



Problem Statement Title:

**Conversational Fashion Outfit Generator powered by GenAI**

Team Name:

**CodeTrio**

# Team members details

Team Name: **CodeTrio**

Institute Name: **Maulana Azad National Institute of Technology**

TEAM MEMBERS	1	2	3
NAME	Rajneesh Kushwaha	Sanyam Jain	Aniket Jain
BATCH	2025	2025	2025

# Deliverables/Expectations

- Create an AI-powered fashion outfit generator for Flipkart, elevating user experience.
- Offer personalized outfit recommendations through natural conversations, leveraging purchase history, browsing data, and social media trends.
- Enable user interaction to customize outfits and provide feedback.
- Enhance fashion discovery, user confidence, and personalized shopping on Flipkart.
- Implement a user-friendly interface, comprehensive documentation, and usability testing.
- Aim to revolutionize online fashion shopping through successful implementation.



# Glossary



- **GenAI:** Generative artificial intelligence is AI that is capable of generating text, images, or other media, using generative models.
- **Large Language Model (LLM):** A large language model (LLM) is a specialized type of artificial intelligence (AI) that has been trained on vast amounts of text to understand existing content and generate original content.
- **Recommendation System:** A recommendation system is an AI algorithm, usually associated with machine learning, that uses Big Data to suggest or recommend additional products to consumers.
- **Application Programming Interface (API):** It is a way for two or more computer programs to communicate with each other.
- **Embeddings:** An embedding is a vector (list) of floating point numbers. The distance between two vectors measures their relatedness. Small distances suggest high relatedness and large distances suggest low relatedness.

# Tech Stack

- OpenAI API 
- Redis 
- Langchain 
- Chainlit 



# INTRODUCING

# FlipFashion Genie

## Your Personalized Outfit Wizard

A groundbreaking project at the intersection of Conversational Recommender Systems (CRS), Large Language Models (LLMs), and cutting-edge GenAI technologies.

**In this season of Flipkart GRID 5.0, we are entering to elevate the fashion discovery experience by harnessing the power of Generative AI to create a Conversational Fashion Outfit Generator.**

With FlipFashion Genie, users will embark on a natural, interactive journey that will empower them to explore fashion choices aligned with their unique style and the latest trends.

