Chapter 14
E-Learning Keyword Search Optimization Using Machine Learning Algorithms

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ABSTRACT

The rise of e-learning technologies in the past few decades has completely changed how people acquire and interact with educational resources. Because there is so much useful data accessible on the internet, it is essential to optimize keyword searches effectively to make certain individuals find the resources they need quickly. The present research examined the efficacy of processing approaches such as tokenization and extracting features utilizing learning to rank (LTR), as well as e-learning search optimization approaches utilizing support vector machines (SVM), naive bayes, and neural networks. The multi-platform online courses data that the authors downloaded from the Kaggle database to do the tests are utilized. According to findings, SVM combined with tokenization and LTR produced higher quality outcomes than other approaches in terms of precision, accuracy, recall, and F1 score.

INTRODUCTION

In the era of mobile the WWW (World Wide Web), portable education has become a potent supplement to conventional online instruction that leverages all the benefits of smartphones and tablets to provide pupils with an enjoyable educational atmosphere. Learn any group at every moment (Joshi et al., 2023). The expense of smart cell phones has decreased, and their effectiveness has increased due to the ongoing advancements in communications technologies. Mobile education has grown in popularity as more people utilize their smartphones and other mobile devices to convert PCs into multitasking machines (Wu, 2020). Designers of e-learning platforms should think about utilizing sophisticated search engine algorithms that can process complicated searches and yield precise results to incorporate multi-keyword

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searches (Angeline et al., 2023). Furthermore, online instruction development teams may be able to analyze user browsing habits better and enhance the platform's search capabilities by using research tools for keywords like Moz Keyword Explorer or Google Keyword Planner (Tripathi and Al-Zubaidi, 2023).

Employing phrases, do a digital educational program search by following these procedures, which depend on the list of outcomes that are displayed:

Identify relevant keywords: Identify the key phrases that prospective pupils use while looking for programs by analyzing the subject matter of your educational offerings and the intended audience (Marar et al., 2023).

Use keyword research tools: To find suitable phrases for the instruction, use tools for keyword analysis, such as Moz Keyword Explorer, SEMrush, or Google Keyword Planner. Include the following phrases in the subject matter, narratives, and names of courses (Kem, 2021). To increase the number of words to be found, be careful to incorporate the suggested keywords into the course's titles, explanations, and substance (Kem, 2023).

Monitor keyword performance: To evaluate the efficacy of the phrases picked, monitor their results utilizing tools such as Google Search Console.

Optimize your course pages: Improve the search engine optimization of the course web pages by incorporating appropriate phrases into the metadata, titles, explanations, and text.

Use categories and filters: Use subcategories & and criteria along with terms to aid visitors in navigating the extensive course library.

Consider long-tail keywords: Use long-tail phrases that highlight your credentials in the headings and descriptions of your courses.

By using procedures to comprehend requests from users, interpret textual information, and rank results from searches, approaches provide viable ways to improve keyword search capabilities in systems for online learning (Gada, & Chudasama, 2024). In this research, NN, SVM, and NB are used in conjunction with preprocessing methods, including analyzing text tokenization and LTR extraction of characteristics. We conduct our inquiry to assess these techniques' effectiveness on the Kaggle Multi-Platform Courses on the Internet Datasets (Gada et al., 2023). The aim is to evaluate the effectiveness of SVM using tokenization and LTR in enhancing keyword search outcomes in comparison to other methods by looking at accuracy, recall, and F1 score measures (Albadawi, 2021). By pushing the boundaries of e-learning term search optimization, this investigation advances the field. It may have ramifications for improving the user interface and promoting more efficient retention of information in virtual learning settings (Regin et al., 2023).

Challenges in E-Learning

E-learning has transformed the landscape of education, offering learners access to a vast array of educational resources and opportunities through online platforms (Albadawi, 2023a). However, with the abundance of content available, effective keyword search optimization is crucial to ensure learners can efficiently locate relevant materials (Princy Reshma et al., 2023). Machine learning algorithms provide