Outfit Assistant

TEAM 13
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1.INTRODUCTION

1.1 Overview

Fashion Trends

In a world driven by ever-evolving fashion trends and an increasing demand for stylish yet functional attire, the apparel industry has witnessed an unprecedented surge in the popularity of sports brands like Nike and Adidas.

The Giants

These global giants have not only become synonymous with athletic performance but have also cemented their status as fashion staples for individuals of all walks of life.

Inherent Challenges

Today, as we embark on a journey to introduce a novel solution, we aim to address the inherent challenge of finding the perfect outfit from these iconic brands.

1.2 The Fashion Conundrum

- Selecting the ideal ensemble from Nike and Adidas, which offer an extensive range of products spanning athletic wear, streetwear, and everything in between, can be a daunting task

- With countless options available, consumers often find themselves overwhelmed, spending hours sifting through catalogs and websites to find the perfect match.

1.3 The MVP

- The Minimum Viable Product (MVP) that we are introducing is a chatbot-driven recommendation system designed to assist users in curating the perfect outfits from Nike and Adidas.

- This intelligent chatbot will serve as a virtual fashion assistant, offering tailored outfit suggestions, product recommendations, and style advice.

Outfit Assistant

01

Personalized recommendation: Outfit Assistant will under stand the users style prefrences throught interactive conversations and provide outfit recommendations that align with their individuals tastes.

02

Seamless intergration: users can easily explore and purchase recommended products from Nike and Addidas through direct links, making the shopping process effortless.

03

Style tips and trend: Outfit Assistant will stay with the lastest fashion trends and offer style tips to keep users informed and on-trend.

04

Feedback mechanism: users can provide feedback on the recommendations, helping the chatbot improve its accuracy overtime.

1.4 Purpose

- The primary purpose of the Outfit Assistant is to simplify and enhance the fashion discovery and shopping experience for Nike and Addidas enthusiasts
- Outfit Assistant will empower users to make well-informed and stylish choices, ultimately boosting their confidence and satisfaction

1.5 The Opportunity

- Our project presents an exciting opportunity to streamline this experience and offer a solution that simplifies the outfit selection process for users.
- By harnessing the power of artificial intelligence, we aim to provide an efficient and personalized means for individuals to discover fashion items from Nike and Adidas.

2. PROBLEM

2.1 Challenge

- The MVP for the Outfit Assistant seeks to address the challenge of assisting individuals in choosing stylish and appropriate outfits for various occasions, mitigating the pain points and inefficiencies associated with personal styling decisions

- The Outfit Assistant will provide personalized outfit recommendations to the user based on their preferences, occasion, and income.

2.2 Pain Points and Inefficiencies

Fashion Overwhelm

- Consumers face an overwhelming array of fashion choices, from clothing styles to color combinations, making it difficult to create outfits that suit their unique preferences and the occasion at hand

Lack of Confidence

- Many individuals lack the confidence to put together stylish outfits, resulting in uncertainty when it comes to personal fashion choices.

Time-Consuming Process

- Creating the perfect outfit can be a time-consuming process, requiring extensive research and experimentation, which is not always feasible for busy individuals.

Occasion-Specific Challenges

- Dressing appropriately for various occasions, such as interviews, parties, or casual outings, can be particularly challenging, as there are no one-size-fits-all solutions.

Sustainability Concerns

- With increasing awareness of sustainability, users may struggle to choose eco-friendly and ethical fashion options that align with their values.

2.3 Competitive Landscape

Fashion Subscription Boxes

Some companies offer subscription services that send curated outfits to users' doors, but these solutions may not fully cater to the user's personal style and preferences

Virtual Stylists

Virtual stylists powered by AI or human fashion experts provide outfit recommendations, but they can be costly and lack real-time assistance for daily fashion decisions

Social Media and Apps

Social media platforms and mobile apps provide fashion inspiration from influencers and celebrities (KOL), but users may find it challenging to replicate these looks with their own wardrobe.

2.4 OUTSTANDING

- The Outfit Assistant aims to stand out by offering a convenient, accessible, and personalized solution for everyday outfit recommendations. It leverages AI and user input to suggest outfits based on individual style preferences, occasion, and even ethical fashion considerations, addressing the pain points associated with the current fashion decision-making process

3. SOLUTION OVERVIEW

3.1 Overview

01
Outfit Assistant proposes an AI-based solution that utilizes deep learning algorithms to provide personalized product recommendations to fashion e-commerce customers.

