

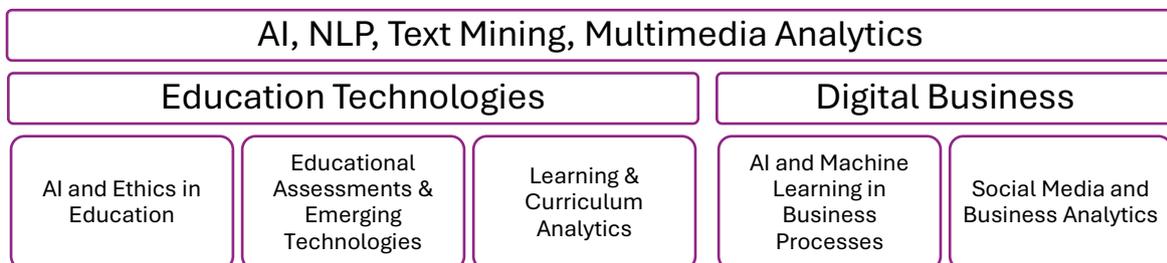
Research Statement

1. 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 content 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. To that end, I have designed assessment frameworks, developed AI-supported feedback and learning tools, and studied how emerging technologies like large language models (LLMs) can support connectivist and collaborative learning.

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.

2. Research Areas



Overview of my key research areas

My central research concern is how **AI and data analytics can be ethically and effectively integrated into education and business contexts to create real-world impact**. Some key questions include:

1. How can AI systems improve student engagement, mental health, and performance while preserving fairness and transparency?
2. What frameworks can ensure active learning, cognitive load management and ethical use of AI in teaching, educational assessments and feedback systems?
3. How can learning and curriculum analytics inform data-driven decision-making in teaching and course design?
4. How can businesses use AI and data analytics for real-time, scalable decision-making across domains like finance, maintenance, and customer insights?
5. How can social media and behavioral data be leveraged for understanding user profiles and models for education and business projects?

2.1 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 feedback and recommendations.

Impact: Share the research in AI for education conferences (AMCIS, ICCE) where we present our findings learning experiences of student with ChatGPTe. We also published papers in these top journals which help bring reputation to SMU education (EAIT). Currently, I secured a grant (conditional accept) for the project "AI for Nudging in Education" from SSG.

2.2 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".

2.3 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). Innovation in teaching is crucial to have effective learning for new generation students. 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 APSCE societies which are active in IS and computers related research and pedagogy works. This enabled to build the network and enhance the reputation of SCIS and SMU. Not only do I publish my research works but also run tutorials and workshops in the conferences organized by these societies.

2.4 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 SMU. 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.

2.5 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.

3. Research Evolution

As an Education Track Faculty, my research has evolved to focus on the application of data mining and text mining techniques across domains such as education, business process management, curriculum development, and digital transformation. The summary below represents my research evolution over the years, structured into three major phases. Each phase includes representative projects and publications. For the full list, please refer to my CV.



3.1 Phase I: Core Text Analytics, NLP & User Profiling

In the early stage of my research career, my work focused on solving text related problems involving information retrieval, sentiment mining, and user modeling. I developed models such as LDA, entity-extraction techniques, and ideological stance prediction systems using social media and debate data. Key research themes include, political stance detection, user profiling and attribute discovery, sentiment analysis from social media and discourse extraction and normalization. Selected works:

- *Extracting and normalizing entity-actions from users' comments* (COLING 2012)
- *Learning Topics and Positions from Debatepedia* (EMNLP 2013)
- *Predicting User's Political Party using Ideological Stances* (SocInfo 2013 – Best Paper Finalist)
- *Finding Thoughtful Comments from Social Media* (COLING 2012)
- *User Attribute Discovery –Political Affiliation Identification* (PAKDD 2014)

3.2 Phase II: Education Technology, Pedagogy, and Business Process Analytics

In this phase, my research aligned with my faculty role and institutional goals, focusing on education analytics, curriculum innovation, NLP & Text mining in education, and business process improvement using data-driven techniques. Key sub-areas:

