

Research Statement

Introduction

My research focuses on advancing the fields of learning analytics, text analysis, and digital business through the development of models, algorithms, and frameworks related to opinion mining, information retrieval, and entity extraction. For over a decade, I have been actively engaged in exploring how AI and analytics can be applied to enhance education technology, digital business processes, and user behavior analysis. My work spans the integration of AI in educational assessments and personalized learning environments, addressing ethical concerns such as fairness and transparency, and employing AI tools like ChatGPT to improve student engagement and mental health.

In addition to developing solutions for educational systems, my research applies to various domains, including software systems, digital business, and mobile applications. These areas often work with large, unstructured datasets, and my work offers domain-specific data and text mining methodologies that convert this unstructured data into actionable insights for both humans and machines. By focusing on analytics-driven approaches, my research contributes to optimizing learning processes, improving business decision-making, and creating scalable AI-driven tools that benefit both educational and business sectors. Through collaborations with industry and academic partners, I continue to drive innovation and apply my research to solve real-world problems.

Research Areas

Figure 1 depicts the two key areas of my research; education technologies and digital business. I have been actively participating in the research in both these areas and published several works in top journals and conferences.

Education Technologies	Digital Business
<ul style="list-style-type: none"> • AI and Ethics in Education • Educational Assessments & Emerging Technologies 	<ul style="list-style-type: none"> • AI and Machine Learning in Business Processes • Social Media and Business

Figure 1: Overview of my key research areas

AI and Ethics in Education

The integration of AI in education focuses on its growing role in transforming learning practices, especially in assessments and personalized learning environments. In this research, I explore students' adoption of AI tools, such as ChatGPT, as mentors in undergraduate computing projects, highlighting the potential of AI to enhance personalized learning experiences (Gottipati, Shim, Shankararaman, 2023). Studies like AI for Connectivism Learning examine how students interact with AI tools like ChatGPT in advanced programming courses, offering insights into how AI can support collaborative learning and critical thinking (Gottipati, Shim, Shankararaman, 2023). As AI becomes more prevalent in personalized learning environments and automated assessments, the research emphasizes the importance of addressing ethical challenges such as fairness,

transparency, privacy, and bias (Lim, Gottipati, Cheong, 2023). These concerns are critical as AI systems influence important decisions about student performance and learning outcomes. In this research I focus on the development of ethical frameworks to ensure that AI-driven educational tools are used responsibly, ensuring that they promote equitable learning opportunities without reinforcing biases or unfair practices (Lim, Gottipati, Cheong, 2023). This balance between harnessing AI for innovation and maintaining ethical standards is essential for the sustainable integration of AI in education. A new area of my research involves nudging in education by AI, where AI is used to provide subtle, data-driven prompts or "nudges" to students to encourage positive learning behaviors and improve outcomes. This approach enhances student engagement and self-directed learning through tailored feedback and recommendations.

Impact: Share the research in AI for education conferences (AMCIS, ICCE) where we present the. We also published papers in these top journals which helps bring reputation to SMU education (EAIT). Currently, I am working on the grant proposal application for "AI for Nudging in

Educational Assessments & Emerging Technologies

Another key area I explore is the use of advanced technologies to enhance assessments and learning in digital education. It emphasizes analytics-based assessments that personalize and reflect real-world skills, supported by AI and data analytics for deeper student insights (Lim, Gottipati, Cheong, 2023). The research also highlights emerging tools like virtual reality and AI (e.g., ChatGPT) to create interactive learning experiences (Gottipati, Shim, Shankararaman, 2023). Additionally, it addresses the ethical use of AI in education, ensuring fairness and transparency (Lim, Gottipati, Cheong, 2023).

Impact: Share the education research in the IS communities (AMCIS, ICCE, EDUCON) where we present the new curriculum designs and IS education findings. We also publish papers in these top conferences which helps bring reputation to SMU education. We also secured a MOE TRF grant in 2024, "**PresentationPro: Improving Public Speaking Skills through AI-Driven Virtual Reality Interactions (MOE Reference Number: MOE2023-TRF-015)**".