02
Outfit Assistant will be able to converse with users in a natural language manner, asking them questions about their preferences and interests in order to generate a list of recommended products.

03
Outfit Assistant will also be able to learn from user interactions, adapting its recommendations over time to better match the user's evolving tastes.

04
An additional function is allowing customers to try on clothes virtually without having to physically wear them by using a combination of computer vision and machine learning techniques to simulate how the clothes would fit on the customer’s body.

3.2 AI Model

- Our model uses machine learning techniques to improve its accuracy over time. It allows the chatbot to learn from user interactions and adapt its recommendations to better match the user's evolving tastes.

- Our model has a conversational UI that is easy and enjoyable to use. This will make it easy for users to interact with the chatbot and get the information they need.

3.2 AI MODEL

CHATBOT

Interacting with user and get needed information

VFR-MODEL

Simulate how clothes would fitting on the customer's body

RS-MODEL

Providing personalized size and products recommendations

3.2.1 Chatbot

- Chatbot: The chatbot allows customers to interact with the system in a natural and intuitive way. The chatbot can answer customer questions, provide product recommendations, and even process orders.

- Natural language processing (NLP): The NLP component is responsible for understanding the customer's requests and preferences. It uses a variety of techniques, such as text classification, named entity recognition, and sentiment analysis, to extract relevant information from the customer's conversation.

3.2.2 VRF-Model

- Body Shape Recognition: Employing machine learning algorithms, the AI model accurately estimates the customer's body shape and dimensions based on a single 2D image.

- Garment Simulation: The system can simulate how clothes would fit on the customer's body by draping the models of the garments onto the model of the customer's body.

3.2.3 RS-Model

- Product recommendation system: The recommender system is responsible for presenting the recommended products to users in a way that is both relevant and engaging. It does this by considering factors such as occasions, user preferences, product popularity, and price.

- Size recommendation system: The AI model analyzes the customer's body shape and compares it to the garment's size chart, providing personalized size recommendations for optimal fit.

Technical Novelty

01
Use of artificial intelligence (AI):This is a significant improvement over traditional recommender systems, which are often based on static rules or collaborative filtering.

02
Ability to integrate with other data sources: These models can integrate with other data sources, such as social media and product reviews.

03
Realistic Garment Simulation: AI models can now simulate the intricate behavior of fabrics, drape, and wrinkles, allowing for a more realistic depiction of how garments fit and move on different body types.

04
Personalized Body Models: AI can be used to generate personalized body models from simple 2D images . This allows shoppers to see how garments will fit on their specific body shape.

Fulfillment of business needs

01

Reduced size-related returns: By providing customers with a more accurate understanding of how clothes will fit, virtual fitting rooms can help to reduce the number of size-related returns. This saves retailers money on shipping and handling costs, and it also improves customer satisfaction.

02

Personalization: Outfit Assistant will personalize its recommendations to each individual user. This will ensure that users are only recommended products that are relevant to their interests and needs. It can also help to increase sales.

03

Reduced costs: These models can help businesses to reduce costs by automating tasks, such as customer service and product recommendations. This can free up employees to focus on other tasks.

04

Convenience: Outfit Assiatant is available 24/7 and can be accessed from anywhere, making it a convenient way for users to shop for fashion.

Fulfillment of business needs

05

Data-Driven Insights: AI models can collect and analyze data on user preferences and sizing trends, providing valuable insights for retailers to improve product design, sizing, and inventory management.

06

Engagement: Outfit Assistant will use a variety of engagement techniques to keep users interested and coming back for more. This could include things like asking users questions, providing product recommendations, and offering discounts and promotions.

07

Scalability: Outfit Assistant will be scalable to a large number of users. This will ensure that Outfit Assistant can continue to provide a high-quality experience as the number of users grows.

08

Improved Brand Perception: Retailers that adopt virtual fitting room technology demonstrate their commitment to innovation and customer satisfaction, enhancing their brand image.

