

Real-Time Course Recommendation System for Online Learning Platforms

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Abstract : This research presents the design and implementation of a real-time course recommendation system for online learning platforms, leveraging user competencies and expertise levels. The system begins by extracting and classifying the complexity levels of courses from UdeMy datasets using semantic enrichment techniques and resources such as WordNet and BERT. A predictive model assigns complexity levels to each course, adding columns that represent the course category, sub-category, and complexity level to the existing dataset. Simultaneously, user profiles are constructed through questionnaires capturing their skills, sub-skills, and proficiency levels. The recommendation process involves generating embeddings with BERT, followed by calculating cosine similarity between user profiles and courses. Courses are ranked based on their relevance, with the BERT model delivering the most accurate results. To enable real-time recommendations, Apache Kafka is integrated to track user interactions (clicks, comments, time spent, completed courses, feedback) and update user profiles. The embeddings are regenerated, and similarities with courses are recalculated to reflect users' evolving needs and behaviors, incorporating a progressive weighting of interactions for more personalized suggestions. This approach ensures dynamic and real-time course recommendations tailored to user progress and engagement, providing a more personalized and effective learning experience. This system aims to improve user engagement and optimize learning paths by offering courses that precisely match users' needs and current skill levels.

Keywords : recommendation system, online learning, real-time, user skills, expertise level, personalized recommendations, dynamic suggestions

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