# AASD4016 FULL STACK DATA SCIENCE SYSTEMS

# Fashion Recommendation System & AI Stylist

## Final Project Report



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**Problem Statement:**

When shopping for fashion items online, consumers often experience an overwhelming number of choices, leading to "choice overload." This extensive array of options can result in decision fatigue, making it challenging for shoppers to select items confidently. Furthermore, consumers frequently struggle to pair clothing and accessories together effectively, which complicates the process of creating cohesive and satisfying outfits.

**Why This Problem:**

Our machine learning product addresses these issues by providing personalized recommendations tailored to individual user preferences. Utilizing advanced algorithms such as k-nearest neighbors, ResNet50, and Gemini, our product simplifies the selection process by reducing decision fatigue.

Additionally, it supports in the creation of cohesive outfits, thereby enhancing user satisfaction. This streamlined approach not only boosts the confidence of shoppers with style-matched choices but also enriches the overall shopping experience.

**Competitors:**

Stitch Fix and Trunk Club are notable competitors in personalized fashion recommendations, while StyleMe enhances its offerings with deep learning and 3D modeling. To distinguish our project from competitors like StyleMe, we aim to advance our use of machine learning algorithms and introduce innovative features.

**ML Canvas:**


*Figure 1: ML Canvas*

**Model Evaluation:**

The dataset does not include labels or categories, evaluating the recommendation system becomes challenging because we don't have ground truth information to compare the recommendations. Here are some approaches we considered:

+ <u>Embedding Similarity</u>: We compute the cosine similarity between embeddings of recommended items and the query item. We were using other dataset which has more than 5000 images about clothing for evaluation, and the most result scores will fall between 65% to 80% similarity.

+ <u>User Feedback Integration</u>: Integrate user feedback into the recommendation system, such as thumbs-up or thumbs-down buttons, star ratings, or comments. Use this feedback from users to improve the recommendation algorithms.

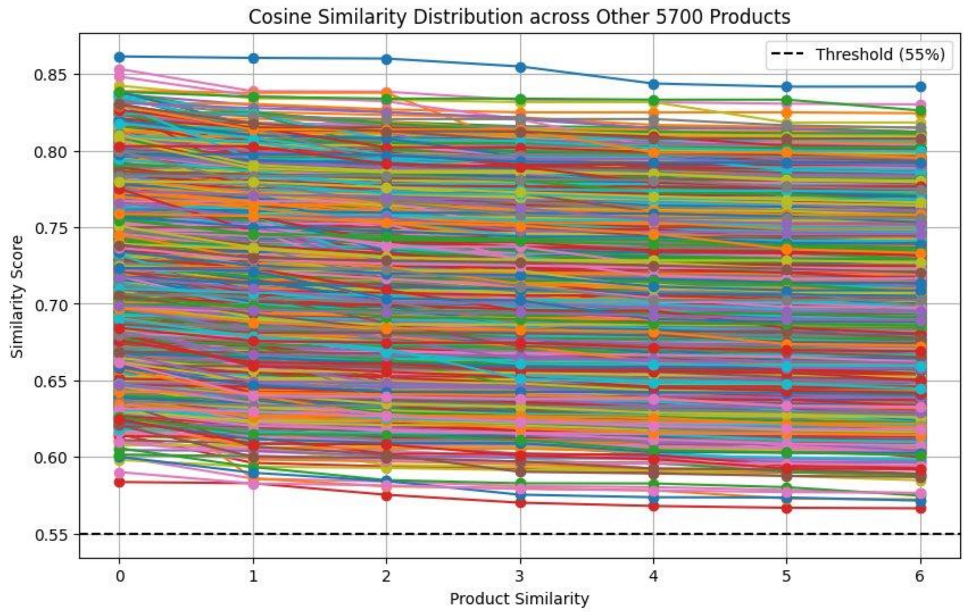


*Figure 2: Evaluation Result*

**Model Deployment:**

We started from building a model on a Jupyter notebook. Next, we converted it into a python script. Utilized Flask API framework and Jinja2 template to provide web service. Then build the docker images on Docker before pushing it to Docker Hub. Next from Docker Hub, we created a VM on GCP which will cost around $10 per month to store our model on cloud.

**Challenges:**

We were facing a problem with evaluation methods. However, by launching the products, we can enhance our recommendation system by using feedback from our users. AI Stylist Decision will support users to get general decisions from the AI, however, the final decision would be from the users not the AI Decision. Deployment phase also faced a problem as our dataset has tons of quality images, so it takes a lot of time to deploy to docker and to cloud.

**What's next?**

We plan to start by recommending products based on selected item features. In the next step, we aim to integrate user preferences for Personalized Recommendations. We also plan to develop a chatbot using pretrained models to enhance user interaction. Our current model handles basic dataset features, but we are willing to build a complex deep learning model to handle more complex images from users.