

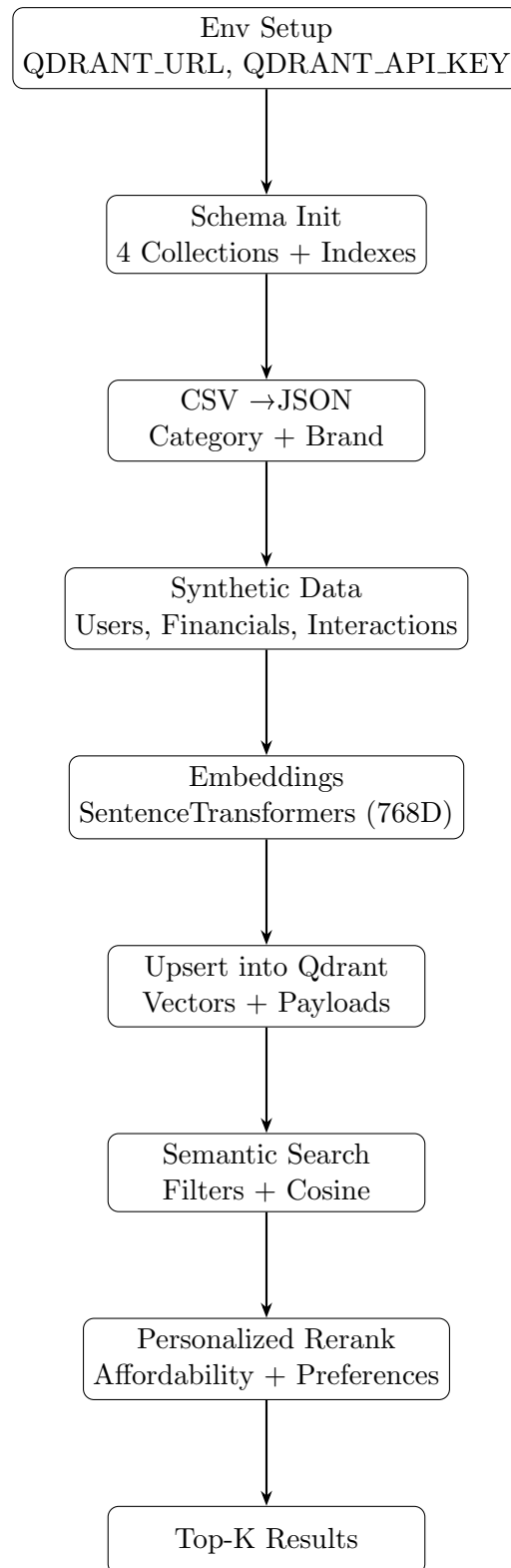
Context-Aware FinCommerce Pipeline

January 21, 2026

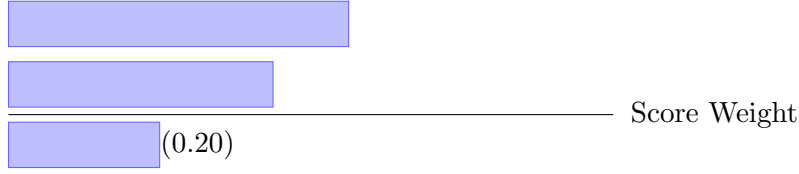
Overview

This report summarizes the end-to-end Context-Aware FinCommerce Recommendation Pipeline, including schema setup, data generation, vector insertion, and semantic search with reranking.

Pipeline Diagram



Score Contribution Visualization



Core Scoring Formula

$$\text{final_score} = 0.45 s_{\text{semantic}} + 0.35 s_{\text{afford}} + 0.20 s_{\text{pref}}$$

$$s_{\text{afford}} = \begin{cases} 0, & \text{if available_balance} \leq 0 \\ \max\left(0, 1 - \frac{\text{price}}{\text{available_balance}}\right), & \text{otherwise} \end{cases}$$

$$s_{\text{pref}} = \max(\mathbb{I}[\text{category} \in \text{preferred_categories}], \mathbb{I}[\text{brand} \in \text{preferred_brands}])$$

Key Collections

- **products_multimodal** (768D): price, category, brand, in_stock, region
- **user_profiles** (768D): location, risk_tolerance
- **financial_contexts** (256D): available_balance, credit_limit, eligible_installments
- **interaction_memory** (768D): user_id, purchased

Execution Summary

1. Setup Qdrant collections and payload indexes.
2. Transform transactional CSV into product JSON payloads.
3. Generate synthetic user, financial, and interaction data.
4. Generate 768D embeddings using SentenceTransformers for text fields.
5. Upsert all points into Qdrant.
6. Query using semantic similarity with price and stock filters.
7. Rerank by affordability and preferences.
8. Return top- k ranked products.