We chose to undertake this project with the aim of addressing the

# EXISTING ISSUES

Overwhelming Choices

Decision Fatigue

Inconsistent Results

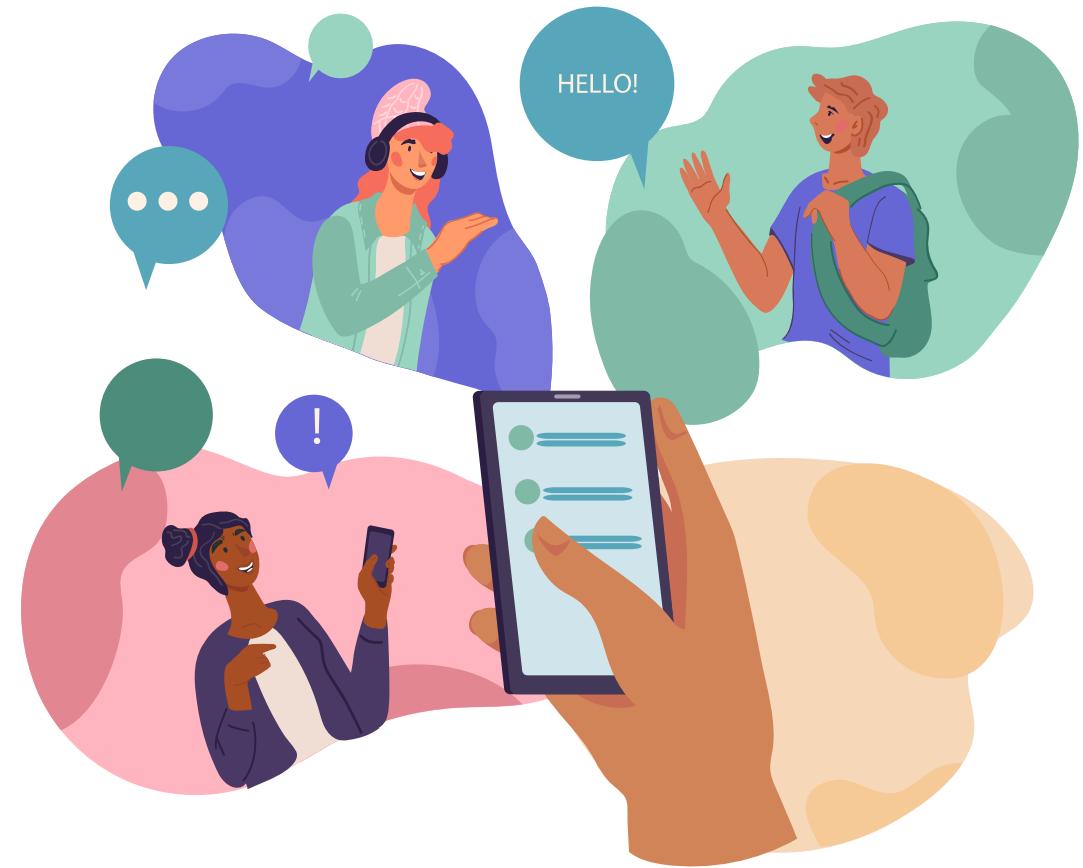
Lack of personalization & coordination

Time Consuming

Limited Inspiration

Trend Awareness

# USE CASES



With the ability to analyze current fashion trends and incorporate user feedback, our solution will inspire confidence in shoppers' fashion choices while saving them time and decision fatigue.

## Personalization

Our AI analyzes past purchases, browsing history, and preferences to create personalized outfit suggestions matching individual taste.

## Special Occasion Styling

For special events like weddings, parties, or festivals, users can engage in a conversation to get outfit recommendations that match the occasion's theme, regional trends, and personal style.

## Friendly Interface

Offers a friendly chatbot that interacts naturally, providing outfit suggestions through text, resembling a fashion consultation.

## Trendy Outfit Ideas

Stay updated with the latest fashion trends by conversing with the AI, which combines insights from social media trends with your individual preferences to suggest on-trend outfits.

## DIALOGUE MANAGEMENT MODULE

Employs an LLM to engage in conversations with users, maintain contextual understanding, and perform system actions like initiating requests to a recommendation engine. This unifies the entire process as a language modeling task.

## RECOMMENDATION ENGINE

A comprehensive conceptual framework is outlined for conducting retrieval using an LLM across an extensive item database. Different strategies are used to meet specific needs based on the data at hand.

