

2) Secondary Stakeholders:

- Local Businesses: Restaurants, shops, and offices that can benefit from increased foot traffic by offering parking discounts or partnerships.
- City Governments: Interested in reducing congestion and integrating smart parking solutions into urban planning.
- Technology Providers: Companies providing AI, IoT, and payment gateway solutions for seamless integration.

3) Tertiary Stakeholders:

- Investors and Sponsors: Financial backers interested in supporting the platform for potential high returns and market growth.
- Real Estate Developers: Developers who can integrate Parkalot's solution into new residential or commercial projects.
- Security Service Providers: Companies offering CCTV and security services for enhanced monitoring of parking spots.
- Marketing Agencies: Agencies involved in promoting the platform to attract more users and property owners.

Opportunities:

- 1) **Urban Market Expansion:** High demand for parking in congested cities.
- 2) **Technology Integration:** Enhanced real-time monitoring and secure payments.
- 3) **Business Partnerships:** Collaboration with local businesses and developers.
- 4) **Sustainability Initiatives:** Reduced congestion and emissions through optimized parking.
- 5) **Revenue Streams:** Subscription plans, transaction fees, and advertising.

➤ Existing System/ Description of the Current Situation:

In most urban areas, finding a convenient parking spot is a significant challenge due to limited availability, inefficient utilization of parking spaces, and lack of reliable information. Traditional parking systems rely on on-site management or static information, which often leads to traffic congestion as drivers circle around searching for parking. Existing parking solutions are mostly centralized, focusing on public or

commercial parking lots, with limited use of technology to enhance efficiency and user experience.

Private parking spaces owned by individuals or businesses remain largely underutilized, as there is no efficient platform to connect these property owners with potential parking seekers. Current systems lack real-time monitoring, secure booking, and automated payment features, which are crucial for modern, technology-driven users. Additionally, security concerns and inefficient transaction handling further discourage property owners from renting out their spaces. This results in an inefficient parking ecosystem that fails to meet the growing demand in urban areas.

➤ **Problem Statement:**

Urban areas face significant challenges in managing parking demand due to inadequate systems and underutilized private parking spaces. Traditional parking methods lead to congestion, wasted time, and increased emissions as drivers struggle to find available spots. Existing solutions are often centralized, focusing only on public or commercial parking lots, leaving private spaces unoptimized and inaccessible. This results in lost revenue opportunities for property owners and frustration for drivers.

Moreover, current systems lack real-time data, secure transaction handling, and effective monitoring, making them unreliable and inconvenient. There is no streamlined platform that integrates advanced technologies such as AI for identity verification, IoT for real-time monitoring, and automated mobile payments to enhance user experience. These limitations create a significant gap in the parking ecosystem, calling for a more efficient, secure, and scalable solution that connects parking seekers with property owners, optimizes space utilization, and reduces congestion in urban environments.

➤ **Proposed Solution:**

The proposed solution is Parkalot, a peer-to-peer parking platform that connects parking seekers with property owners offering their unused spaces. This platform utilizes advanced technologies to address the limitations of existing systems. It incorporates AI-based identity verification to ensure secure and reliable user registration, eliminating

fraudulent activities. Real-time monitoring of parking spots is achieved through IoT-enabled devices such as CCTV cameras, enhancing security and transparency.

Parkalot integrates location-based services for efficient parking spot discovery and navigation, guiding users directly to their reserved spaces. Automated mobile payments simplify the transaction process, allowing users to pay based on parking duration securely and seamlessly. Property owners can list, manage, and monetize their parking spaces through an easy-to-use interface, creating a decentralized marketplace for parking. This solution optimizes parking space utilization, reduces traffic congestion, and provides a secure and convenient parking experience for both parking seekers and property owners, transforming the urban parking landscape.

➤ **Scope of the Project:**

The Parkalot project is composed of four major modules, each designed to address specific functionalities within the platform:

1. **User Registration and Verification Module:** This module allows users (both parking seekers and property owners) to register on the platform. It includes AI-based identity verification, where users upload their identification documents and photographs, which are compared using facial recognition technology. This ensures that only verified individuals can access the platform, enhancing security and trust between users.
2. **Parking Spot Management Module:** This module enables property owners (User1) to list, manage, and monitor their parking spaces. Owners can upload details such as location, size, availability, and pricing of their parking spots. Real-time updates and notifications are provided for new bookings, cancellations, and user feedback. This module also allows owners to link IoT-enabled CCTV cameras for real-time monitoring of their listed parking spots.
3. **Parking Spot Discovery and Booking Module:** This module is designed for parking seekers (User0) to search and book available parking spots. Users can filter spots based on location, availability, and pricing. Integrated with GPS and mapping services, the module provides real-time navigation to guide users to their reserved

spots. This module also includes automated booking confirmation and real-time updates on spot availability.

