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AI-Based Recommendation System

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Abstract
Recommendation systems have become integral in various sectors such as e-commerce, entertainment, and education. This paper presents the design and implementation of a simple AI-based recommendation system using a content-based filtering approach. The system utilizes a dataset containing product details and computes cosine similarity to recommend relevant products. Implemented with Python and deployed through a web interface using Gradio, the model provides real-time suggestions with confidence scores. The project demonstrates the feasibility of integrating machine learning techniques with interactive user interfaces to enhance the shopping experience.

Key Words: AI, recommendation system, cosine similarity, content-based filtering, Gradio, product recommendation

1. INTRODUCTION
In the era of digital transformation, recommendation systems are playing a crucial role in helping users navigate vast choices. They are widely used in online platforms such as Amazon, Netflix, and YouTube to enhance user engagement. This paper focuses on building a simple yet functional AI-based recommendation system that suggests products based on content similarity.

2. METHODOLOGY

2.1 Dataset and Preprocessing
The dataset used includes product names and descriptions. Textual data is vectorized using TfidfVectorizer, converting it into numerical form for similarity computation.

2.2 Similarity Computation
We calculate the cosine similarity between product vectors to identify the most similar products. This allows the system to suggest items that are contextually and semantically close to the input.

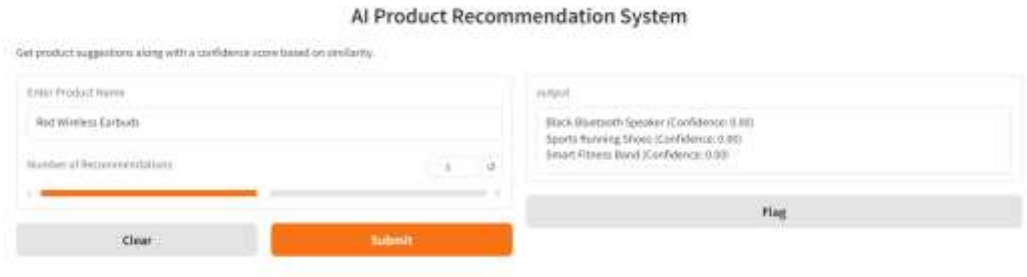
2.3 Recommendation Algorithm
Given a product input, the algorithm:
- Finds the index of the product.
- Retrieves the cosine similarity scores.
- Sorts and filters the top matches.
- Returns product suggestions with corresponding confidence scores (scaled similarity values).

2.4 User Interface
The recommendation system is deployed using Gradio, enabling an easy-to-use HTTP interface. Users can input a product name and instantly receive top product recommendations.

Table-1: Sample Output from System

Input Product	Recommended Products	Confidence Score
Phone Cover	Mobile Case	0.92
Headphones	Wireless Earbuds	0.89

Fig-1: Screenshot of Gradio UI



3. CONCLUSIONS

This AI-based product recommendation system demonstrates a practical application of content-based filtering using cosine similarity. With an easy-to-use frontend and real-time response, it can enhance user experience in various digital marketplaces. Future work could integrate collaborative filtering or hybrid models to improve recommendation accuracy.

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BIOGRAPHIES

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Final-year B.Voc (AIDS) student at Abdul Razzak Kalsekar Polytechnic New Panvel College. Passionate about machine learning, recommendation systems, and data science applications. Has experience with Python, web deployment, and applied AI projects.