GE - 5100 Product Development for Engineers

Team 8

PROJECT PROPOSAL

ON

"SmartParkIQ: A Smarter Way to Park"

By

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My Contribution

Janani (System Architect & Technical Strategist):
I led the design of our app's backend logic and overall system flow. I structured the architecture to support intelligent features like parking fine forecasting, smart parking recommendations, and additionally, real-time tow alerts. I also outlined how user and city data would be collected, processed, and leveraged to improve recommendations over time. Additionally, I defined integration points for potential B2B partnerships, such as syncing with municipal tow records, public parking garage records, and traffic APIs. My focus was to ensure that *SmartParkIQ* is scalable, reliable, and ready for future expansion as a data-driven platform.

Project Summary

SmartParkIQ is an AI-powered parking recommendation platform that helps users find the most affordable, reliable, and verified public parking spots in real time. The app solves key pain points in the current market such as inaccurate listings, limited real-time updates, confusing navigation, and hidden fees by combining user feedback loops, real-time data, and machine learning algorithms. Our team's diverse skill set allows us to tackle design, research, strategy, and system architecture in parallel.

SmartParkIQ's approach includes a built-in feedback prompt that asks users to confirm the accuracy of pricing data after parking. This binary feedback is used to retrain our model to improve future suggestions. Users receive a discount for their first hour, encouraging early adoption, while no-shows are penalized to prevent misuse and ensure garage operator compliance.

The app offers value to both customers and businesses: public garage managers benefit from increased occupancy and dashboard analytics, while users enjoy transparent pricing and location-aware suggestions. Strategic partnerships with insurance companies and navigation apps will allow us to expand distribution channels. Our business model avoids reliance on volume alone, instead offering B2B APIs, enterprise dashboards, and potential bundled service licensing.

Final Deliverable Summary

By the end of the semester, our team will deliver the following:

1. **Canvas Business Model:**
    - Key activities include smart pricing engine development, loyalty program management, and maintaining feedback loops.
    - Customer Segments: Drivers, garage owners/operators, insurance companies, navigation app companies.
    - Channels: App stores, B2B licensing, strategic bundling with insurance plans.
    - Revenue Streams: Subscription plans, operator analytics dashboard, advertisement placements, B2B partnerships.

2. **Marketing Research:**
    - Includes competitor benchmarking (e.g., ParkWhiz, SpotHero), user pain points, and surveys.
    - Market demand validation for smart parking platforms with feedback and dynamic pricing features.
    - Validation of interest from insurance companies and urban garage operators.
3. **Prototype:**
    - High-fidelity interactive prototype created in Figma.
    - Key features: Search-based recommendations, pre-booking with ETA hold, real-time confirmation prompts, loyalty dashboard, and payment system.
    - Admin view mockups for garage operators with analytics.
4. **Supporting Materials:**
    - Technical architecture outline.
    - Business pitch deck.
    - Integration proposal for potential B2B partners (insurance and navigation apps).

Testing Plan

Our testing plan involves validating the app's UI, feature set, and pricing recommendation engine through a structured feedback process:

- **Target Users:** 20-25 participants including student drivers, daily commuters, and part-time urban drivers.
- **Recruitment:** Volunteers from local campuses, social media, and rideshare communities.
- **Prototype to Test:** Interactive Figma prototype with major flows (search, book, feedback, reward system).
- **Timeline:**
    - **Week 1-2:** Initial design testing (UI/UX) with 5 users.
    - **Week 3-4:** Smart pricing feedback testing with 10 users.
    - **Week 5-6:** Loyalty and penalty flow testing with 10 additional users.
- **Evaluation Criteria:**
    - Usability and ease of navigation.
    - Accuracy perception of recommended spots.
    - Engagement with feedback and rewards prompts.
    - Willingness to pre-book and accept penalties.

Insights from testing will be used to update the prototype and retrain pricing feedback logic.

Team Roles

Mansi (UI/UX Designer & Research Lead): Mansi leads the design process and user research. She ensures that the app layout is intuitive, accessible, and well-informed by real user behaviors.

She handles survey design, user interviews, and synthesizes qualitative feedback into actionable design improvements.

Janani (System Architect & Technical Strategist): Janani maps the feedback loop mechanisms, designs the backend architecture, and ensures the data is handled reliably. She defines logic for retraining recommendations, penalty processing, and integration APIs for B2B clients.

Suyog (Business Strategist & Market Analyst): Suyog defines the revenue model, value propositions, and strategic direction. He identifies potential customer segments, partnership opportunities, and runs market sizing estimates. He also drives the creation of the Business Model Canvas and product positioning.

Project Management

Our team uses Notion for documentation, Jira board tracking, and meeting minutes. Weekly meetings are held via Teams or in-person to discuss progress. Tasks are divided based on expertise and interest and reviewed at midweek checkpoints. All documents are version-controlled in a shared Google Drive folder.

