Dr. Liyuan Liu, Saint Joseph's University, United States

**Bio:**

Dr. Liyuan Liu is an Assistant Professor in the Department of Decision & System Sciences at Saint Joseph's University (Philadelphia, PA, USA). She holds a Bachelor's degree in Business Administration with a concentration in Human Resource Management and advanced her studies with master's degrees in Financial Economics and Business Analytics. She earned a Ph.D. in Analytics and Data Science from Kennesaw State University (Kennesaw, GA, USA). She specializes in teaching Artificial Intelligence and Business Statistics. Her professional journey includes research roles at Equifax, Novelis, and Travelers, where she contributed as a data science researcher. Her academic and professional background, marked by diversity, naturally led her into data science, enabling her to refine artificial intelligence algorithms across various business applications and industry fields. Dr. Liu has impacted the field through her publications, which encompass topics such as Artificial Intelligence, Blockchain, HR Analytics, Healthcare, Education, Risk Modeling, and Data Security. She has authored and co-authored over 30 peer-reviewed scholarly articles. Moreover, she is actively engaged in supporting underrepresented groups, particularly young women in STEM programs, to foster inclusivity in education.

**Title:**

Beyond One-Size-Fits-All: An AI-Driven Approach for Personalized Quizzes Using Clustering and ChatGPT

**Abstract:**

With the rapid advancement of generative AI (GenAI), significant improvements have been noted in educational efficiency, notably in the preparation of teaching materials and student tutoring. GenAI offers educators the opportunity to customize learning materials, which can enhance student engagement and learning outcomes. Customized quizzes and exams have emerged as popular topics in educational research, demonstrating their potential to bolster learning. However, the adoption of customized learning in various educational institutions remains limited due to technical challenges and other issues. These include identifying student characteristics to group them, determining appropriate exam difficulty, ensuring fairness in generated quizzes/exams, and the lack of real-world applications to demonstrate method effectiveness.

In this study, we propose a framework that utilizes AI-driven clustering algorithms to group students based on background factors such as GPA, major, past quiz scores, and midterm exam results. We then profile each group and employ ChatGPT to generate quiz questions tailored to each group’s specific characteristics. We implemented this framework at a university in Philadelphia, USA, with students (freshmen and sophomores) who were enrolled in the same course. The results highlight the framework's effectiveness and feasibility, with statistical tests indicating that students perform better on customized quizzes than on traditional ones.