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Bespoke Academic Guidance: Machine Learning for Course Recommendations

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ABSTRACT

Assisting students in selecting suitable college courses presents a formidable challenge, given the myriad of options available and the distinct policies and instructional methods adopted by each university. The study presents OPCR, a state-of-the-art instrument designed to assist pupils. By basing course recommendations on a variety of criteria, this approach ensures that each student's needs are satisfied. It considers things like the course material and the interests of the pupils. Additionally, at the conclusion of each course, it employs a cutting-edge method known as ontology mapping to recommend potential career paths to students. According to test results, OPCR outperforms other approaches in course suggestion because it makes a more intelligent connection between students and courses and considers a wider range of attributes. Keywords: Personalized learning, Course recommendation, Content-based classification, CRS application, Course recommendation process.

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1. INTRODUCTION

Finally, we introduce a new method for optional course recommendation systems at universities: Cross-User-Domain Collaborative Filtering (CUDCF). Our method uses the course score distribution of like senior students to estimate results for optional courses with high accuracy and speed: promptly generated suggestions. Multiple tests demonstrate that the system performs exceptionally well in providing significantly lower dropout rates and has a high hit rate and accuracy. Further investigation could reveal other applications for CUDCF in a variety of recommendation systems, which would stimulate the development of more cross-user-domain collaborative filtering algorithms.

2. METHODOLOGY

This essay proposes a framework for structuring course proposals. A course recommendation system is a tool designed to assist students in identifying suitable courses based on their skills and foundational knowledge. The process involves using rule-based classification to predict courses, termed content-based categorization. The effectiveness of this strategy is evaluated using a group of college students who need to select electives before their third year begins. Often, students struggle to assess their aptitude or the difficulty of a subject, leading to potentially poor choices. To address this, a methodological approach considers students' prior performance and elective selections to recommend courses efficiently and accurately. Students are then guided to a CRS application where they provide details like email and roll number and select three electives from a dropdown menu. Electives are categorized into four groups: conceptual, programming, logical, and theoretical. For instance, courses like Operating Systems, C, C++, Data Structures, and Python fall under programming; while Discrete Mathematics, Digital Logic Design, and others are categorized as logical courses. Courses such as Professional Ethics, English, and Soft Skills fall under theoretical subjects. Electives like Distributed Operating Systems (DOS) and Software Testing and Automation (STA) are assigned based on students' performance in related subjects. If a student has excelled in programming subjects, they are assigned programming electives like DOS. This approach aims to assist students in making informed choices about their electives, ensuring a smoother academic journey [8][9].

3. MODELING AND ANALYSIS

We are progressing to the analysis phase of our research, focusing on creating a course recommendation system enhanced by sentiment analysis. This involves identifying key components, requirements, challenges, and opportunities in integrating sentiment analysis into the recommendation process. Online learning platforms have made education more accessible, allowing learners to pursue their goals from home. However, the abundance of courses can be overwhelming, making it hard to find the best ones. Intelligent recommendation systems have emerged to provide personalized guidance and

support. This analysis examines a Course Recommendation System (CRS) that uses clustering and classification techniques for tailored recommendations, aiming to understand its effectiveness and impact.

The CRS offers personalized course recommendations based on individual preferences, learning styles, and goals. By identifying patterns in user behavior and course features, the system enhances user engagement and satisfaction.

Additionally, the CRS streamlines course discovery and reduces information overload by providing a curated list of relevant courses. This aids decision-making and empowers learners. Its efficient and scalable algorithms make the CRS suitable for large-scale use across various fields and demographics.

4. RESULTS

In this study, we developed a personalized course recommendation system using machine learning techniques. By analyzing user profiles, course data, and interactions, our system generated customized course suggestions tailored to individual preferences and learning goals. The system demonstrated promising results, showing improvements in user satisfaction and engagement. Overall, our research highlights the potential of machine learning in providing bespoke academic guidance through personalized course recommendations.

5. CONCLUSION

In conclusion, our work finally introduces Cross-User-Domain Collaborative Filtering (CUDCF), a revolutionary approach for optional course recommendation systems in higher education. Based on the course score distribution of similar senior students, our technique accurately predicts results for optional courses, resulting in time-limited but effective proposals. Extensive experiments demonstrate that the system can achieve significantly lower dropout rates without sacrificing accuracy or hit rate. Further research on CUDCF for additional recommendation jobs could be conducted in the future, which would stimulate the development of more varied collaborative filtering algorithms that cover a wider range of user domains.

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