4. **Payment and Security Module:** This module handles secure transactions between parking seekers and property owners. It supports various payment methods and ensures secure processing through encryption and secure payment gateways. Automated billing is generated based on parking duration, and transaction history is maintained for both parties. Additionally, this module integrates security features such as user authentication and secure data storage to protect user information and financial data.

Project Plan

Project Plan: Work Breakdown Structure (WBS) for Parkalot

1. Project Management

- 1.1 Work Breakdown Structure (WBS)
- 1.2 Roles & Responsibility Matrix
- 1.3 Change Control System
- 1.4 Reports / Documentation
- 1.5 Final Documentation

2. Introduction & Research

- 2.1 Literature / Market Survey
- 2.2 Requirements Analysis
- 2.3 Problem Statement and Proposed Solution
- 2.4 Stakeholder Identification and Analysis

3. System Design

- 3.1 Architectural Design
- 3.2 UI/UX Design
- 3.3 Database Design
- 3.4 Security Design

4. Implementation

- 4.1 Development Environment Setup
 - IDE Configuration
 - Version Control (Git)
- 4.2 Server Configuration
 - Cloud Environment Setup (AWS, Azure)
 - Backend Server Deployment
- 4.3 Database Implementation
 - Database Schema Design
 - Data Integration
- 4.4 Presentation Layer
 - Mobile App Development (React Native/Flutter)
 - Web App Development (React.js/Vue.js)
- 4.5 Business Logic Layer

- API Development and Integration
- AI-based Identity Verification Implementation

- 4.6 Data Management Layer
 - Data Storage and Retrieval Functions
 - Real-time Data Processing (IoT Integration)

- 4.7 Physical Layer
 - IoT Device Setup (CCTV Cameras)
 - Network and Security Configurations

5. Testing & Performance Evaluation

- 5.1 Unit Testing
- 5.2 Integration Testing
- 5.3 Security and Performance Testing
- 5.4 User Acceptance Testing (UAT)

6. Documentation

- 6.1 End User Documentation
- 6.2 Application Administration Documentation
- 6.3 System Administrator Documentation

7. Deployment & Maintenance

- 7.1 Deployment to Production
- 7.2 Post-Deployment Monitoring
- 7.3 Bug Fixes and Updates

8. Conclusion & Outlook

- 8.1 Final Project Report
- 8.2 Future Enhancements and Scalability Plan
- 8.3 User Feedback and Continuous Improvement Plan

This WBS provides a comprehensive structure that covers all aspects of the Parkalot project, from initial project management and research to system design, implementation, testing, and final deployment. Each major deliverable is broken down into smaller, manageable components, ensuring that all work is accounted for and clearly defined.

Roles & Responsibility Matrix:

The purpose of roles & responsibility matrix is to identify who will do what.

WBS #	WBS Deliverable	Activity #	Activity to Complete the Deliverable	Duration (# of Days)	Responsible Team Member(s) & Role(s)
#1	User registration and verification module	1	Implement AI based identity verification for user registration	45	Aqib-ur-rehman /Huzaifa khan
#2	Parking spot management module	2	Develop interfaces for property owners to list,edit and monitor parking spots	30	Huzaifa khan/Waqas Rathor
#3	Parking spot discovery and booking module	3	Implement search,booking,and real-time updates for parking spot availability	40	Aqib/Waqas Rathor/Huzaifa
#4	IoT based real time monitoring module	4	Integrate IoT devices for real time parking spot monitoring	35	Aqib/Waqas Rathor/Huzaifa
#5	Secure payment and transaction module	5	Integrate secure payments gateways and automate billing based on parking duration	25	Huzaifa khan/Waqas Rathor
#6	GPS navigation integration	6	Integrate GPS for navigation and mapping of parking spots	20	Aqib-ur-rehman /Huzaifa khan
#7	Testing and performance evaluation	7	Conduct unit,integration,and performance testing	30	Aqib/Waqas

#8	Deployment and maintenance	8	Deploy the platform to cloud infrastructure and insure post-launch monitoring	20	Huzaifa Khan/Waqas Rathor
#9	Documentation and user training	9	Prepare end-user and administration documentation ; Provide training sessions	15	Aqib-ur-rehman /Waqas Rathor
#10	Marketing and user acquisition	10	Design and execute marketing strategies to attract users and property owners	30	Huzaifa Khan/Waqas Rathor

