

# Course Evaluation and Improvement: Enhancing Higher Education Through Sentiment Analysis in Course Rating Systems

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## Abstract

The substantial burgeoning of online learning has given students access to a multiple variety of courses on different learning platforms. Nevertheless, choosing the best course is still a difficult task that constantly depends on obsoleted ratings and evaluations that do not precisely reflect the convoluted student experience. We offer the "Suggesting-Best-Courses-using Sentiment-Analysis" project, a web-based platform that aims to transform the course grading system. This technology uses sentiment analysis to give users a more valid and thorough assessment of online courses. Our software uses web scraping techniques to collect comments and evaluations about the course from various internet sources once users enter the URL of the course they wish to evaluate. Various Machine learning techniques like Count Vectorizer and Random Forest are used, and each remark is assigned to one of three sentiment categories – positive, negative, or neutral. A mathematical algorithm is used to generate a course rating that only depends on the feedback provided by students by evaluating the overall sentiment represented in all comments. The training data for our model comes from Kaggle and includes reviews of courses from the well-known learning management system Coursera. The reliability and quality of its sentiment analysis model is maintained by using this dataset. The machine learning model generates a rating out of 5, which is displayed to users and provides a more thorough and insightful assessment of the course. The "Suggesting-Best-Courses-Using-Sentiment-Analysis" project is beyond simply ranking courses. Users can compare two courses, which ultimately helps in decision-making. This tool helps students choose courses with greater knowledge and better value, which improves their overall educational experience. In conclusion, our study presents a new method for evaluating courses that is based on machine learning and sentiment analysis. We want to help students make educated decisions and improve their educational path by giving users a more thorough and informative evaluation of online courses.

**Keywords:** Sentiment Analysis, Online Courses, Machine Learning

## 1. Introduction

Online education has experienced an unconventional approach in the past few years, delivering a plethora of courses on various disparate platforms. With several alternatives available, it can be daunting for learners to choose the ones that will align with their requirements and long-term goals in terms of education. Conventional evaluation methods, which are generally dependent on overly simple star ratings, often fall short of providing a complex and realistic assessment of a course's quality. The "Suggesting-Best-Courses-Using-Sentiment-Analysis" initiative offers a innovative and revolutionary

solution to this urgent problem. This study delves into the shift in the paradigm that this initiative highlights for the assessment of online learning. This method uses sentiment analysis to analyze and evaluate the comments and reviews offered by other students rather than depending exclusively on numerical ratings. The project aims to provide users with a more thorough and significant evaluation of online courses by classifying attitudes as favorable, negative, or neutral. This essay examines the methods, strategies, and effects of this novel approach. Each user remark is assessed and evaluated to the appropriate sentiment category using machine learning techniques like Count Vectorizer and Random Forest. These feelings play a fundamental role in creating a course rating that is only determined from the collective perspectives offered by students when they are combined across all comments for a specific course. The course reviews from the renowned learning management system Coursera were collected by Kaggle and used as the training data for the sentiment analysis model. This strategy not only improves the validity of course evaluations but also encourages students to make more informed choices. The "Suggesting-Best-Courses-Using-SentimentAnalysis" initiative is more than simple course ranking. Users now have the power to directly compare two courses, which will help them make better decisions. This project aims to improve learners' overall educational experiences and give them the skills they need to make wise decisions in their pursuit of knowledge by facilitating a more detailed understanding of course strengths and shortcomings. In essence, this research study sets out on a quest to decipher the ground-breaking methodology underlying the "Suggesting-Best-Courses-using-Sentiment-Analysis" initiative, with the aim of illuminating its potential to fundamentally alter the landscape of course ratings in online education. This strategy attempts to empower learners to make educated decisions, so improving the quality and effectiveness of their educational endeavors by giving users a more thorough and insightful assessment of online courses.

## 2. Motivation

The "Suggesting-Best-Courses-using-Sentiment-Analysis" project is motivated by several factors. Firstly, it addresses the limitations of traditional course rating systems, which often rely solely on star ratings and may not provide a comprehensive view of a course's quality. Instead, the project aims to offer users more thorough ratings by analyzing comments and reviews. Secondly, with the surging demand for online learning and the proliferation of available courses, the project seeks to assist users in making well-informed decisions by providing more accurate ratings. Lastly, the initiative has commercial applications, benefiting course providers by offering insights into course effectiveness and areas for improvement. Overall, this project has the potential to address challenges in online learning and provide users with more precise and personalized course ratings.