4.METHODOLOGIES

4.1 Architecture of structure

- Outfit Assistant is designed to provide fashion product recommendations using data from Nike & Adidas. It utilizes a combination of natural language processing (NLP) and machine learning techniques to understand user preferences and suggest relevant fashion items available on Nike & Adidas.
- In addition, this model also uses computer vision to simulate the user’s body and products from Nike and Adidas for virtual fitting

4.1 Architecture of structure

4.1 Architecture of structure

There are 3 key components of Outfit Assistants's structure:

- Chatbot model
- VRF-model
- RS-model

4.1 Chatbot

"I want to find a Chinese restaurant."
Natural Language Understanding
Dialog State Tracking
Inform (cuisine="Chinese")
User
Dialog State
Dialog Manager
Query
Knowledge Base
Request (location)
"Where do you want to eat?"
Natural Language Generation
Dialog Policy

4.1.1 Chatbot

1. Natural language processing:

- Natural language processing (NLP) enables chatbots to convert users' text and speech into structured data to be understood by a machine. The NLP process consists of the following steps:

- Tokenization:
- Normalization
- Entity recognition
- Semantic analysis

4.1.1 Chatbot

2. Natural language understanding:
- Natural language understanding (NLU) is a subfield of NLP which focuses on understanding the meaning of human speech by recognizing patterns in unstructured speech input. NLU solutions have 3 components:

- Dictionary to determine the meaning of a word
- Parser to determines if the syntax of the text conforms to the rules of the language
- Grammar rules to break down the input based on sentence structure and punctuation

4.1.1 Chatbot

3. Natural language generation:

- Natural language generation (NLG) is the process of transforming machine-produced structured data into human-readable text. After understanding users' intent, NLG has 4 steps to generate a response:

- Content determination
- Data interpretation
- Document planning
- Sentence aggregation

4.1.2 VRF-model

The model consists of three main modules: Semantic Generation, Clothes Warping, and Content Fusion.

4.1.2 VRF-model

- The Semantic Generation module receives the image of a target clothing and its mask, data on the person's pose, a segmentation map with all the body parts (hands are especially important), and clothing items identified.
- The first generative model (G1) in the Semantic Generation module modifies the person’s segmentation map so that it clearly identifies the area on the person’s body that should be covered with the target clothes. Having this information received, the second generative model (G2) warps the clothing mask so as to correspond to the area it should occupy.

4.1.2 VRF-model

- After that, the warped clothing mask is passed to the Clothes Warping module, where the Spatial Transformation Network (STN) warps the clothing image according to the mask. And finally, the warped clothing image, the modified segmentation map from Semantic Generation Module, and a person's image are fed into the third generative module (G3), and the final result is produced.

4.1.3 RS-model

Interview form
Feedback
Create/update
User Model Database
User Modeling System
Query for user's model
Current user model
Qury for retrieve user and product's data
Query
Query
Query
Users
Recomended products
Recommendation Engine
Retrieved products
Retrieval System
Retrieved products data
Product Database

4.1.3 RS-model

- Recommendation engine: The recommendation engine is responsible for generating recommendations for users based on their past behavior, preferences, and other relevant information.

- User modeling system: The user modeling system is responsible for building and maintaining user profiles. These profiles contain information about users' preferences, interests, and past behavior. The user modeling system uses this information to provide personalized recommendations to users.

4.1.3 RS-model

- Retrieval system: The retrieval system is responsible for retrieving relevant products from the product database. It uses the recommendations generated by the recommendation engine to retrieve the most relevant products for each user.

- Product database: The product database contains information about all the products that the recommendation system can recommend. This information includes product descriptions, images, prices, and other relevant attributes.

4.2 Technologies

1.Chatbot:

- Chatbot models/platforms: GPT 3.0, ChatGLM-6b,...
- NLP techniques: Named entity recognition, sentiment analysis, ...

2. VRF-model:

- Generative models: ACGPN,...
- Generative Adversarial Networks.
- Computer vision techniques: Body recognition, Semantic generation, Outfit simulation,...

4.2 Technologies

3.RS-model:

- Recommendation models/platforms:
- Filtering: Content-based, Collaborative, hybrid.
- Graph Neural Networks
- Matrix Factorization
- Machine learning techniques: Retrieving Similarity Products, CNNs, RNNs ...

