Say Yes to the Dress

Powering Pricing Decisions with Knowledge Graph

Macy's Team: Taimoor Khawaja, Uma Kandaswamy
Faculty Advisor: Mohammad Fazel Zarandi

Ariella Nelson

Maya Nesen

Problem Statement

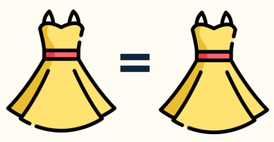
Currently, Macy's has:
1. No method to quickly identify similar products
2. No way to see what specific product attributes drive sales

→ **Sub-optimal Assortment Planning** →

Approx. **5%** of last year's inventory remained unsold

Approx. **$200M loss** estimated from liquidating last year's inventory

Our Solution



Build a tool to **quickly identify similar products**

+

Build a **knowledge graph** to **surface attributes tied to sales**

=

Empower **smarter pricing** and **assortment decisions**

Data

4K Dresses (in our sample)

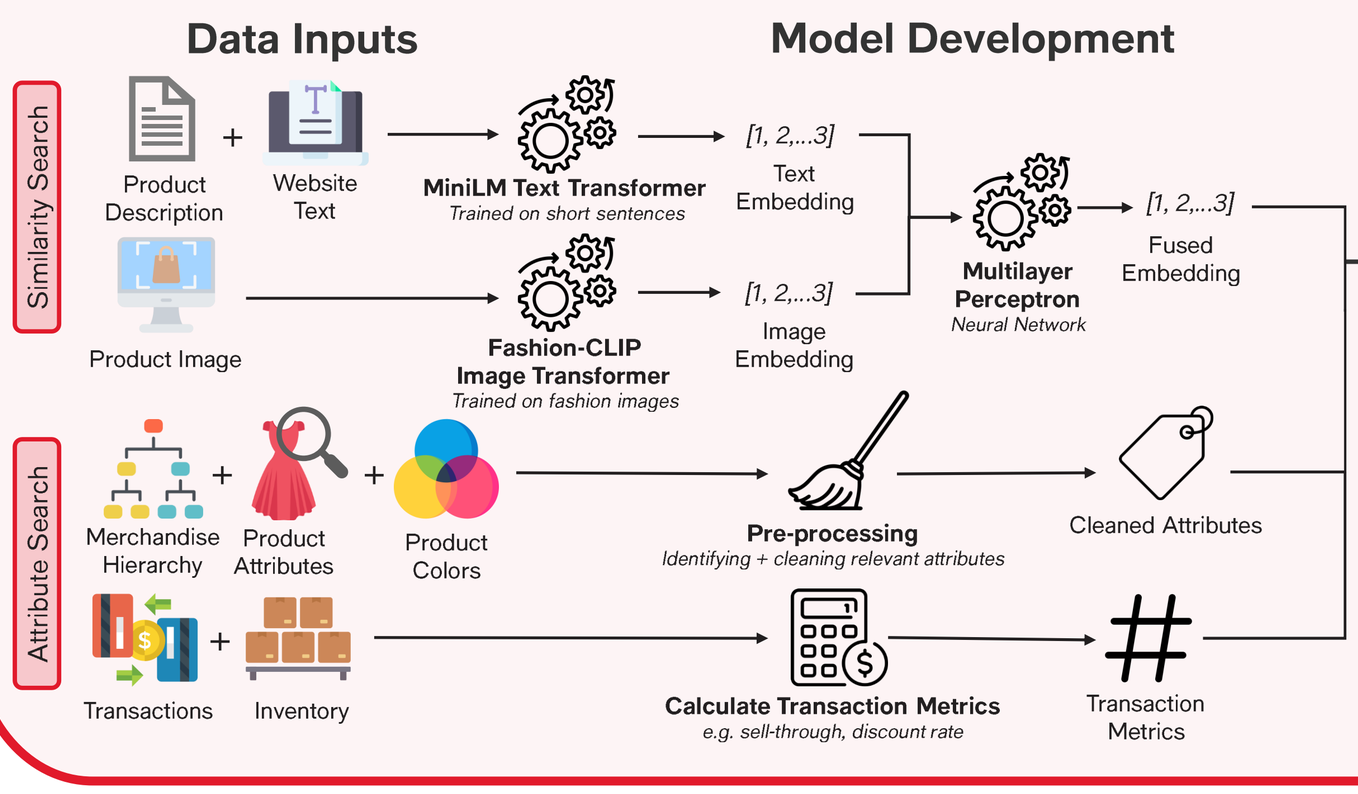
368 Distinct Attribute Values

306M Items Purchased (in the last year)

