Beichen Xue

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RESEARCH INTERESTS

My research interests lie in human-centered HCI, with a focus on understanding the explicit and implicit impacts of human-AI interactions on people. I am particularly interested in how users' mental models of a system influence their reactions and experiences.

EDUCATION

National University of Singapore	**Aug 2021 –**
Bachelor of Science in Data Science and Analytics, Minor in Computer Science	**Present**

- Expected Date of Graduation: June 2025
- Relevant Courses: CS3244 Machine Learning, PL3103 Cognitive Psychology

EXPERIENCES

Human Computer Interaction Part-Time Research Intern, NUS School of Computing	**Oct 2024 –**
	Present

- Designed experiments on exploring how AI confidence levels expressed through natural language impact human confidence in decision making context. Investigated verbal and cognitive alignment between human and AI, with a focus on lasting effects across tasks.
- Designed EEG-based experiment to assess cognitive states of human confidence before and after decision-making.
- Explored social influence of AI through contagion and conformity in interactions with humans.

Machine Learning Part-Time Research Intern, NUS Department of Mathematics	**July 2023 –**
	Dec 2023

- Conducted mathematical analysis on self-attention mechanisms, applying nonlocal methods to optimize graph-based diffuse interface functionality.
- Developed task-specific transformers utilizing image deconvolution techniques, enhancing model denoising capabilities.

Machine Learning Summer Research Intern, NUS Department of Mathematics	**April 2023–**
	June 2023

- Mathematically established that incorporating layer-wise nonlinear activation into stacked state-space models improves their ability to approximate complex sequence-to-sequence relationship.
- Demonstrate the exponential memory decay of state-space models through theoretical and empirical analysis.

Machine Learning Intern, Amaris.AI	**May 2022 –**
	July 2022

- Conducted a detailed evaluation of a T5 transformer model for question generation, analysing its strengths and limitations.

- Investigated application of Knowledge Graph Ontology to enhance generation of abstract and templated questions, improving model's ability to create varied and contextually relevant outputs.

PUBLICATIONS

- **We Shape AI, and Thereafter AI Shape Us: Humans Align with AI through Social Influences, ICLR 2025 Workshop & CHI 2025 SIG**
- **State-Space Models With Layer-Wise Nonlinearity Are Universal Approximators With Exponential Decaying Memory, NeurIPS 2023**

SKILLS

- Machine Learning/Deep Learning: PyTorch-Transformers, Graph Learning, Natural Language Processing
- System Development: Full-Stack (Frontend + ML-based backend) interactive system development
- Physiological Signals: EEG Signal collection and processing
- Database: PostgreSQL (PL/pgSQL)