5. CORE FUNCTIONALITY

Outfit Assistant aims to simplify and enhance the user's fashion decisions. To effectively address the challenges and pain points associated with outfit selection, the system should encompass the following main functions:

Personal Style Profiling

- User Input: Allow users to input their style preferences, including preferred colors, clothing types, brands, and style inspirations. This can be achieved through a questionnaire or interactive chat interface.
- **AI Analysis**: Employ AI algorithms to **analyze user-provided information** and **understand individual fashion preferences**.

Recommendations

- Categorization: Categorizing product through user's preferences, body shape or special occasions.
- **Matching**: Use AI to **match user preferences** with **appropriate outfit recommendations.**

Real-time Assistance and Feedback

- Chat Interface: Offer a chatbot or interactive interface that provides real-time assistance, enabling users to ask for immediate fashion advice or feedback on specific outfit combinations.

Outfit Assistant system aims to simplify and enhance the user's fashion decisions. To effectively address the challenges and pain points associated with outfit selection, the system should encompass the following main functions:

Image Recognition and Generation

- Integrating image recognition and generation technology allows users to upload their own images and then the system will generate several images of the user after combining with the suggested outfits from the system, helping users easily visualize and give appropriate feedback

Dynamic Updates and Trend Tracking

- Trend Analysis: Continuously update the system with the latest fashion trends and insights, ensuring that recommendations are in line with current styles.

User Feedback Loop

- Rating and Feedback: Enable users to provide feedback on suggested outfits, allowing the system to learn and improve its recommendations over time based on user interactions and preferences.

6. PERFROMANCE METRICS

6.1 Click-Through Rate(CTR)

With the click-through rate (CTR), we measure in some form how many clicks are garnered by the recommendations. The underlying assumption is that more clicks on the recommended items indicate that the recommendations were more relevant for the users.

Algorithm : Collaborative Filtering.

1. Find Similar Users on the Basis of Ratings
2. Calculate the Ratings
3. User-Based vs Item-Based Collaborative Filtering
4. Dimensionality Reduction
5. Matrix Factorization

6.2 Adoption

*User Interaction Rate:

$$\text{User Interactions Rate} = \frac{Number\ of\ interactions}{Total\ number\ of\ users\ engaging\ with\ the\ chatbot}$$

*Conversation Length:

$$\text{Conversation Length} = \frac{Total\ number\ of\ interactions\ in\ the\ conversation}{Number\ of\ times\ the\ conversation\ occurred}$$

*Number of new users:

The closer the number of new users is to the number of total users engaging with your chatbot, the greater the likeliness of first-contact resolution.

6.3 Conversion

- **Conversion Rate**

- Define Goal: Identify the desired action, such as making a purchase, signing up, or any other action you want users to take after receiving a recommendation from the chatbot.
- Collect Data
- Track the number of users who received a recommendation from the chatbot.
- Track the number of users who performed the desired action (e.g., made a purchase) after receiving the recommendation
- Calculate Conversion Rate:

$$\text{Conversion Rate} = \left(\frac{\text{Number of users who performed the desired action}}{\text{Number of users who received the recommendation}}\right) \times 100$$

- Analysis and Evaluation: Compare Conversion Rates between different variants of recommendations from the chatbot to assess their performance.
- Iterate and Optimize: Monitor and iterate the process to track changes in Conversion Rate and optimize the chatbot's recommendation strategy

6.3 Conversion

- **A/B Testing**

- Define Goal: Specify a specific goal to measure, such as conversion rate, interaction time, or revenue.
- Group Splitting: Users are randomly divided into two (or more) groups: the test group and the control group. The test group is exposed to a new variant of the chatbot, while the control group continues to experience the current version. Track the number of users who received a recommendation from the chatbot.
- Implement Variant: Apply the new variant of the chatbot to the test group and continue using the current version for the control group.
- Data Collection: Monitor and collect data on the defined goals from both groups over a specified period.
- Result Analysis: Compare the performance between the two groups to examine whether there is any statistically significant difference in the predefined goals.
- Make a Decision: Based on the results, make a decision regarding whether to keep the current variant or deploy the new variant for the entire chatbot system.