Text Descriptions · **Attributes** (Fabric, Style...) · **Product Colors** · **Inventory**

Product Images · **Website Text** · **Merchandise Hierarchy** · **Transactions**

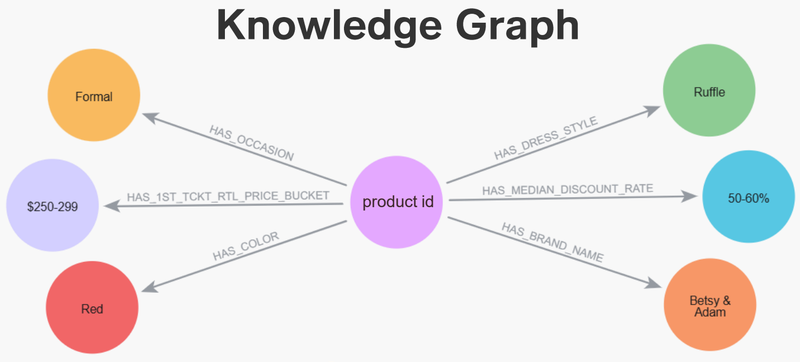
Methodology



Results

Bottom dresses have poor sell-through & lower price → Drop from assortment

Knowledge Graph

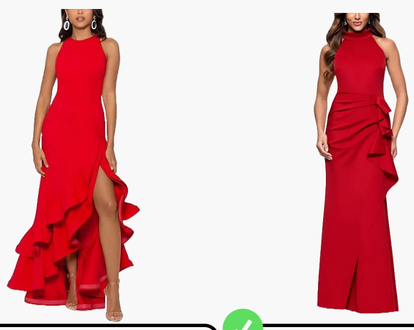


4.4K product + attribute nodes

100K relational edges

- ★ Easily find and visualize product-attribute relationships
- ★ Vector embeddings + graph attributes create refined similarity sets
- ★ Similarity sets + transaction metric attributes can be used to adjust the assortment plan

Assortment Decisions



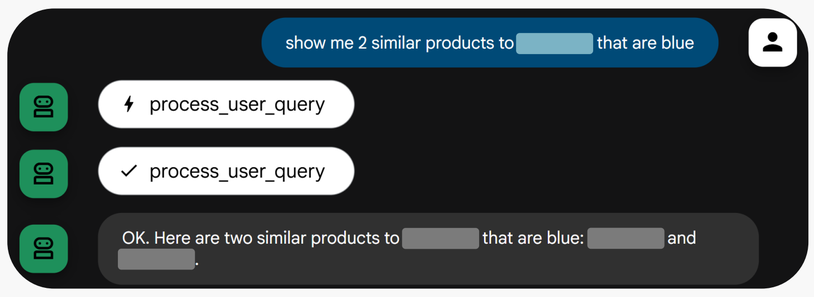
✓ High Price, High Sell-Through

✓ High Price, High Sell-Through

✗ Low Price, Medium Sell-Through

✗ Medium Price, Low Sell-Through

Business Insights Agent



Retrieves relevant products and attributes from knowledge graph

Generates business insight summaries from query results

15 – 30 seconds to answer

Concept proven

Our chatbot will allow non-technical merchants and assortment planners to use our knowledge graph in decision-making

Expected Number of Users
100-200 across **3+** teams

Business Impact

Multiple Use Cases

Providing Similarity Set Interpretability
Identify what attributes unite or divide a set of similar products

Find High Performing Product Features
Identify attributes that are correlated with strong sales

Compare Similar Products' Performance
Quick comparison of similar products across sales metrics

Once the graph is expanded to more products and location granularity, it's expected to increase net sales by
↑$2.2M

Our model will be integrated into Macy's Hyper Local Assortment Planning Agent, expected to generate
↑$5–10M