A. NLP, Text Mining and Education Applications.

Key projects focus on mining student feedback using LDA and NLP, topical summarization and discourse analysis of discussion forums, opinion mining to improve course and instructional design. Selected works:

- *Text analytics for course improvement suggestions* (RPTEL, 2018)
- *Latent Dirichlet Allocation for textual feedback analysis* (ICCE 2018)
- *TopicSummary tool for forum analysis* (FIE 2019)
- *Discourse Analysis in Discussion Forums* (Best Paper Finalist - ICCE 2019)

B. Education Technology & Tools

Key projects focus on tools for student feedback analytics (SUFAT), mobile app for competency tracking, NLP based programming feedback systems and curriculum competency alignment tools. Selected works:

- *SUFAT – Student Feedback Analytics Tool* (FIE 2018)
- *Competency Analytics Tool* (EAIT Journal, 2017)
- *MyCompetencies – Mobile App for IS Students* (EDUCON 2016)
- *Semi-automated Feedback Tool for Programming Assignments* (ICCE 2016)

C. Education Pedagogy & Curriculum Innovation

Key projects focus on applied gamification and experiential learning, designed integrated project environments for IS education and embedded analytics into business process modeling and data courses. Selected works:

- *Gamification in Outreach Camps* (FIE 2018)
- *Enterprise Integrated Project Environment* (FIE 2017)
- *Data Warehousing and Business Analytics Course with Experiential Learning* (AIS SIGED 2016 – Best Paper)
- *Analytics in Business Process Modeling Course* (AIS SIGED 2015)

3.3 Phase III: AI in Education, Digital Transformation, AI Ethics

This phase marks a strategic evolution of my research into addressing systemic, design and ethical aspects in using AI and analytics in education and business. Key sub areas:

A. AI in Education & Instructional Analytics

I am exploring how AI and analytics can enhance teaching, formative assessment, and instructional design, with focus on automated evaluation tools, feedback-aware learning systems, NLP for formative assessments and instructional design based on student engagement patterns (e.g., video/audio logs). Selected works:

- *Learning-Undergraduate Students' Experiences of ChatGPT* (2023)
- *"Analytics-informed Instructional Design for Higher Education"* (2022)
- *"ExGen: Ready-to-use exercise generation in introductory programming courses"* (2023 - Best Paper)
- *"SlideIO: Enhancing PPTs using AI Nudges"* (2025, pilot work)
- *AI-driven nudge generation in education* (Ongoing prototype with LLMs)

B. Digital Transformation & Curriculum Innovation

This line of research builds frameworks for embedding emerging tech (AI, analytics) into education, policy, and curriculum such as mapping SkillsFuture frameworks into IS courses, tools for outcome-based curriculum redesign, WFH analytics from social media during the pandemic and AI-powered dashboards for student feedback & outcome alignment. Selected works:

- *Curriculum Analytics for Skills Alignment with SFw* (2022)
- *Social Media Mining for Work-from-Home Policy Analysis* (2021)
- *Outcome Mapping Tools for IS Curriculum Redesign* (2020–2023)

C. Responsible AI & Ethics in EdTech

I've worked on ethics frameworks that address fairness, transparency, bias, etc., in AI-enabled learning systems and assessment tools, ethical governance models for LLMs in education and student trust and explainability in automated grading systems.

- *"Ethical Considerations for AI in Educational Assessments"* (2023)
- *"Educational Technologies and Assessment Practices: Evolution and Emerging Research Gaps"* (2024)

4. Future directions

Looking ahead, I'll continue to focus on four key research 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'll continue exploring LLMs, AI, social media, and sensors to research student well-being projects. Additionally, I am interested in researching AI's role and application of sensors in improving efficiency and decision making in healthcare. These areas align with my goal of leveraging AI for enhanced learning and operational efficiency. I will continue to work with the UG students in research collaborations and focus my efforts on translational research.