6.4 Similarity metrics

a. Cosine similarity

To compute the similarity between a purchased item and the new item for an item-centered system, we simply take the cosine between 2 vectors representing those items. Cosine similarity is the best match if there are many high-dimensional features, especially in text mining.

$$cosine(x, y) = \frac{\sum_{i=1}^{n} x_i y_i}{\sqrt{\sum_{i=1}^{n} x_i^2} \sqrt{\sum_{i=1}^{n} y_i^2}}$$

b. Pearson correlation coefficient

PCC is a measure of the slope of the line that represents the relation between two vectors of users ratings. It can range from -1 to 1, 0 means no linear correlation.

$$r = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2} \times \sqrt{\sum_{i=1}^{n} (y_i - \bar{y})^2}}$$

6.5 Predictive metrics

a. MAE

MAE is the average magnitude of differences between recommendation and relevant rating

$$\mathrm{MAE} = \frac{1}{|\hat{R}|} \sum_{\hat{r}_{ui} \in \hat{R}} |r_{ui} - \hat{r}_{ui}|$$

b. RMSE

RMSE is a quadratic scoring metric that also measures average magnitude, but the square root makes a difference.

$$\mathrm{RMSE} = \sqrt{\frac{1}{|\hat{R}|} \sum_{\hat{r}_{ui} \in \hat{R}} (r_{ui} - \hat{r}_{ui})^2}.$$

7. TIMELINE AND ROADMAP

7.1 Timeline

Week 1
Market Research and Feature Planning

Week 2
Enhanced Feature Development and UI Design Kickoff

Week 3
MVP Development and Integration

Week 4
Testing, Optimization, and Deployment

Post-Launch
Continuous Monitoring and Improvement

Week 1 (19/11/2023 - 25/11/2023):

Market Research and Feature Planning:

- Objective: Understand business requirements, user preferences, and plan key features.
- Deliverable: Documented business requirements and feature plan.

Week 2 (26/11/2023 - 02/12/2023)

Enhanced Feature Development and UI Design Kickoff :

- Objective: Develop core features, initiate user interface design, and finalize feature set.
- Deliverables: Initial feature development, user interface design kickoff.

Week 3 (03/12/2023 - 09/12/2023)

MVP Development and Integration

- Objective: Develop the MVP chatbot, integrate features, and perform initial testing.
- Deliverables: Functional MVP with integrated features.

Week 4 (10/12/2023 - 16/12/2023)

Testing, Optimization, and Deployment :

- Objective: Conduct extensive testing, optimize performance, and deploy the MVP.
- Deliverables: Fully tested and optimized MVP, deployed for public use

Week 4 (10/12/2023 - 16/12/2023)

- Milestones:
  - Milestone 1: User Testing (10/12/2023): Conduct user testing for functionality and user interface.
  - Milestone 2: Optimization (13/12/2023): Optimize chatbot algorithms and user interface based on feedback.
  - Milestone 3: Deployment (16/12/2023): Officially launch the MVP for public use.

Post-Launch (From 17/12/2023)

Continuous Monitoring and Improvement :

- Objective: Monitor user interactions, collect feedback, and implement continuous improvements.

Post-Launch (From 17/12/2023)

- Ongoing Activities:
  - User Feedback Collection: Implement mechanisms for collecting user feedback.
  - Performance Monitoring: Monitor real-time performance and user interactions.
  - Continuous Improvement Initiatives: Regularly update and enhance features based on feedback and emerging trends.

7.2. Major Milestones and Deliverables

1	Feature Plan and Business Requirements Document (25/11/2023)	Documented feature plan and business requirements.
2	MVP Deployment (16/12/2023)	Fully tested and optimized MVP, officially deployed for public use.
3	Continuous Improvements (After 16/12/2023)	Regularly updated dataset, refined algorithms, expanded features, and implemented user engagement strategies.

8.INTERACTION

8.1 Chat Interface

- The central element of our MVP is the chat interface, where users can engage in conversations with the AI-powered chatbot. This chat interface serves as the primary means of communication, and it is where users can ask for fashion recommendations, seek style advice, or discuss outfit ideas.

8. 2. Natural Language Processing (NLP)

- The chatbot is equipped with advanced Natural Language Processing (NLP) capabilities, enabling it to understand and respond to user queries in natural language. Users can type or speak their requests, and the chatbot will interpret their inputs to generate meaningful responses. NLP allows for a more human-like interaction, enhancing the overall user experience.

8.3. Personalization

- This information includes the user's gender, age, favorite colors, and any specific occasions or activities they have in mind (e.g., running, gym, casual outings).

