Conversational Agents for Enhancing Education Through Scenario-Based learning

Information Systems, Intelligent Systems

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Context

In the context of modern education, the rapid evolution of technology and the increasing integration of digital tools require educators to adopt innovative methods to enhance student learning, with a growing emphasis on personalized and interactive learning experiences. Traditional educational methods often fall short in catering to the diverse learning needs and paces of individual students. Scenario-based learning, which involves learners engaging in realistic scenarios to apply their knowledge, has proven to be an effective pedagogical approach. The use of Generative Artificial Intelligence (GenAI), such as LLMs, there is an opportunity to enhance scenario-based learning experiences.

Objectives

This project aims to develop an intelligent educational LLM-based agent capable of guiding students through educational scenarios, resolving cases, and providing real-time assistance to clarify doubts. Focusing on pedagogical approaches, the agent will serve as a tutor, adapting to the student's learning style and pace to facilitate deeper understanding and engagement.

Innovation

By leveraging GenAI, the project aims to create a LLM-based agent for tutoring, involving dynamic and interactive learning scenarios, offering a practical and immersive educational experience that goes beyond traditional methods. The adaptive learning support feature allows the agent to tailor its guidance based on the learner’s progress, ensuring a personalized and effective learning journey. Additionally, the focus on pedagogical integration ensures that the agent's responses and interactions are grounded in proven educational theories and strategies, providing pedagogically sound and beneficial support for learners.

Workplan

1) Preparação da Dissertação (realizada a tempo parcial) Literature review on pedagogical methods and adaptive teaching strategies that can be applied with AI agents for learning interaction and learning scenarios, with a particular emphasis on scenario-based learning (SBL). Solution definition, including pedagogical methods, AI components and user interfaces. Data preparation for scenarios considering the defined models and formats. Description of testing and validation scenarios.

2) Realização dos trabalhos conducentes à Dissertação propriamente dita (em exclusividade) Creation of realistic, interactive learning scenarios Implementation of the core LLM-based agent Adaptation of the agent considering pedagogical methods selected Development and integration of algorithms for personalized learning paths, considering different levels of student expertise. Development of a user interface with module integration. Testing and validation of the learning solution. Dissertation writing.

Bibliography

Bai, S., Gonda, D. E., & Hew, K. F. (2024). Write-Curate-Verify: A Case Study of Leveraging Generative AI for Scenario Writing in Scenario-Based Learning. IEEE Transactions on Learning Technologies.

Shaaban, S. S. A., & Shaat, M. A. (2022). A Scenario-Based Learning Approach for Enhancing Al-Azhar University-Gaza Student-Teachers’ TEFL Practices in Inclusive Education Classes. Journal of Language Teaching and Research, 13(4), 740-748.

Profile

N/A

Venues

ETFA - IEEE Conference on Emerging Technologies & Factory Automation INDIN - IEEE International Conference on Industrial Informatics ICIT - Annual International Conference on Industrial Technology ICCA - IEEE International Conference on Control and Automation