High Level Design (HLD)

H&M Personalized Fashion Recommendations

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**Abstract**

Certainly, the emergence of online garment purchasing has significantly altered consumer behaviour, with convenience and accessibility being key drivers. However, despite the vast array of options available on platforms like H&M's online store, the absence of personalized recommendations akin to those offered by sales advisors in physical stores presents a notable gap. Without tailored suggestions based on individual body shapes and fashion preferences, customers may find themselves overwhelmed by the sheer volume of choices, potentially leading to decision paralysis and abandoned purchases.

To address this challenge and elevate the online shopping experience, integrating effective product recommendation systems becomes imperative. By leveraging data analytics and algorithms, H&M can analyze customer preferences, past purchases, and body measurements to offer personalized suggestions that align with each shopper's unique style and fit requirements. This tailored approach not only streamlines the browsing process but also enhances customer satisfaction and increases the likelihood of conversion.

In essence, by implementing personalized recommendation systems, H&M can bridge the gap between the convenience of online shopping and the personalized assistance offered in traditional brick-and-mortar stores, thereby enriching the overall shopping experience for its customers.

**Introduction**

**1. Why this High-Level Design Document?**

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding and can be used as a reference manual for how the modules interact at a high level.

The HLD will:

* Present all the design aspects and define them in detail
* Describe the user interface being implemented
* Describe the hardware and software interfaces
* Describe the performance requirements
* Include design features and the architecture of the project

**2. Scope**

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly technical terms which should be understandable to the administrators of the system.

**3. Definition**

The terms used in the projects are:

* Apriori – an algorithm for frequent item set mining and association rule learning over relational databases
* Sklearn- open-source data analysis library

**General Description**

**1. Product Perspective**

H&M Personalized Fashion Recommendation is a machine learning based regression model which helps the customer get his/her own personalized recommendations. It reduces the browsing time which is often spent on going through the products which may or may be the choice of the customer

**2. Problem Statement**

To create the machine learning based solution to recommend personalized fashion for the customer’s access.

**3. Problem Solution**

Develop product-based recommendation engine based on data from previous transactions, as well as from customer and product meta data. The available meta data spans from simple data, such as garment type and customer age, to text data from product descriptions, to image data from garment images.

**4. Further Improvement**

The project can be extended by using higher level html, cascading styling sheets, JavaScript, Bootstrap, React, Angular and Node JS, it can be made into full -fledged system having a professional touch to it and providing personalized fashion recommendations.

**5. Data Required**

For training the model we need the data that consist of articles- product name, its types, index no, article\_id, customers, their transactions, ids, prices, sales, etc.

Data is completely depending upon our problem statement

**6. Tools Used**

* Python programming language and frameworks such as NumPy, Pandas, Scikit-learn, Matplotlib, Seaborn are used to build the whole model.
* PyCharm and Visual Studio Code is used as IDE.
* For visualization of the plots, Matplotlib and Seaborn are used.
* Heroku is used for deployment of the model.
* Front end development is done using Stream lit.
* GitHub is used as version control system.

**7. Constraints**

The recommendation system should give the proper results and be user friendly. Different model to be created for different products.

**8. Assumptions**

The main objective of the project is to recommend different products for customer based on previous purchases and transactions using machine learning. It is also assumed that all aspects of this project have the ability to work together in the way the designer is expecting

**Design Details**

**1. Process Workflow**

For identifying the different types of anomalies, we will use a machine learning model. Below is the process flow diagram.

ML model for Recommendation

Training/Validation on data

Take the data from sensors

Take the necessary action

Recommendation result

Model Training and Evaluation

Diagram

Description automatically generated

Deployment Process

Diagram

Description automatically generated

**2. Error Handling**

Initially I got an error using PyCharm while running the recommender system and using html too. I was also facing trouble while deploying website and also displaying the contents and recommending different products.

**Performance**

**1. Reusability**

H&M Recommendation system need not be accurate as possible as it is going to just give fashion recommendations to customers and also the model gives the customers to spend less time browsing through products.

**2. Application compatibility**

Since we are using python and it is compatible with any platform, we follow Application compatibility

**3. Resource utilization**

At the initial stage, I am using Kaggle as it already has dataset in the files and it need not be uploaded in the files which might consume too much of the space. And the website also uses less of the RAM than any other.

**4. Deployment**

The code is deployed in GitHub. The whole system is live and is hosted on Heroku.

**Conclusion**

This project introduces a machine learning model for H&M's recommendation system, aiming to provide customers with multiple tailored suggestions based on their previous transactions. By leveraging machine learning, we analyze, test, and train data to enhance the browsing experience. These personalized recommendations streamline the shopping process, reducing browsing time and ensuring a more efficient and satisfying shopping journey for customers.

**References**

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