Expectations

- **Task Selection:** Based on individual skill alignment and workload capacity.
- **Work Visibility:** Progress shared weekly in Notion with status updates.
- **Feedback Loop:** Design and strategic ideas are reviewed by all team members in weekly syncs. Honest but respectful critiques are encouraged.
- **Communication:** Team WhatsApp group for real-time updates, Teams for formal notes.
- **Valid Exceptions:** Illness, family emergencies, or academic overload (with advance notice).
- **Non-Compliance:** Repeated failure to deliver without notice will trigger a reallocation of responsibilities and faculty escalation if needed.

Conflict Remediation

Design and execution disagreements are handled via majority consensus after an open discussion. If consensus isn't possible, the team votes. For interpersonal or performance issues, a one-on-one dialogue is encouraged first, followed by full team mediation. Persistent issues will be escalated to course instructors.

Preliminary Project Schedule

Our project is structured into four distinct phases: Proposal, Definition, Design, and Validation spanning from July 15, 2025, to August 17, 2025. These phases are organized into six agile Epics

to streamline our work. The Proposal Phase focuses on finalizing the app idea and conducting competitor analysis. During the Definition Phase, we define our users, key features, and develop use-case scenarios.

Next, the Design Phase covers wireframing, branding, and building an interactive prototype using Figma. Parallel to this, we design the app logic for core features such as tow alerts, parking predictions, and towing support. The final phase includes internal testing, prototype submission, and delivery of a compelling pitch deck and demo video.

This structured timeline ensures balanced workload distribution, consistent progress, and clear deliverables at each stage.

Project Milestones and Timeline
(Overall duration: July 15, 2025 – August 17, 2025)

Proposal Phase *(July 15 – July 24)*

- Finalize app concept, objectives, and user needs *(07/16 – 07/19)*
- Research competitor apps and analyze gaps *(07/18 – 07/20)*
- Draft proposal document and get instructor feedback *(07/20 – 07/24)*

Definition Phase *(July 25 – July 31)*

- Define user personas, user journey maps, and pain points *(07/25 – 07/26)*
- Identify key app features for prototype (e.g., tow alerts, parking predictions, towing assistance) *(07/26 – 07/27)*
- Write user stories and use-case scenarios *(07/27 – 07/28)*
- Design app architecture and screen flow diagrams *(07/28 – 07/29)*
- Begin low-fidelity wireframing *(07/30 – 07/31)*