Learning & Curriculum Analytics

The third area of my focus is using data analytics and AI to improve education by analyzing student interactions, such as discussion forums and feedback. Research like Learning Web Programming: Identifying Complex Topics from Student Discussion Forums and Lecture Slides uses analytics to identify areas where students encounter difficulties, allowing educators to provide targeted support and improve learning outcomes (Gottipati, Shim, 2023). Similarly, studies such as Profiling student learning from Q&A interactions in online discussion forums demonstrate how analyzing these interactions can offer valuable insights into student engagement, understanding, and performance (Gottipati, Shim, 2021). Additionally, feedback and social media analytics are employed to assess student feedback from discussion forums and informal reflections, helping educators adapt teaching strategies and refine curriculum design to better meet student needs (Gottipati, Shankararaman, 2015). These analytics-driven approaches ensure more personalized learning and help keep curricula relevant in a dynamic educational landscape. Innovation in teaching is crucial to have effective learning for new generation students. This involves innovation in both the curriculum design and course design and delivery. In particular, I work with the teaching approaches

such as experiential learning, integrated project learning, min-case pedagogy, design thinking etc.

Impact: I work with SMU-X team to implement the experiential learning in undergraduate courses. I also share my teaching innovation with external researchers. For example, I work with AIS and APSEC societies which are active in IS and computers related research and pedagogy works. This is enable to build the network and enhance the reputation of SCIS and SMU. To enable such collaborations, not only I publish my research works but also run tutorials and workshops in the conferences organized by these societies

AI and Machine Learning in Digital Business

In this research area, I focus on applying AI and machine learning to optimize and automate business operations. Research in this area explores how these technologies can enhance decision-making, streamline processes, and increase efficiency across various business domains. For example, studies like Machine Learning Based Financial Aid Management Process investigate how AI models can be used to automate complex tasks such as financial aid distribution, reducing human error and improving accuracy (Gottipati, Shankararaman, 2023). Similarly, AI-driven tools are used for predictive analytics in fraud detection and risk management, helping businesses make more informed decisions. This area of research highlights the growing role of AI in transforming traditional business processes, making them more data-driven, efficient, and scalable. In my recent work, I am focusing on applying AI and Sensor techniques on the machine maintenance management.

Impact: This research has led to the development of practical tools like the SMU Scholarship Management Tool, created in collaboration with IITS at Singapore Management University. This AI-driven tool automates the scholarship management process, ensuring efficient allocation and distribution of funds. Furthermore, the impact of this work is disseminated through publications in leading business research communities, contributing to the ongoing discussion on the integration of AI in business processes.

Social Media and Business Analytics

My final research interest is to explore the use of data analytics to gain insights from social media platforms, helping businesses and educational institutions understand behaviors, trends, and perceptions. This area of research applies AI techniques such as text mining, sentiment analysis, and behavioral analytics to analyze large datasets. For example, studies like Analyzing tweets on new norm: Work from home during COVID-19 outbreak demonstrate how businesses can adapt to shifting trends and customer expectations during crises through social media insights (Gottipati, Shim, 2021). Additionally, Social Media Influencers and Instagram Storytelling explores how businesses leverage influencer marketing to optimize brand engagement and outreach (Chong, Gottipati, 2021). Recently, this research has expanded to include the analysis of student wellbeing through AI, social media, sensors, and behavioral analysis. By analyzing student behaviors and social media interactions, this work aims to improve educational outcomes by identifying mental health concerns and providing tailored support. This approach not only aids in optimizing teaching and learning processes but also enhances the overall student experience by addressing their well-being through data-driven insights. This research contributes to developing comprehensive strategies that align education and business practices with evolving social and behavioral dynamics. I

am extending this work to other domains such as healthcare by working closely with the medical professionals.