8.4. Visual Recommendations

- Once the chatbot has gathered sufficient information, it will provide visual recommendations by displaying images of Nike and Adidas clothing and footwear products. Users can swipe through these recommendations, view detailed product information, and select items that catch their eye.

8.4. Visual Recommendations

8.5. Direct Links to Purchase

- For each recommended product, the chatbot will provide direct links to the official Nike and Adidas websites, making it easy for users to browse further details and make purchases with a simple click.

8. 6. Style Tips and Trends

- To keep users informed and in vogue, the chatbot will periodically share style tips and trends. Users can ask the chatbot for advice on how to style a particular item or stay updated on the latest fashion trends from Nike and Adidas.

8.7. Feedback Mechanism

- User feedback is crucial for enhancing the chatbot's recommendations. Users can provide feedback on each recommendation, indicating whether they liked or disliked the suggested products. Over time, this feedback will help the chatbot refine its recommendations and better align with individual preferences.

8.8. Help and Support

- In case users encounter any issues or have questions about the chatbot's functionality, there will be a dedicated "Help" or "Support" feature that users can access for assistance. This ensures a seamless and frustration-free user experience.

9.LIMITATIONS AND ENHANCEMENTS

Limitations

01
Limited understanding of context: AI chatbots may not be able to fully understand the context of a user's request. This can lead to recommendations that are not relevant to the user's needs

02
Lack of personalization: AI chatbots may not be able to personalize recommendations to the same extent as a human stylist

03
Cost: Developing and deploying a fashion recommendation AI chatbot can be expensive. This may make it difficult for small businesses to afford to use this technology.

04
Maintenance: Fashion recommendation AI chatbots require ongoing maintenance to keep them up-to-date and to ensure that they are providing accurate recommendations. This can be time-consuming and expensive.

Limitations

05

Acceptance: Not all consumers are comfortable using AI chatbots. Some consumers may prefer to interact with a human customer service representative.

06

Accuracy of body measurements: Virtual fitting rooms rely on accurate body measurements to generate realistic simulations of how clothes would fit on a person. However, current methods of measuring body dimensions using webcams or mobile devices are not always accurate, which can lead to inaccuracies in the virtual fitting experience.

07

Difficulty replicating fabrics and textures: Virtual fitting rooms can struggle to accurately replicate the fabrics and textures of clothing items, which can make it difficult for consumers to assess the quality of a garment virtually.

Limitations

=> Despite these limitations, Outfit Assistant can be a valuable tool for fashion retailers and consumers alike. As AI technology continues to develop, we can expect to see these chatbots become more personalized, more accurate, and more engaging.

Future enhancements

01
Price comparison: Outfit Assistant could compare prices of items from different retailers to help users find the best deals.

02
Wardrobe management: Outfit Assistant could help users manage their wardrobes by providing tips on how to style their clothes and how to care for them.

03
Mixed reality (MR): Virtual fitting room AI models could be combined with MR technology to create an even more immersive experience. This would allow users to see how clothes look on them in real time, without having to physically try them on.

04
Affordability: Virtual fitting room AI models will become more affordable as the technology continues to develop. This will make them more accessible to businesses of all sizes

10. CONCLUSION

10.1 Key points

- Outfit Assistant is a ML model that helps customers provide personalized outfit suggestions to users based on their preferences, occasions and current fashion trends.

- It also helps retailers increase sales by recommending products that are likely to be of interest to their customers.

10.2 Value proposition

Customers

- Enjoy a personalized, convenient, and confident shopping experience, reducing the hassle of returns and ensuring a better fit.

Retailers

- Enhance customer satisfaction, increase sales, reduce returns, and gain valuable insights into customer preferences.

Improved brand awareness

- Chatbots can help businesses connect with potential customers and build brand awareness

10.3 Potential impact and benefits

- Enhanced Customer Experience
- Improved Sales and Revenue
- Inventory Optimization and Reduced Stockouts
- Real-time Product Recommendations and Dynamic Shopping Experience
- Data-Driven Insights and Improved Business Decisions
- Reduced Decision Fatigue and Improved Shopping Efficiency
- Trend Discovery and Personalized Style Guidance
- Cross-Selling and Upselling Opportunities
- Tailored Marketing Campaigns and Targeted Advertising
- Reduced Customer Service Costs and Improved Customer Satisfaction

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