## 3. Problem Statement and Motivation

Traditional course rating systems often fall short in providing a comprehensive assessment of a course's quality, relying solely on star ratings that may not capture specific strengths and weaknesses. This limitation can hinder users' ability to make informed decisions about which courses to pursue. The "Suggesting-Best-Courses-using-Sentiment-Analysis" project seeks to remedy this issue by introducing a more thorough rating system that employs sentiment analysis to analyze comments and reviews, categorizing them into positive, negative, or neutral sentiments. The project's objectives include developing a user-friendly platform that allows users to input course URLs for comprehensive analysis,

empowering users to make informed choices, and generating precise, personalized course ratings based solely on user feedback.

#### 4. Review of Literature

In the review of existing or similar systems, two notable platforms stand out. Firstly, Class Central offers a platform where users can access user-generated reviews and ratings for online courses, enabling course seekers to make informed choices. It aggregates courses from various online providers and assigns ratings based on user feedback. Secondly, Coursera, a prominent online course provider, employs machine learning to analyze reviews and ratings, utilizing this data to offer personalized course recommendations. Coursera's recommendation system takes into account multiple factors, including course content, instructor quality, and difficulty level, enhancing the precision of its course suggestions.

In addition to Class Central and Coursera, there are other noteworthy platforms that contribute to the landscape of online course evaluation and recommendation systems. Udemy, for instance, allows learners to access a wide array of user-generated course reviews and ratings. This platform empowers users to gauge the quality of courses based on peer feedback. Furthermore, edX, a renowned provider of online courses, employs a comprehensive approach to course recommendations. They consider not only user reviews and ratings but also incorporate data on course completion rates and learner engagement. This holistic perspective aims to ensure that users receive course suggestions tailored to their individual preferences and learning goals.

Another significant player in the online education space is LinkedIn Learning, which leverages user reviews and ratings alongside learners' professional profiles and career interests to provide personalized course recommendations. By aligning course suggestions with users' career aspirations, LinkedIn Learning offers a unique approach to course discovery that resonates with professionals seeking to enhance their skill sets. Additionally, Future Learn, a platform specializing in online courses from top universities and institutions, employs a collaborative filtering-based recommendation system. It assesses users' course choices and behaviors, drawing insights from learners with similar preferences to propose relevant courses, fostering a sense of community-driven learning.

In summary, the review of existing systems highlights a diverse array of platforms, each utilizing unique approaches and data sources to enhance the online learning experience. These systems not only provide users with valuable insights through reviews and ratings but also leverage machine learning and collaborative filtering techniques to deliver tailored course recommendations, catering to the diverse needs and aspirations of online learners.

#### 5. Proposed Methodology

As previously discussed, our proposed system represents an online course rating platform that assesses courses solely based on user comments and reviews. Unlike traditional online course rating systems that rely solely on star ratings, which can be deceptive and may not truly reflect a course's quality, our system strives for precision. It achieves this by evaluating the sentiment expressed in each comment, categorizing them as positive, negative, or neutral.

The system employs web scraping techniques to gather comments related to a specified course URL from a website. Subsequently, the collected comments undergo preprocessing steps, including the removal of stop words, punctuation, and conversion to lowercase. These processed comments are then submitted to a sentiment analysis model for evaluation. The sentiment analysis model, which incorporates a Count

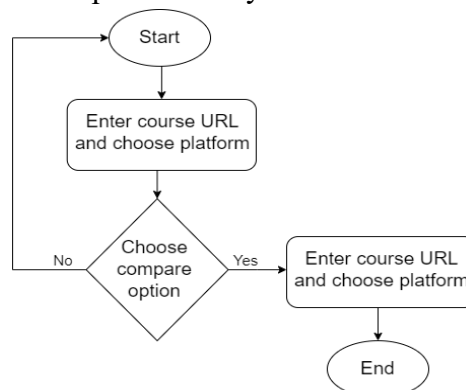
Vectorizer followed by a Random Forest Classifier, assigns each comment into one of the sentiment categories: positive, negative, or neutral. The model's training dataset comprises course reviews from Coursera.

Following the sentiment classification of each comment, the system computes a course rating based on the proportion of positive comments. This final rating is presented to users through the user interface (UI). Our proposed system has the potential to offer more precise and dependable course ratings for online learners, empowering them to make more informed decisions when selecting courses.