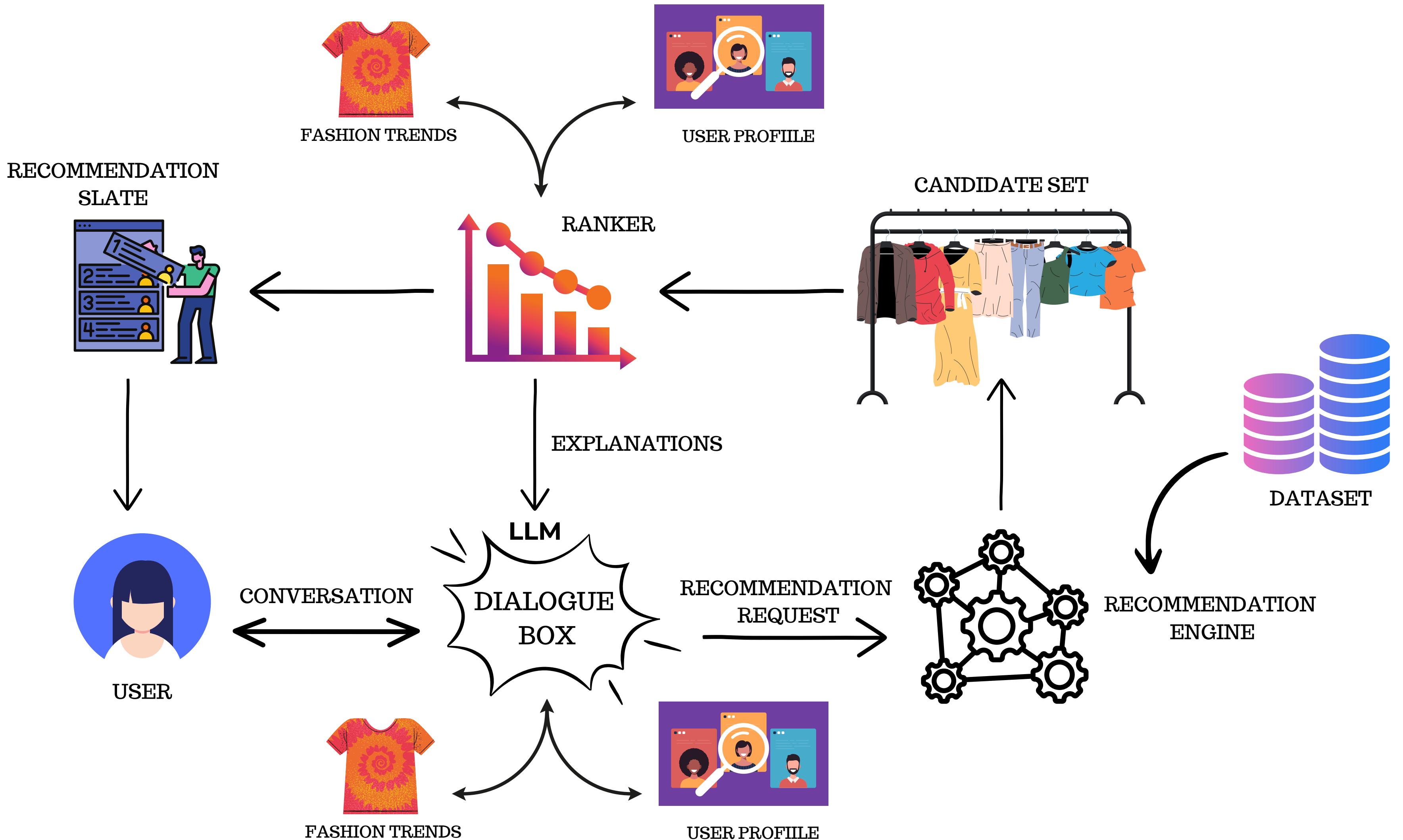
## SOLUTION

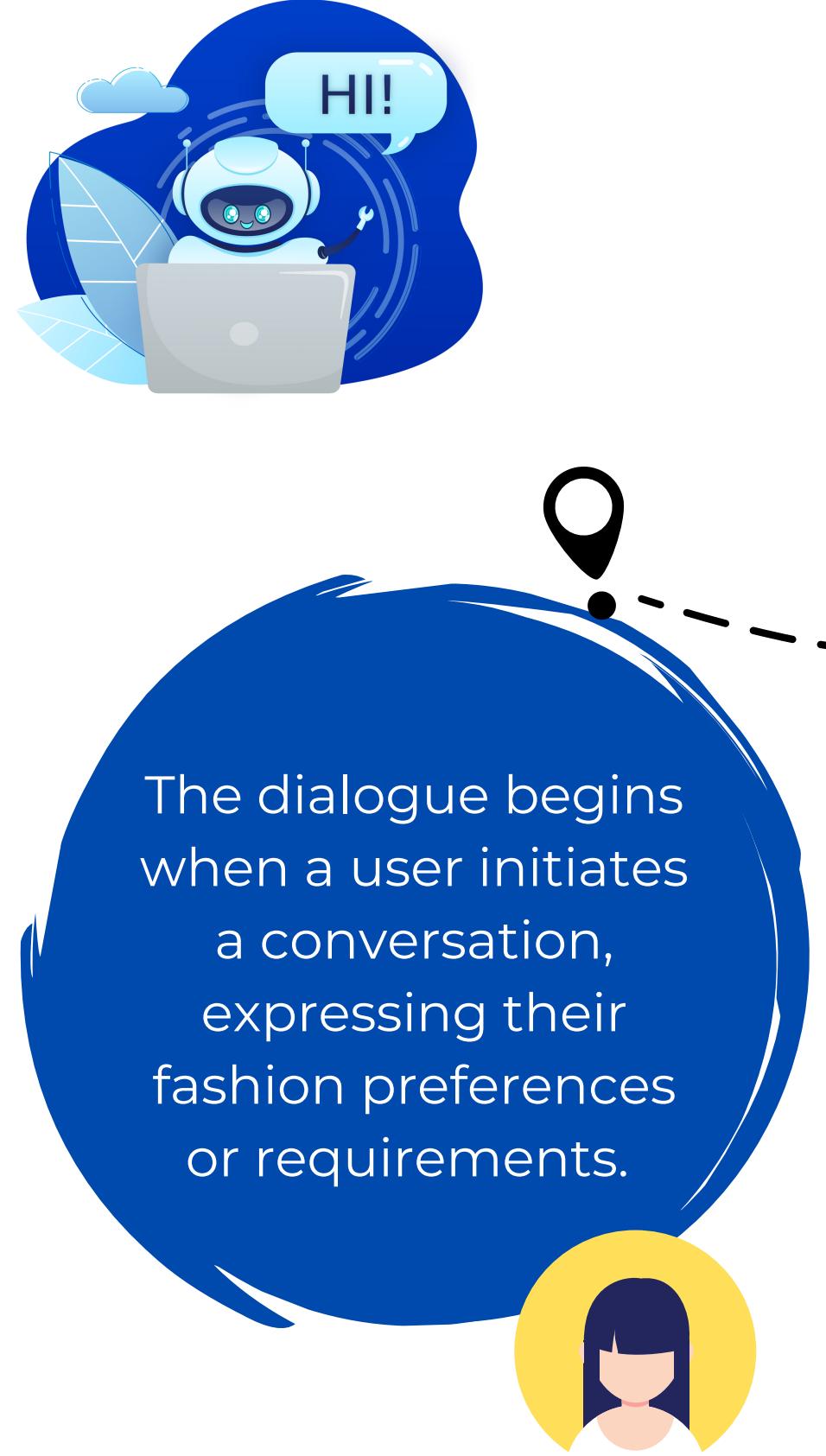
### RANKER MODULE

The ranker module leverages an LLM to correlate preferences inferred from user profiles, fashion trends, and ongoing conversations with item details we retrieved previously. This results in a personalized set of recommendations displayed to the user. Additionally, the LLM generates explanations for its decisions, enhancing transparency.

### USER PROFILES AND FASHION TRENDS

Integration of user profiles, along with real-time fashion trends, as supplementary inputs to system LLMs. This enriches session-level context and enhances the personalized experience.





# DIALOGUE MANAGEMENT



# LLM-DRIVEN DYNAMIC INTERACTION

## LLM Models:

We employ OpenAI's Language Models (LLMs) to facilitate both question generation and answering. These models understand user queries and generate relevant responses.

