**Product Requirements Document (PRD)**

**Project Title:** SmartCart — A GenAI-Powered Multi-Agent Personalized E-Commerce Platform

**Hackathon Theme:** Hack the Future: A Gen AI Sprint Powered by Data  
**Problem Statement Chosen:** Smart Shopping: Data and AI for Personalized E-Commerce

**1. Overview**

SmartCart is a GenAI-powered, multi-agent e-commerce system designed to deliver hyper-personalized product recommendations. It utilizes intelligent agents (Customer Agent, Product Agent, Recommendation Agent, Persona Generator) to interpret user behavior, preferences, and psychographics for tailoring every aspect of the online shopping experience.

**2. Objectives**

* Create hyper-personalized shopping experiences.
* Use GenAI to generate customer personas and product storytelling.
* Utilize mood, behavior, and psychographics for tailored recommendations.
* Support voice search and conversational assistants.
* Provide analytics around mood trends, product categories, and recommendation performance.

**3. Key Features**

**Core Features:**

* **Persona Generation:** From demographics and behavior using Gemini API.
* **Mood Selection:** User mood influences recommendations.
* **Recommendation Engine:** Based on persona traits and psychographics.
* **Product Storytelling:** AI-generated creative descriptions.
* **Explainable Recommendations:** Human-readable reasons why products are recommended.
* **Voice-Based Search:** Natural voice queries mapped to product suggestions.
* **Conversational Assistant:** GenAI chat agent answering shopping queries.
* **Behavior Tracking:** Tracks interactions and mood changes.

**Bonus Features:**

* **Psychographic Match %:** Displayed for each product.
* **Shopping List & Analysis:** Save, view, and analyze shopping behavior.
* **Analytics Dashboard:** Mood trends, category engagement, and shopping insights.

**4. System Architecture**

**Agents:**

* **Customer Agent:** Handles profile generation and behavior logging.
* **Product Agent:** Enhances metadata and storytelling.
* **Recommendation Agent:** Calculates match % and explains suggestions.
* **Persona Generator Agent:** Synthesizes traits from customer data.

**Backend:**

* **Framework:** FastAPI
* **Database:** SQLite (long-term memory and session persistence)
* **AI Integration:** Gemini API

**Frontend:**

* **Framework:** React + Vite
* **Styling:** TailwindCSS
* **Deployment:** Vercel (Frontend), Render/Railway (Backend)

**5. API Endpoints**

* /generate\_persona
* /recommend\_products
* /product\_storytelling
* /submit\_behavior
* /get\_mood\_recommendations
* /chat
* /shopping-lists/, /shopping-lists/{list\_id}/items/, /shopping-lists/{list\_id}/analysis
* /analytics/shopping-patterns, /analytics/mood-trends, /analytics/categories, /analytics/recommendations

**6. Dataset Information**

* **customer\_data\_collection.csv**
* **product\_recommendation\_data.csv**
* Columns extended to include mood, match %, product storytelling, etc.

**7. UI Flow Summary**

1. **Landing Page:** Hero banner + login or user ID entry.
2. **Persona Sidebar:** Displays mood picker, persona traits.
3. **Product Listings:** Show recommendations with match %, storytelling, and explainability.
4. **Voice Search:** Converts speech to product queries.
5. **Chat Assistant:** Floating bot for conversation + help.
6. **Shopping List:** Manage personalized lists + analyze them.
7. **Analytics:** Displays behavioral insights and trends.

**8. Deliverables**

* Full backend with FastAPI and SQLite.
* Deployed frontend integrated with backend.
* GenAI-based features live (persona, storytelling, chat).
* Sample UI for hackathon demo.
* Complete PRD, demo script, and deployment link.

**9. Success Criteria**

* All endpoints functional and connected.
* Multi-agent coordination works.
* Persona generation + mood flow affects recommendations.
* Judges can test the platform end-to-end.
* Bonus features are implemented and demonstrated.