AI based product retailer recommendation using image based product searching and sentiment analysis.

**Abstract**

This project presents an AI-based product recommendation system designed to enhance the shopping experience for users by integrating image-based product searching and sentiment analysis. The proposed system leverages Convolutional Neural Networks (CNNs) to recognize products from input images and subsequently identifies retailers that offer the recognized product. Recommendations are tailored based on ratings and reviews provided by other users. Sentiment analysis is employed to gauge customer sentiments from reviews, ensuring that the recommendations prioritize highly-rated products from well-regarded retailers. This approach not only simplifies the product search process but also provides personalized retailer recommendations, enhancing user satisfaction and decision-making.

**Proposed System**

**1. Image Input and Product Recognition**

* **Image Acquisition**: The system accepts an image input from the user, which can be a photo of a product.
* **Preprocessing**: The input image is preprocessed to standardize dimensions and enhance features relevant for recognition.
* **Feature Extraction using CNN**: A pre-trained CNN model (e.g., VGG16, ResNet50) is used to extract high-level features from the image.
* **Product Classification**: These features are fed into a classification layer to identify the product category and specific product name.

**2. Product Search and Retailer Identification**

* **Database Query**: The recognized product name is used to query a database of retailers that stock the identified product.
* **Retailer Retrieval**: The system retrieves a list of retailers, along with product availability and relevant details.

**3. Retailer Recommendation Using Sentiment Analysis**

* **Ratings and Reviews**: Each retailer's product offering is accompanied by user ratings and textual reviews.
* **Sentiment Analysis**: Natural Language Processing (NLP) techniques, particularly sentiment analysis, are applied to the textual reviews to assess the overall customer sentiment.
  + **Sentiment Score Calculation**: A sentiment score is calculated for each review, classifying them as positive, neutral, or negative.
  + **Overall Sentiment Evaluation**: An aggregate sentiment score for each retailer is computed based on individual review scores.
* **Recommendation Algorithm**: The retailers are ranked based on a combination of ratings and sentiment scores, ensuring that highly rated and positively reviewed retailers are prioritized.

**4. User Interface and Experience**

* **Interactive UI**: The system provides an intuitive interface for users to upload images, view product recognition results, and receive retailer recommendations.
* **Recommendation Display**: Recommended retailers are displayed along with ratings, sentiment scores, and links to purchase the product.
* **Feedback Mechanism**: Users can provide feedback on the recommendations to continually improve the system's accuracy and relevance.

**System Architecture**

1. **Front-End**: User interface for image upload and displaying recommendations.
2. **Back-End**:
   * Image preprocessing and feature extraction using CNN.
   * Product recognition module.
   * Database for retailer information, ratings, and reviews.
   * Sentiment analysis module using NLP techniques.
   * Recommendation engine that integrates product recognition and sentiment analysis results.

**Technologies Used**

* **Convolutional Neural Networks (CNNs)**: For image-based product recognition.
* **Natural Language Processing (NLP)**: For sentiment analysis of user reviews.
* **Database Management System**: To store product, retailer, rating, and review data.
* **Web Framework**: To build the user interface and integrate backend functionalities.

**Conclusion**

This AI-based system provides an innovative solution for product recommendation in e-commerce applications, leveraging the power of computer vision and sentiment analysis. By recognizing products from images and recommending retailers based on user sentiment, the system aims to enhance the shopping experience, making it more intuitive, personalized, and reliable.