VibeMatcher 360 Vision

Semantic Fashion Recommender Report

1. Project Overview

VibeMatcher 360 Vision is an AI-powered fashion recommendation system that interprets natural-language vibe queries and matches them to semantically similar fashion products using OpenAI's text embeddings. The project combines embedding-based similarity search with visual analytics (UMAP) and automatic tag enrichment through clustering to create explainable and intelligent recommendations.

2. Objectives and Methodology

- Generate vector embeddings for product descriptions using text-embedding-ada-002.
- Accept user vibe queries and compute cosine similarity to rank matching items.
- Visualize embedding relationships via UMAP and similarity heatmaps.
- Use K-Means clustering to identify hidden product groupings and suggest new tags.
- Measure latency and similarity quality across multiple queries.

3. Key Results

Three representative vibe queries were tested to evaluate system accuracy and responsiveness:

1. energetic urban chic -> Urban Bomber Jacket (Score: 0.86, Latency: 2.7s)
2. cozy boho weekend -> Boho Dress (Score: 0.78, Latency: 2.1s)
3. minimal workwear sleek -> Chic Midi Skirt (Score: 0.71, Latency: 1.6s)

Average similarity: 0.78 | Average latency: 2.1 seconds

4. Innovation Summary

- UMAP + Heatmap Visualization: Projects product embeddings into a 2D semantic space, allowing for visual analysis of product relationships and stylistic proximity.
- Auto-Tag Generation via Clustering: Utilizes K-Means to automatically suggest new vibe tags based on embedding groupings, enriching product metadata and enabling scalable catalog expansion.

5. Reflection and Future Work

The system demonstrates that semantic embeddings can effectively translate human aesthetic intent into data-driven recommendations. Visualization and clustering enhanced both interpretability and dataset quality. Future improvements include integration with FAISS or Pinecone for large-scale vector search, multimodal image-text embeddings using CLIP, and deployment as a Streamlit or API-based interactive tool.

6. Repository and Author

Project Repository: https://github.com/ramkumar27072006/Vibe-Matcher-360-Vision

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