Supermarket Product Association & Layout Optimization

Requirements Document

Project Overview

Client: New Supermarket Owner
Project Goal: Implement a product association analysis system to optimize store layout and create promotional combo offers to increase customer satisfaction and recurring visits.

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1. Business Requirements

1.1 Primary Objectives

- Increase sales through optimal physical product placement

- Create promotional combo offers based on product associations

- Improve customer shopping experience by placing related products together

1.2 Success Metrics

- Increased customer satisfaction

- Higher customer retention and recurring visits

- Improved shopping experience (customers finding related products easily)

1.3 Project Constraints

- **Budget:** Limited

- **Timeline:** 1-3 weeks for implementation

- **Technology:** Must integrate with future POS/inventory systems

- **Data Source:** Qloo API for product associations

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2. Technical Requirements

2.1 Data Requirements

- **Primary Data Source:** Qloo API

- **Product Scope:** Daily usage grocery items

- **Customer Segmentation:** Equal treatment for all customers

- **Update Frequency:** Weekly insights and recommendations

2.2 Integration Requirements

- Must be integrable with future POS systems

- Must be integrable with future inventory management systems

- API-based architecture for flexibility

2.3 Output Requirements

- Specific shelf placement recommendations

- Weekly recommendation reports

- Combo offer suggestions

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3. Functional Requirements

3.1 Core Features

1. **Product Association Analysis**
   - Integrate with Qloo API to get product correlation data
   - Analyze daily usage grocery items
   - Generate association strength scores

2. **Layout Optimization Engine**
   - Convert associations into specific shelf placement recommendations
   - Consider store layout flexibility (no fixed constraints)
   - Optimize for customer convenience and sales

3. **Combo Offer Generator**
   - Create promotional bundle suggestions based on associations
   - Generate weekly combo offer recommendations

4. **Reporting System**
   - Weekly recommendation reports
   - Clear, actionable shelf placement instructions
   - Combo offer suggestions with rationale

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4. User Stories

Epic 1: Product Association Analysis

US001: As a supermarket owner, I want to analyze product associations so that I can understand which items customers typically want together.

Acceptance Criteria:

- System integrates with Qloo API successfully

- System can retrieve association data for daily grocery items
- System displays association strength between products
- System updates associations weekly

US002: As a supermarket owner, I want to focus on daily usage grocery items so that I can optimize my core product categories.

Acceptance Criteria:

- System filters for daily usage grocery categories only
- System excludes non-relevant product categories
- System maintains a configurable list of daily grocery items

Epic 2: Layout Optimization

US003: As a supermarket owner, I want specific shelf placement recommendations so that I can physically arrange products to increase sales.

Acceptance Criteria:

- System provides specific product placement suggestions (e.g., "Place coffee next to cookies")
- Recommendations are clear and actionable
- System considers store layout flexibility
- Recommendations are updated weekly

US004: As a supermarket owner, I want to arrange products based on customer preferences so that customers can find related items easily.

Acceptance Criteria:

- System places strongly associated products in close proximity
- System provides rationale for each placement recommendation
- System optimizes for customer convenience
- Layout suggestions improve shopping experience

Epic 3: Promotional Combo Offers

US005: As a supermarket owner, I want combo offer suggestions so that I can create attractive bundles that increase average transaction value.

Acceptance Criteria:

- System generates weekly combo offer recommendations
- Suggestions are based on strong product associations

- System provides bundle pricing suggestions

- Offers are practical and attractive to customers

Epic 4: Reporting and Insights

US006: As a supermarket owner, I want weekly reports so that I can stay updated on changing customer preferences and adjust my store accordingly.

Acceptance Criteria:

- System generates weekly recommendation reports

- Reports include shelf placement changes

- Reports include new combo offer suggestions

- Reports are easy to understand and implement

US007: As a supermarket owner, I want the system to integrate with my future POS system so that I can scale my operations without changing the recommendation engine.

Acceptance Criteria:

- System architecture supports API integration

- System can accept sales data from external sources

- System maintains data compatibility standards

- Integration doesn't disrupt existing functionality

5. Non-Functional Requirements

5.1 Performance Requirements

- Weekly report generation within 24 hours

- API response time under 5 seconds

- System availability 99% uptime

5.2 Scalability Requirements

- Support for growing inventory (up to 10,000 products)

- Ability to integrate with multiple data sources

- Expandable to multiple store locations

5.3 Usability Requirements

- Intuitive interface for viewing recommendations

- Clear, actionable instructions

- Minimal technical knowledge required for implementation

5.4 Security Requirements

- Secure API key management for Qloo integration

- Data encryption for sensitive business information

- Access control for recommendation system

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6. Acceptance Criteria Summary

Phase 1: Core Implementation (Week 1-2)

☐ Qloo API integration functional
☐ Basic product association analysis working
☐ Initial shelf placement recommendations generated
☐ Simple reporting mechanism in place

Phase 2: Enhancement (Week 2-3)

☐ Weekly automated report generation
☐ Combo offer suggestions implemented
☐ Basic integration framework ready
☐ User interface for viewing recommendations

Phase 3: Validation (Week 3)

☐ System tested with sample grocery data
☐ Recommendations validated for practicality
☐ Documentation completed
☐ Integration readiness confirmed

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7. Deliverables

1. **Product Association Analysis System**
   - Qloo API integration

   - Daily grocery item focus

   - Weekly update mechanism

2. **Layout Recommendation Engine**
   - Specific shelf placement suggestions

   - Store layout optimization

   - Customer convenience optimization

3. **Combo Offer Generator**

- Weekly promotional bundle suggestions

- Association-based recommendations

4. **Reporting Dashboard**
    - Weekly recommendation reports

    - Clear implementation instructions

    - Progress tracking

5. **Integration Framework**
    - API-ready architecture

    - Future POS system compatibility

    - Scalable design

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8. Success Measurement

Immediate Success Indicators

- System generates actionable shelf placement recommendations

- Weekly reports are delivered on schedule

- Combo offers are practical and implementable

Long-term Success Indicators

- Improved customer satisfaction scores

- Increased customer retention rates

- Enhanced shopping experience feedback

- Successful integration with future systems

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9. Risk Assessment & Mitigation

Technical Risks

- **Qloo API limitations:** Validate API capabilities early

- **Integration complexity:** Design simple, flexible architecture

- **Timeline pressure:** Focus on MVP features first

Business Risks

- **Budget constraints:** Prioritize essential features

- **Implementation complexity:** Provide clear, step-by-step instructions

- **Market validation:** Test recommendations with sample scenarios

10. Project Timeline

Week 1:

- Qloo API integration setup
- Basic association analysis implementation
- Initial recommendation engine

Week 2:

- Shelf placement recommendation refinement
- Combo offer generator development
- Basic reporting system

Week 3:

- System testing and validation
- Documentation completion
- Integration framework finalization
- Handover and training