Grants

1. PresentationPro: Improving Public Speaking Skills through AI-Driven Virtual Reality Interactions, Tertiary Education Research Fund (TRF), Ministry of Education (MOE), 2023 , PI (Project Level):Kyong Jin Shim, Co-PI (Project Level): Swapna GOTTIPATI, \$144,302.20
2. Q&A Monkey: Platform for Personalized Learning and Improved Teaching Process, Technology-enabled Learning Grant, Singapore Management University Centre for Teaching Excellence (CTE) PI (Project Level): Kyong Jin SHIM, Co-PI (Project Level): Swapna GOTTIPATI, 2021
3. Perception Versus Reality: Measuring Digital Skills in Singapore, ICDL Asia Pte Ltd , PI (Project Level): Swapna GOTTIPATI, 2017, S\$6,426.42
4. Learning Analytics on Qualitative Student Feedback to Improve Teaching and Learning in Higher Education, Tertiary Education Research Fund (TRF), Ministry of Education (MOE) , PI (Project Level): Swapna GOTTIPATI , Co-PI (Project Level): Venky SHANKARARAMAN, 2016, S\$142,072
5. LiveClass: Live Class Discussion Management and Analysis Tool, SMU Internal Grant, Ministry of Education (MOE) Tier 1 , PI (Project Level): Venky SHANKARARAMAN , Co-PI (Project Level): Swapna GOTTIPATI, Seshan RAMASWAMI, 2017, S\$80,484

Future directions

Looking ahead, my research will focus on four key areas: AI-driven nudging in education, enhancing student well-being through AI and behavioral analysis, adult learning, and AI and sensor technologies in healthcare and navy operations. In education, I aim to develop AI systems that provide personalized, data-driven feedback to improve engagement and outcomes. I will also explore AI, social media, and sensors to monitor student well-being and provide timely support. Additionally, I will research AI's role in personalizing adult learning and apply AI and sensors to improve efficiency and decision making in healthcare. These areas align with my goal of leveraging AI for enhanced learning and operational efficiency.

Selected Publications

1. Lim, T., Gottipati, S., & Cheong, M.L.F. (2024). Educational Technologies and Assessment Practices: Evolution and Emerging Research Gaps. *Reshaping Learning with Next Generation Educational Technologies*, 136-172.
2. Don Ta, Phuc Nguyen, and Gottipati,S. (2023). ExGen: Ready-To-Use Exercise Generation in Introductory Programming Courses, 2023. **International Conference on Computers in Education**
3. Gottipati, S., Shim, K.J., & Shankararaman, V. (2023). Exploring students' adoption of ChatGPT as a mentor for undergraduate computing projects: PLS-SEM analysis. *Asia-Pacific Society for Computers in Education, International Conference on Computers in Education, ICCE*.
4. Gottipati, S., Shim, K.J., & Shankararaman, V. (2023). AI for Connectivism Learning—Undergraduate students' experiences of ChatGPT in advanced programming courses. *AMCIS 2023 Proceedings*. 14.
5. Lim, T., Gottipati, S., Cheong, M., Ng, J.W., & Pang, C. (2023). Analytics-enabled authentic

- assessment design approach for digital education. *Education and Information Technologies* 28 (7), 9025-9048.
6. Lim, T., Gottipati, S., & Cheong, M.L.F. (2023). Artificial intelligence in today's education landscape: Understanding and managing ethical issues for educational assessment.
 7. Lim, T., Gottipati, S., & Cheong, M.L.F. (2023). Ethical considerations for artificial intelligence in educational assessments. *Creative AI Tools and Ethical Implications in Teaching and Learning*, 32-79
 8. Gottipati, S., Shim, K.J., & Cheong, M.L.F. (2023). Learning Web Programming: Identifying Complex Topics from Student Discussion Forums and Lecture Slides. 023 IEEE Global Engineering Education Conference (EDUCON), 1-8
 9. Gottipati, S., Shankaraman, V. (2023). Machine Learning Based Financial Aid Management Process. *AMCIS 2023 Proceedings*. 14.
 10. Gottipati, S., Shim, K.J. (2021). Analyzing tweets on new norm: Work from home during COVID-19 outbreak. 2021 IEEE 11th Annual Computing and Communication Workshop and Conference
 11. Chong, M., & Gottipati, S. (2021). Social Media Influencers and Instagram Storytelling: Case Study of Singapore Instagram Influencers. *Journal of Applied Business and Economics* 22 (10)
 12. Gottipati, S., Shim, K.J., & Shankaraman, V. (2021). Profiling student learning from Q&A interactions in online discussion forums. *Asia-Pacific Society for Computers in Education, International Conference on Computers in Education, ICCE*.