- **User Interface (UI):** The User Interface (UI) stands as the interactive face of the application, allowing users to effortlessly input the URL of the course they wish to assess. It acts as a gateway, receiving user input and seamlessly transmitting it to the backend for further processing.
- **Web Scraping:** In this vital process, the application utilizes web scraping techniques to retrieve comments associated with the specified course URL from the web. These comments are then systematically stored in a database, establishing the foundation for subsequent analysis.
- **Data Processing:** The Data Processing module undertakes the task of refining the comments obtained from the web scraping module. To enhance data quality, it conducts operations such as eliminating stop words, punctuation, and converting text to lowercase. The meticulously processed comments are subsequently directed to the machine learning model for sentiment analysis.
- **Sentiment Analysis Model:** Leveraging advanced sentiment analysis techniques, the Sentiment Analysis Model employs a Count Vectorizer followed by a Random Forest Classifier. This combination effectively classifies each comment into one of three categories: positive, negative, or neutral. The model's training dataset derives from a comprehensive collection of course reviews obtained from Coursera.
- **Rating Calculation:** Once the sentiment analysis model has assessed each comment's sentiment, the application proceeds to calculate a course rating. This rating is computed by evaluating the percentage of positive comments among all the analyzed feedback, providing users with a meaningful indicator of the course's quality.
- In essence, this system incorporates an intuitive User Interface, employs web scraping to gather crucial data, engages in meticulous data processing for improved analysis, utilizes a sophisticated sentiment analysis model for comment classification, and ultimately calculates an informative course rating based on user sentiment.

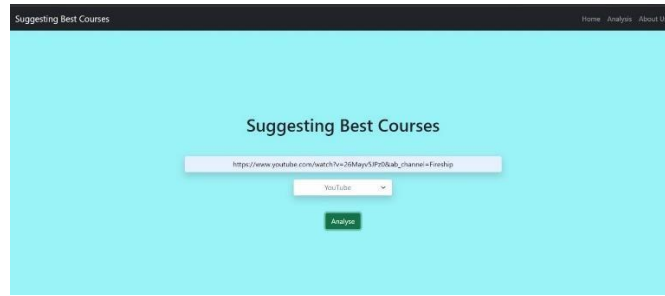
### 5.1 Algorithm and Process Design

Following is the block diagram of the implemented system.



**Fig.1 Block diagram of the System**

## 6. Experiments And Results



**Fig. 6.1** First page of the application.



**Fig. 6.2** After inserting link web scrapping is initialized.



**Fig. 6.3** Page of the application displaying the best courses.

## 7. Conclusion

In conclusion, the "Suggesting-Best-Courses-using Sentiment-Analysis" system represents a significant advancement in the realm of online course selection, offering students a valuable and reliable tool to navigate the vast landscape of available courses. By harnessing the power of sentiment analysis techniques to meticulously classify user comments and calculate course ratings, this system addresses the inherent limitations of traditional star based ratings.

This innovative approach enables users to make well informed decisions by providing a nuanced understanding of a course's strengths and weaknesses based on authentic user feedback. The system's effectiveness lies in its ability to distill the collective sentiments of learners into actionable insights, allowing students to identify courses that align with their specific needs and preferences.

Moreover, the system's accuracy and dependability are rooted in its rigorous data processing, sentiment analysis model, and extensive training on real-world course reviews. By calculating ratings based on the percentage of positive comments, it offers users a more transparent and meaningful metric for course quality assessment.

In a digital learning landscape marked by the proliferation of online courses and the growing demand for quality education, the "Suggesting-Best-Courses-using Sentiment-Analysis" system emerges as a valuable companion for students on their educational journey. It not only enhances the course selection process but also fosters a culture of informed decision-making, empowering learners to make the most of their online learning experiences. As a result, this system contributes significantly to the ever-evolving field of online education, bridging the gap between learners and high-quality courses.

## 8. Future work

The future enhancements and expansions of this project hold the potential to elevate the online course rating system to new heights. Firstly, incorporating course recommendations will empower users to discover relevant courses with ease. Secondly, by delving into advanced techniques like natural language processing and deep learning, the system can offer personalized recommendations based on user preferences and historical interactions, thus enhancing the user experience. Thirdly, integration with other educational platforms would create a seamless and all-encompassing educational journey. To further enhance accuracy, the sentiment analysis model can be refined by leveraging larger datasets or advanced methods like deep learning. Additionally, considering factors beyond sentiment, such as course difficulty and instructor quality, will provide a holistic course rating. Lastly, involving user feedback ensures continuous improvement, fostering a collaborative learning environment where users play an active role in shaping the system's evolution. These prospective additions promise to make the system an indispensable tool for students in their pursuit of quality online education.

## 9. Acknowledgement

With profound gratitude, we proudly present our mini project, titled 'Course Rating System using Sentiment Analysis.' The sense of accomplishment that accompanies the successful completion of a project would remain incomplete without acknowledging the invaluable contributions of the individuals whose unwavering support made it all possible.

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## 10. AUTHORS' BIOGRAPHY

Short biography of each author may be included, with/without photographs, after main content of the research paper and before references. The biography may only include details related to the current position/designation of the authors. No personal detail can be included in biography.



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