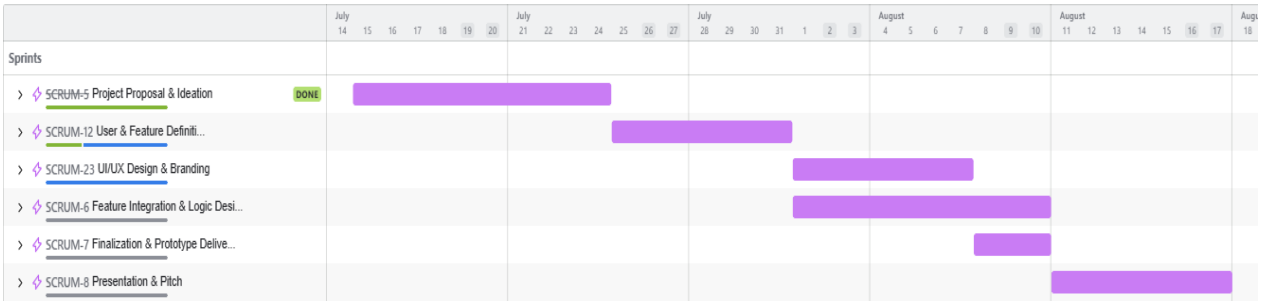
Design Phase *(August 01 – August 07)*

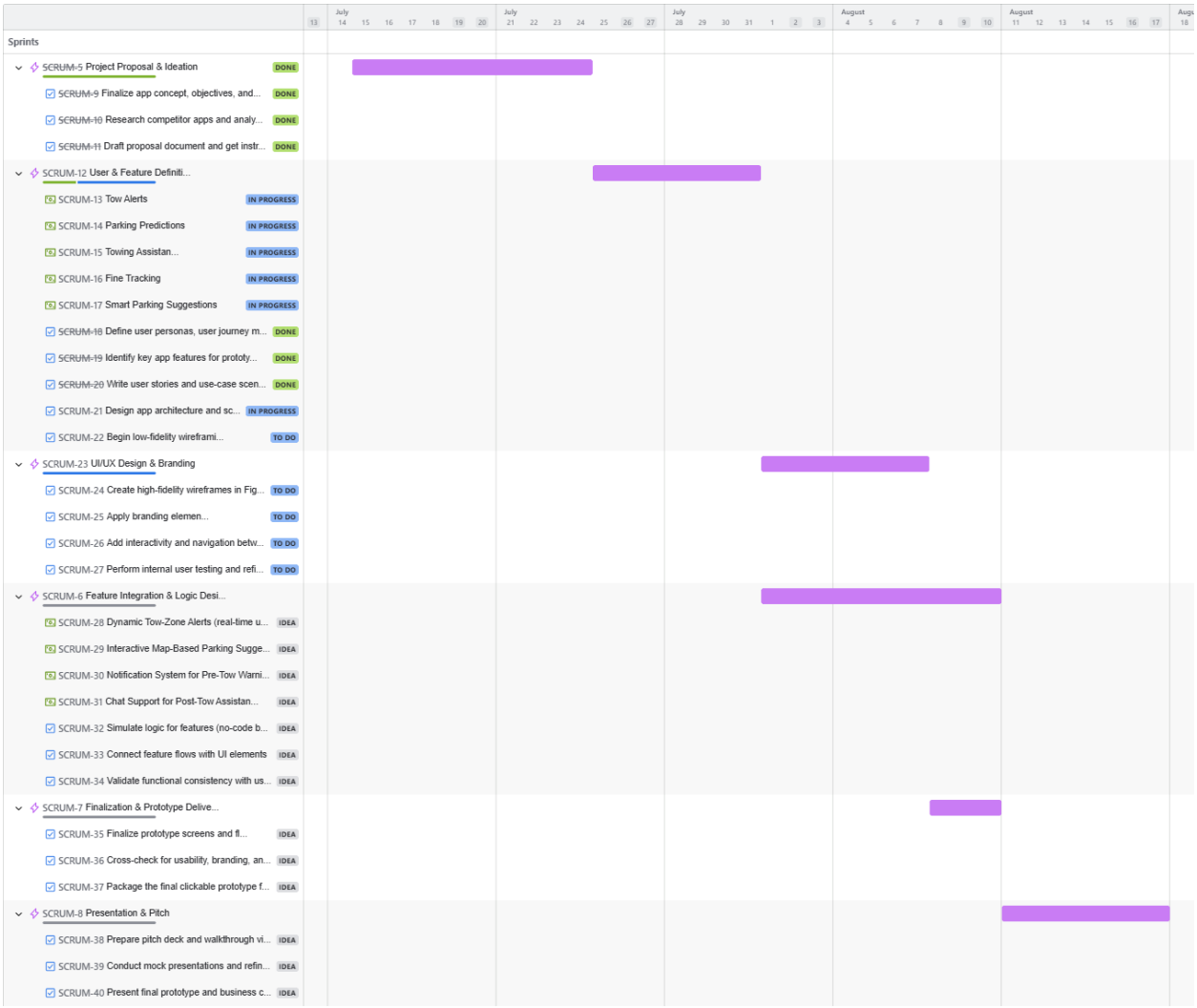
- Create high-fidelity wireframes in Figma *(08/01 – 08/03)*
- Apply branding elements (color scheme, typography, logo) *(08/03 – 08/04)*
- Add interactivity and navigation between screens *(08/04 – 08/06)*
- Perform internal user testing and refine the design *(08/06 – 08/07)*

Validation & Presentation Phase *(August 08 – August 17)*

- Finalize prototype for submission *(08/08 – 08/10)*
- Prepare pitch deck and walkthrough video *(08/11 – 08/13)*
- Conduct mock presentations and refine based on feedback *(08/14 – 08/16)*
- Present final prototype and business concept *(08/17)*

Gantt Chart: Product Development Timeline





Epic 1: Project Proposal & Ideation (July 15 – July 24)

Tasks:

- Finalize app concept, objectives, and user needs (07/16 – 07/19)

- Research competitor apps and analyze gaps (07/18 – 07/20)
- Draft proposal document and get instructor feedback (07/20 – 07/24)

Epic 2: User & Feature Definition (July 25 – July 31)
Features:
- Core App Capabilities:
  - Tow Alerts
  - Parking Predictions
  - Towing Assistance
  - Fine Tracking
  - Smart Parking Suggestions

Tasks:
- Define user personas, user journey maps, and pain points (07/25 – 07/26)
- Identify key app features for prototype (07/26 – 07/27)
- Write user stories and use-case scenarios (07/27 – 07/28)
- Design app architecture and screen flow diagrams (07/28 – 07/29)
- Begin low-fidelity wireframing (07/30 – 07/31)

Epic 3: UI/UX Design & Branding (August 01 – August 07)
Tasks:
- Create high-fidelity wireframes in Figma (08/01 – 08/03)
- Apply branding elements (color scheme, typography, logo) (08/03 – 08/04)
- Add interactivity and navigation between screens (08/04 – 08/06)
- Perform internal user testing and refine design (08/06 – 08/07)

Epic 4: Feature Integration & Logic Design (August 01 – August 10)
Overlaps with UI Design to allow parallel development planning.
Features:
- Dynamic Tow-Zone Alerts (real-time updates)
- Interactive Map-Based Parking Suggestions
- Notification System for Pre-Tow Warnings
- Chat Support for Post-Tow Assistance

Tasks:
- Simulate logic for features (no-code backend planning or logic mapping)
- Connect feature flows with UI elements
- Validate functional consistency with user stories

Epic 5: Finalization & Prototype Delivery (August 08 – August 10)
Tasks:
- Finalize prototype screens and flow
- Cross-check for usability, branding, and consistency

- Package the final clickable prototype for submission

Epic 6: Presentation & Pitch (August 11 – August 17)
Tasks:

- Prepare pitch deck and walkthrough video (08/11 – 08/13)
- Conduct mock presentations and refine based on feedback (08/14 – 08/16)
- Present final prototype and business concept (08/17)