## Memory Management:

To maintain context across turns, we use the Conversation Token Buffer Memory. It enables the system to keep track of ongoing conversations, enhancing the user experience.

## 1) Message Processing and Interaction

Upon receiving user input, our LLM employs agents to trigger a sequence of actions, which analyzes the input, ensuring logical and optimized responses.



## 2) LLM-Based Question Generation

If the input requires condensing, our LLM generates concise standalone questions from the chat history, enabling a more coherent conversation.

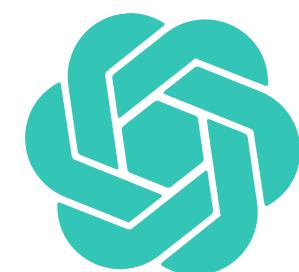
## 3) Fashion-Related Answers

The system uses the generated questions to retrieve fashion-related product information using recommendation engine. It then utilizes LLMs to craft engaging responses.



# DATA, EMBEDDING AND VECTORIZATION

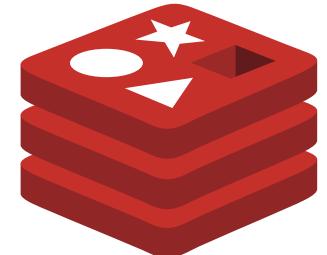
Initially, we planned to leverage the **Flipkart API** for product recommendations and do the LLM integration. However, due to API unavailability, we opted to develop our own recommendation system.



