

Requirements Specification for HawkerGo

1. Target Users

Primary Users

- Local residents seeking hawker center recommendations
- Tourists exploring local food culture
- Time-conscious diners wanting to avoid crowds
- Regular hawker center patrons seeking rewards

Secondary Users

- Hawker stall owners
- System administrators

2. Functional Requirements

FR1: User Management

- FR1.1: Users shall be able to create accounts using email or social login
- FR1.2: Users shall be able to set and update food preferences
- FR1.3: Users shall be able to view and edit their profile information
- FR1.4: System shall maintain user authentication state using JWT

FR2: Recommendation System

- FR2.1: System shall generate personalized hawker center recommendations based on:
 - User's past visits
 - Ratings history
 - Stated preferences
 - Current location
- FR2.2: System shall update recommendations in real-time based on:
 - Current crowd levels
 - Operating hours
 - Weather conditions

FR3: Crowd Monitoring

- FR3.1: System shall display real-time crowd levels using:
 - LTA DataMall API data
 - User-reported data
- FR3.2: Users shall be able to report current crowd levels
- FR3.3: System shall validate crowd reports using multiple data points

FR4: Navigation

- FR4.1: System shall display available transport options including:
 - Walking directions
 - Public transport routes
 - Available taxis
- FR4.2: System shall provide estimated arrival times for each transport option

FR5: Virtual Queue Management

- FR5.1: Users shall be able to join virtual queues
- FR5.2: System shall provide real-time queue position updates
- FR5.3: System shall send notifications when user's turn approaches
- FR5.4: Stall owners shall be able to manage their virtual queue

FR6: Digital Menu Management

- FR6.1: System shall maintain digital menus for participating stalls
- FR6.2: Stall owners shall be able to update their menus
- FR6.3: Users shall be able to view menus with prices and availability

FR7: Loyalty Program

- FR7.1: System shall track user visits and purchases
- FR7.2: System shall award points based on activity
- FR7.3: Users shall be able to redeem points for rewards

3. Non-Functional Requirements

NFR1: Performance

- NFR1.1: App shall load within 3 seconds on 4G networks
- NFR1.2: Recommendations shall update within 1 second
- NFR1.3: System shall handle 100,000 concurrent users

NFR2: Security

- NFR2.1: All API calls shall use HTTPS
- NFR2.2: User passwords shall be hashed using bcrypt
- NFR2.3: JWT tokens shall expire after 24 hours

NFR3: Reliability

- NFR3.1: System shall maintain 99.9% uptime
- NFR3.2: Data backups shall occur every 6 hours
- NFR3.3: System shall handle API failures gracefully

NFR4: Usability

- NFR4.1: App shall be accessible on iOS and Android
- NFR4.2: UI shall follow platform-specific design guidelines
- NFR4.3: App shall support English, Chinese, Malay, and Tamil

4. Data Dictionary

Term	Description
Hawker Center	A communal dining venue regulated by NEA, characterized by multiple independent food stalls, shared seating areas, and affordable food options. It serves as both a cultural institution and daily dining destination, featuring diverse local cuisines, standardized hygiene practices, and established operating patterns. Each center has its unique identity, crowd patterns, peak hours, and community significance.
User	An individual interacting with the HawkerGo system, encompassing both diners and stall owners. Users maintain digital profiles that include dietary preferences, historical interactions, loyalty status, and behavioral patterns. They contribute to the ecosystem through reviews, crowd reporting, and queue participation, while building a personalized experience through their interactions and preferences.
Stall	An independent food business within a hawker center, characterized by its cuisine type, operating hours, pricing structure, and queue management system. Each stall maintains its unique menu, pricing strategy, and customer base while operating under the hawker center's regulations. Stalls may participate in digital ordering, queue management, and loyalty programs through the platform.
Crowd Level	A real-time metric indicating the occupancy and busyness of a hawker center, derived from multiple data sources including user reports, historical patterns, and nearby transport data. It accounts for seating capacity, time of day, weather conditions, and special events, providing users with actionable insights for visit planning.
Queue	A virtual waiting list system that manages customer order sequence at popular stalls. It incorporates party size, estimated wait times, current serving status, and notification

	systems. The queue system maintains historical data for wait time predictions while adapting to real-time conditions such as preparation delays or capacity changes.
Loyalty Program	A reward system that incentivizes user engagement and regular patronage through points accumulation and tier-based benefits. It encompasses visit frequency, spending patterns, special promotions, and reward redemption options while fostering long-term user retention and stall support.
Review	User-generated feedback about hawker centers or specific stalls, including ratings, written comments, and optional photos. Reviews capture food quality, value, service experience, and ambiance, contributing to the collective knowledge base while influencing recommendations and helping maintain quality standards.
Navigation	A comprehensive travel planning feature that combines multiple transport options, real-time conditions, and accessibility considerations to guide users to hawker centers. It incorporates walking routes, public transport schedules, taxi availability, and parking information while considering factors like weather and peak hours.
Menu	A digital catalog of items available at a stall, including prices, descriptions, dietary information, and availability status. Menus reflect the stall's specialties, price ranges, and seasonal offerings while helping users make informed dining decisions.
Notification	A system-generated message alerting users about queue status, crowd levels, nearby promotions, or loyalty rewards. Notifications are context-aware, considering user preferences, location, and past behavior to deliver relevant and timely information.

Terms and Definitions

- Crowd Level: Enumerated value indicating occupancy (Low/Medium/High)
- Queue Status: JSON object containing current queue length and wait time
- GeoPoint: Coordinate pair representing latitude and longitude
- JWT: JSON Web Token used for authentication
- LTA DataMall: Land Transport Authority API providing transport data

- Virtual Queue: Digital waiting list system for stalls