

Cart Analysis System for Myph – System Design Document

1. Introduction

In modern e-commerce systems, cart analysis plays a vital role in understanding consumer behavior, purchase patterns, and inventory management. Myph, a smartphone brand, has introduced a new product line that requires an efficient cart analysis system to manage product selections, pricing, stock levels, and category hierarchies.

The proposed system aims to: Organize products into structured categories. Enable category-based retrieval of products. Facilitate consumer behavior analysis through cart monitoring. Ensure data consistency and fault recovery in e-commerce transactions.

2. Problem Statement

Myph's existing cart management lacks proper product categorization, making it difficult to: Retrieve products under specific categories. Track consumer purchase behavior or detect unusual cart patterns. Maintain accurate stock levels and handle transaction rollbacks.

3. Objectives

1. Design a data model that efficiently represents product details and their relationships within categories.
2. Enable category-based product retrieval for easy browsing and filtering.
3. Implement cart analysis for understanding consumer purchase patterns.
4. Detect outlier or surplus selections in shopping carts.
5. Evaluate relational databases for e-commerce transaction reliability.
6. Support rollback and recovery mechanisms in case of system failure.
7. Provide insights for marketing and inventory decision-making.

4. System Requirements

Hardware: Intel Core i3+, 4GB RAM minimum, 250GB storage, Internet connection.

Software: MySQL/PostgreSQL/MongoDB, Python/Java/Node.js, Apache or XAMPP, Visual Studio Code.

Functional Requirements: Product categorization, cart operations, transaction management, outlier detection.

Non-Functional Requirements: Reliability, scalability, security, performance, and usability.

5. System Analysis

Existing system issues: unstructured data, lack of analytics, weak recovery. The proposed system introduces a hybrid model with real-time tracking and recovery mechanisms.

Advantages include efficient organization, improved analytics, and reliable ACID transactions.

6. System Design

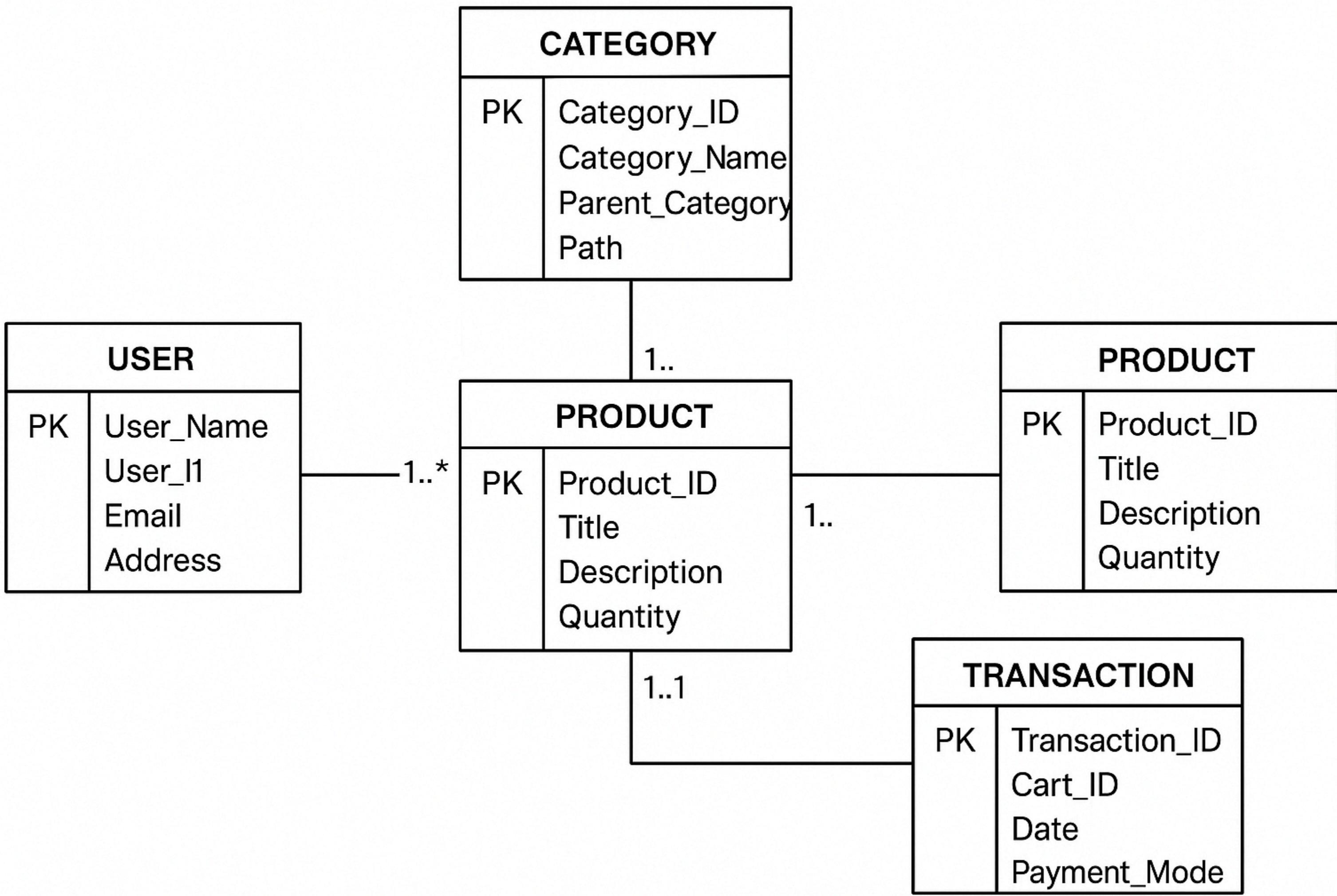
Hybrid architecture combining relational and document databases.

Entities: User, Category, Product, Cart, Transaction.

Relationships: User → Cart (One-to-Many) Cart ↔ Product (Many-to-Many) Product → Category (Many-to-One) Cart → Transaction (One-to-One)

Process Flow:

1. User browses products by category.
2. Adds to cart.
3. System records selections.
4. Checkout triggers transaction.
5. Database enforces ACID.
6. Recovery/rollback on failure.



Normalization: Schema follows 3NF — atomic values, full functional dependency, no transitive dependency.

7. Conclusion

The proposed Cart Analysis System for Myph ensures structured categorization, reliable transactions, scalable analytics, and enhanced consumer experience. It forms the basis for intelligent marketing, inventory management, and e-commerce optimization.