
FASHION TREND IDENTIFICATION AND PERSONALIZED OUTFIT GENERATION

Project Mission

With the rapid growth of online shopping, fashion retailers are seeking innovative ways to improve customer engagement and increase sales. Traditional recommendation systems often fall short in understanding customer preferences dynamically. This project aims to develop an advanced fashion recommendation system using Machine Learning techniques, enhancing personalized shopping experiences.

The project focuses on analysing historical purchase data, product metadata, customer behaviours, and visual elements to recommend fashion products that align with users' preferences. By leveraging collaborative filtering, content-based filtering, and Computer Vision (CV) for image recognition, this system will improve the accuracy of fashion recommendations.

Project Objective

- **Predict Customer Purchases:** Utilize machine learning algorithms to forecast products a customer may buy in the near future.
- **Enhance Customer Experience:** Provide personalized fashion recommendations to improve user engagement and satisfaction.
- **Increase Sales and Revenue:** Assist retailers in promoting relevant products, thereby driving sales growth.
- **Develop an intelligent recommendation engine:** capable of suggesting fashion products based on customer history, interactions, and product attributes.
- **Optimize machine learning models:** to improve prediction accuracy and response time.
- **Incorporate multiple data sources:** textual descriptions, images, and transactional data for a holistic recommendation approach.

Project Scope

❖ In Scope:

- Data collection from the H&M Personalized Fashion Recommendations dataset.
- Implementation of collaborative and content-based filtering methods.
- Utilization of computer vision techniques for product images.

❖ Out of Scope:

- Real-time recommendation deployment.
- Integration with live e-commerce platforms.

Stakeholders

- ❖ **Project Team:** Responsible for research, data analysis, model development, and implementation.

- Mannat
 - Rohit
 - Saurabh
 - Tushar
- ❖ **End Users:** Online shoppers who will benefit from personalized fashion recommendations.
 - ❖ **Retailers & E-commerce Companies:** Businesses looking to improve product discoverability and increase sales through AI-powered recommendations.
 - ❖ **Mentors & Instructors:** Provide guidance and technical expertise in machine learning and recommendation systems.

Roles and Responsibilities

ROLE	RESPONSIBILITIES
Project Team Member	Data collection, model development, evaluation, and documentation
Advisor/ Instructor	Provide guidance on machine learning methodologies and project direction.

Timeline and Milestones

PHASE	TASKS
Phase 1: Data Collection and Preprocessing	Collect H&M dataset, clean and prepare data, handle missing values
Phase 2: Model Development	Implement clustering and recommendation system models
Phase 3: Final Testing, Documentation and Deploying	Conduct testing, document findings, finalize project and deploying the final system

Resources and Budget

- ❖ **Data Sources:**
 - H&M Personalized Fashion Recommendations Dataset (includes customer transaction records, product metadata, and images).
- ❖ **Technical Resources:**
 - **Programming Languages:** Python (NumPy, Pandas, Scikit-learn, TensorFlow, PyTorch).
 - **ML Libraries:** Scikit-learn, XGBoost, LightGBM, OpenCV (for image processing).
 - **Storage & Processing:** Local storage for dataset handling if needed.
- ❖ **Estimated Budget:**
 - Not specified, assumes access to necessary computational resources

Assumptions

- The dataset used is representative of real-world fashion purchase behaviour.
- Users exhibit consistent preferences in their fashion choices.
- The computational infrastructure is sufficient for model training and evaluation.

- Model training and testing data are adequately balanced for fair evaluations.
- Fashion retailers are willing to adopt AI-based recommendations to enhance their business.
- Product metadata (e.g., descriptions, images) is accurate and informative for machine learning models.

Risks and Mitigation Strategies

RISK	IMPACT	MITIGATION STRATEGY
Data Quality Issues	High	Perform thorough data cleaning and preprocessing
Imbalanced Dataset	Medium	Use data augmentation and synthetic sampling techniques
Overfitting and Models	High	Apply regularization techniques, cross- validation
Interpretability Challenges	Low	Choose explainable AI models and visualize feature importance

Communication Plan

COMMUNICATION TYPE	PARTICIPANTS	PURPOSE
Project Meeting	Project Team	Progress Updates and Progress
Status Reports	Project Team and Mentors	Project Progress and Troubleshooting
Final Presentation	All Stakeholders	Showcase Results and Findings

Success Criteria

- **Recommendation Accuracy:** Achieving high precision, recall, and F1-score in test evaluations.
- **User Satisfaction:** Providing relevant and personalized recommendations based on customer preferences.
- **Scalability:** Ensuring the recommendation system can process a large dataset efficiently.
- **Model Performance:** Achieving an optimal balance between accuracy and computational efficiency.
- **Business Impact:** Demonstrating an increase in engagement or potential revenue for fashion retailers.

Approval

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