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Leveraging Large Language Models for Sentiment Analysis in Educational Contexts

Arfan AHMED[a,1], Sarah AZIZ[a], Alaa Abd-ALRAZAQ[a], Rawan ALSAAD[a] and Javaid SHEIKH[a]
[a] *AI Center for Precision Health, Weill Cornell Medicine-Qatar, Doha, Qatar*

Abstract. This short communication presents preliminary findings on the application of Large Language Models (LLMs) for sentiment analysis in educational settings. By analyzing qualitative descriptions derived from student reports, we aimed to assess students' emotional states and attitudes towards their academic performance. The sentiment analysis provided valuable insights into student engagement and areas requiring attention. Our results indicate that LLMs can effectively process and analyze textual data, offering a more nuanced understanding of student sentiments compared to traditional coding methods. This approach highlights the potential of LLMs in enhancing educational assessments and interventions.

Keywords. Large Language Models, sentiment analysis, educational assessment, student engagement

1. Introduction

Understanding students' emotional states and attitudes towards their academic performance is crucial for fostering a supportive learning environment [1,2]. Traditional sentiment analysis methods often use manual coding or basic algorithms, which can be time-consuming and lack depth. This study explores Large Language Models (LLMs) for analyzing student academic reports, offering a more efficient and effective approach.

2. Materials and Methods

The analysis involved qualitative descriptions extracted from academic reports for 9 students, which were processed using LLaMA LLM. The model performed sentiment analysis, generating sentiment scores ranging from 0 to 1, indicating the overall positivity or negativity of the feedback. The analysis focused on various categories, including academic performance, behavior, and effort. This approach allowed for a comprehensive evaluation of student sentiments, providing insights into their emotional states and engagement levels.

[1]Corresponding Author: Arfan AHMED, ara4013@qatar-med.cornell.edu.

3. Results

Sentiment analysis showed varying student engagement levels. Some participants had consistently high scores, reflecting strong performance, while lower scores in specific areas highlighted needs for improvement. These insights can guide educational strategies and interventions.

Table 1. Summary of Sentiment Analysis Scores

Participant ID	Academic Performance	Behavior	Grade	Creativity	Participation	Improvement Areas
01	0.8	0.7	0.9	0.6	0.5	0.4
02	0.8	0.7	0.9	0.6	0.5	0.4
03	0.9	0.8	0.7	0.6	0.5	0.4
04	0.85	0.9	0.8	0.75	0.85	0
05	0.85	0.9	0.88	0.7	0.8	0.6
06	0.8	0.9	0.7	0.6	0.8	0.4
07	0.8	0.9	0.75	0.7	0.8	0.6
08	0.8	1	0.7	0.6	0.9	0.5
09	0.8	0.9	0.85	0.7	0.8	0.75

Table 1 presents sentiment scores for nine participants across performance and behavioral domains. Scores (0 to 1) reflect sentiment in areas like academic performance and effort. Most participants scored above 0.7, indicating strong engagement, while areas like creativity and participation showed room for improvement.

4. Discussion

The findings highlight LLMs' effectiveness in automating sentiment analysis in education, offering clear advantages over labor-intensive traditional methods. LLMs process large text volumes and provide real-time sentiment scores, enabling timely student support. Future research will validate LLMs in broader assessments, with plans to publish a comprehensive report on this study's results and workflow. Further validation with larger samples and diverse settings will also explore deeper links between sentiment and academic performance.

5. Conclusions

This study underscores LLMs' potential for sentiment analysis in education, offering a more efficient and nuanced understanding of student emotions than traditional methods. Integrating LLMs into research and practice can enhance strategies for improving student well-being and academic success.

References

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