

Technologies and Methods to Enhance the Effectiveness of Product Search and Recommendations in E-commerce Systems

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Abstract

E-commerce marketplaces heavily rely on advanced product search and recommendation technologies to enhance user experience, improve customer satisfaction, and drive sales. However, when businesses transition to e-commerce marketplaces, they face unique challenges in product searching and recommendation systems compared to traditional physical stores. This review investigates the effectiveness of various search and recommendation techniques in addressing these challenges, specifically focusing on issues like diverse product catalogues, complex product attributes and compatibility of selected products or items related to searching functionality, and issues like data sparsity, cold start, and limited user history related to product recommendations. The study aims to analyse how different techniques and methods, including Natural Language Processing (NLP), machine learning, data analysis, collaborative filtering, content-based filtering, user queries, search algorithms, catalogue navigation, information retrieval, and other techniques (e.g., transformer models, Siamese networks, Word2vec) are used in product searching and recommendation. This study outlines how these technologies and methods contribute to effectiveness, customer confidence, and personalization. The review findings highlight how integrating various search methods and utilizing hybrid recommendation strategies for businesses can significantly improve user experience, enhance customer satisfaction, and drive higher conversion rates. Including Q&A functionalities further enriches the user experience and provides valuable insights for both customers and businesses. These findings have significant implications for the design and development of future e-commerce platforms, guiding the creation of more effective and user-centric systems and enhancing the overall shopping experience for online consumers.

Keywords: *Search algorithms, Natural Language Processing (NLP), Machine learning, Hybrid integration, Q&A functionality*