PERSONALIZATION IN E-COMMERCE USING AI-DRIVEN RECOMMENDER SYSTEMS

Kyryl Kitsun, Svitlana Kovalenko
National Technical University «Kharkiv Polytechnic Institute», Kharkiv

In the contemporary digital economy, e-commerce has become a fundamental component of the global marketplace. As online shopping continues to grow in popularity, there is an increasing need for e-commerce platforms to continuously adapt to evolving consumer expectations. This study is particularly relevant given the potential of artificial intelligence technologies – especially recommender systems – to personalize the shopping experience by aligning product suggestions with individual user preferences [1]. By analysing purchase history and user behaviour, these systems generate tailored recommendations that enhance user engagement and streamline the decision-making process. The integration of AI, data analytics, and recommender technologies significantly contributes to improving customer satisfaction, boosting conversion rates, and strengthening the competitive advantage of online retailers.

Recommender systems are broadly categorized into three different types: content-based recommender systems, collaborative recommender systems, and hybrid recommender systems [2]. While user-based collaborative filtering can be effective, it struggles with scalability. Item-based collaborative filtering offers a more scalable solution by comparing items through their rating vectors, using cosine similarity for its efficiency and accuracy.

The study focuses on developing personalized online store solutions using artificial intelligence, specifically applying Word2Vec as an alternative to the traditional TF-IDF approach. The primary hypothesis is that Word2Vec-based personalization will outperform TF-IDF in recommendation accuracy and user satisfaction.

TF-IDF (Term Frequency-Inverse Document Frequency) represents documents as sparse vectors based on word frequency, emphasizing rare but important words, but it doesn't capture the context or semantics of words – it treats each word independently. In contrast, Word2Vec creates dense, continuous vector embeddings that capture semantic relationships by analysing word co-occurrence in context, making it better suited for recommendation systems, where understanding the relationship between items (or words) is crucial. While TF-IDF is useful for keyword matching and basic search, Word2Vec excels in recommending semantically similar items based on user behaviour or content patterns. To address the cold-start problem, the Word2Vec approach offers the advantage of generating recommendations based on item descriptions or metadata alone, even in the absence prior user interactions.

References:

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