Project requirements document
AI-ShopRecommender

AI-Based Shopping Recommendation Project

1. Project Goal

The goal of this project is to implement a product recommendation system for a shopping platform using Machine Learning/Artificial Intelligence techniques. The main purpose of the system is to suggest relevant products to users based on their past behaviors and preferences.

2. Functional Requirements

2.1 Data Processing

Collect and preprocess relevant data for recommendations. This may include:

- Users' purchase history (viewed/purchased products).
- Product reviews and ratings.
- Product descriptions and other metadata (categories, brands, prices).

2.2 Recommendation Algorithm

Implement a recommendation algorithm based on Machine Learning:

- **Collaborative Filtering** (User-based or Item-based).
- **Content-based Filtering** (Recommendations based on product features).
- **Hybrid Model** (Combining both techniques to improve recommendations).

- **k-NN**
- **Naive Bayes**
- **ID3**
- **AdaBoost**

2.4 Personalization

Create a personalized recommendation system that improves suggestions over time as more user data is collected.

3. Non-Functional Requirements

3.1 Performance

The algorithm must generate recommendations in a reasonable time, even for a large number of users and products.

3.2 Scalability

The system must be scalable to handle a growing user base and a large number of products.

3.3 Robustness

The system should be robust to missing data, input errors, and other common issues encountered with real-world data.

4. Technologies Used

- **Programming Language**: Python.
- **Python Libraries**:
    - **Data Processing**: Pandas, NumPy.
    - **Machine Learning**: Scikit-learn, TensorFlow (optional, for neural networks).
    - **Neural Networks** (optional): Keras, TensorFlow.
    - **Recommendation**: Surprise (for Collaborative Filtering) or Scikit-learn.
- **Database**: SQL (MySQL, PostgreSQL) or NoSQL (MongoDB) for storing user and product data, JSON files.
- **User Interface (UI)**: tkinter (desktop application).

5. Implementation Requirements

- **Inputs**:
    - User and product data (in tabular format or JSON).
- **Outputs**:
    - Personalized recommendations for each user, in the form of a list of products.