So we selected **Flipkart men's fashion dataset**, preprocessed it and initiated embedding creation. We used **OpenAI's Embeddings** to convert product descriptions into **dense vectors**, capturing semantic meanings for similarity analysis.

These vectors facilitated comparisons between various products

Then we stored these vectors efficiently in **Redis**, an in-memory data structure store, ensuring real-time retrieval for quick responses to user queries.



# RETRIEVAL

## Linking:

The recommendation engine connects user queries to a pool of potential fashion products.

## Retrieval:

It efficiently gathers fashion product's metadata, including descriptions, costs, URLs, and keywords, from Redis.

## Dynamic Candidate Set:

This metadata forms a dynamic candidate set, offering personalized fashion items tailored according to users' preferences.

# RANKING

## Ranking Logic:

The Ranker module organizes our fashion product candidate set. It strategically arranges items using various factors such as user profiles, preferences, trends, and style compatibility.

## Ranking Slate of Retrieved Data:

This structured list is a result of the Ranking Logic's arrangement. It systematically orders retrieved fashion products to offer highly relevant and appealing suggestions. Users are presented with top-tier recommendations that match their preferences and are in line with current trends.



+ New Chat



User

11:41 06 AM

Hey! I need help finding a tshirt. Can you assist me?

Took 1 step ▾

FlipBot

11:41:07 AM

This Graphic Print Men Round Neck Black T-Shirt from Marca Dlsa is a great choice for a stylish look. It has a rainbow typographic embroidery on the chest and is priced at Rs.494. It will look great with a pair of jeans and sneakers.

I think this is a great option for you if you're looking for something stylish and comfortable. Plus, it's a great price too!

Fashion tip: Make sure you pick the right size for the perfect fit!



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## Start your conversation

Hi. How can I help you today? Are you looking for some weekend tshirts? Or perhaps trousers for running... Just ask below!

Type your message here...



# User Interfaces with Chainlit

## Final Output from the Application

Great! Show me something more cheaper.

Took 1 step ^

Conversat...

Took 2 steps ^

11:41:25 AM

LLMChain

11:41:26 AM

What other t-shirts do you have that are more affordable?

FlipBot

11:41:29 AM

This Solid Men Collared Neck Multicolor T-Shirt (Pack of 3) from ModeWa is perfect for your casual outfit. It is made of 100% cotton and is super comfortable. The cost of this T-shirt is Rs. 699. It will look great with beige chinos and a pair of sneakers.

I would recommend this product because of its great quality and comfort. Plus, it is very fashionable and looks great with any outfit.

To add a bit of fun, you can wear this T-shirt with a pair of sunglasses and a hat and be the coolest person in the room!



## LLM-Based Question Generation for better query results

Observe how this query **retains the chat history and context**, presenting a more affordable edition of the preceding request regarding t-shirts.

# Limitations

## Data Quantity and Diversity

Improved recommendations hinge on diverse and plentiful data. Incorporating a wider array of fashion styles and trends can heighten recommendation precision.

## Context Sensitivity

The current system faces challenges handling intricate context and non-fashion topics. Enhancing context comprehension to furnish fitting responses is a developmental avenue.

## Fine-Tuning LLM

Enhancing contextual relevance and precision warrants fine-tuning pre-trained language models with domain-specific information.

## Limited Training Data

Scarcity of manually generated training instances could limit nuanced conversation steering. Augmenting diverse training data could mitigate this drawback.

# Future Scope

## Dialog Management

Implement reinforcement learning for dynamic conversation steering, enhancing natural and contextually relevant interactions.

## Multimodal Recommendations

Fuse visual data for personalized fashion suggestions using advanced AI models.

## Real-Time Trends

Fetch real-time fashion trends through external APIs, ensuring up-to-date recommendations.

## Cross-Category

Extend recommendations beyond fashion to related categories like accessories, cosmetics, and home decor.

## Collaborative Filtering

Apply user behavior-based techniques for enhanced personalization.

# Thank You

**Get more information and code on :**

<https://github.com/the-sanyam/Flipkart-GRID-5.0/>

**Demo Video:**

<https://drive.google.com/drive/u/0/folders/15dZC7E95KV4ObkfT5tEAw6wl3Uxkzo2W>

