Kaiang Wen

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Education

Illinois Institute of Technology, IL, USA *Aug 2023 – Present*
Ph.D. in Computer Science, 3.64 GPA

- Research interests: Virtual/Augmented Reality, Machine Learning, Human-Computer Interaction
- Advisor: Prof. Mark Roman Miller

Beijing Jiaotong University, BJ, China *Sep 2019 – Jun 2023*
B.S. in Computer Science, 3.5 GPA (3.76 in 6th sem)

- First place recipient of the Technology Star Scholarship, the highest honor for disciplinary competitions and research innovations
- BJTU ACM team member
- Advisor: Prof. Xinhang Song

Research Experience

SSIL Lab, Illinois Institute of Technology Chicago, IL
Research Assistant (Advisor: **Mark Roman Miller**) *Aug 2024 – Present*

- Designing and implementing VR applications in Unity3D, leveraging spatial computing and advanced motion planning on Oculus Quest to decode user behavior and cognitive states through motion dynamics.
- Developing and deploying LSTM-based recurrent neural networks to predict user intent by analyzing high-dimensional, noisy time-series motion data from VR systems.
- Implement Time Series Explanation (TSE) techniques to interpret model behavior, identifying critical temporal patterns in motion data that drive predictive outcomes.
- Engineer data pipelines for cleaning, processing, and visualizing raw motion-tracking data to ensure the quality and integrity of model inputs.

CS550 Advanced Operating Systems, Illinois Institute of Technology Chicago, IL
Project Lead – Efficient KV-Cache Replacement for LLMs *Mar 2024 – Apr 2024*

- Designed and implemented a Special-Character-Aware Caching (SCAC) strategy for Llama-2-7B that reduced perplexity by 62% compared to the baseline, optimizing memory efficiency and inference accuracy.
- Conducted comprehensive ablation studies to validate the model's performance under various data corruption scenarios and cache configurations.
- Collaborated in a team of two to implement a PyTorch-based codebase built upon StreamingLLM, delivering open-source code: GitHub Repository.

Megvii Research (Face++) Beijing, China
Research Intern *Jul 2022 – Oct 2022*

- Led an independent research project focusing on time-series analysis, applying computer vision and deep learning to extract and predict physiological signals from noisy laser-illuminated video data.
- Investigated and implemented methods to accelerate Neural Radiance Field (NeRF) training, improving the computational efficiency of complex 3D reconstructions.

VIPL Lab, Chinese Academy of Sciences Beijing, China
Visiting Student (Advisor: **Xinhang Song**) *Aug 2021 – Mar 2023*

- Researched on cervical spondylosis measurement using a U-Net-based model in PyTorch for segmentation and MMPose for pose estimation.
- Achieved a 75% reduction in Cobb metric error (from 20° to 4.88°) through advanced image processing and model optimization, demonstrating expertise in computer vision and machine learning.
- Collaborated with clinicians from Peking University Third Hospital to ensure accurate data labeling and validation.

Publications

Conference Papers

[1] **K. Wen***, Y. Huang*, M. M. R. Mannan*, E. Trost-Goldhammer, M. R. Miller, "Impediments to Motion can be Impediments to Cognition in Augmented Reality," *Under Review.*
[2] **K. Wen**, B. Xie, B. Duan, Y. Yan, "Mambareg: Mamba-based disentangled convolutional sparse coding for unsupervised deformable multi-modal image registration," *arXiv:2411.01399 (2024).* link

Software

[1] VR Motion Tracker: Unity-Based open-source application for experimental human motion data collection and 3D visualization link

Awards & Honors

Bronze Medal in 45th ICPC – Jinan Site

Silver Medal in 2020 CCPC – Mianyang Site

- Top performance in one of the world's most prestigious programming competitions, demonstrating strong problem-solving and teamwork under time pressure.

First Prize in 2020 Contemporary Undergraduate Mathematical Contest in Modeling, Beijing

First Place Recipient of the Technology Star Scholarship in School of Computer and Information Technology, BJTU

- **Highest honor** for outstanding performance in disciplinary competitions and research innovations.

Teaching Experience

CS584 Machine Learning TA *Jan 2025 – May 2025*
College of Computing, Illinois Institute of Technology Chicago, IL
- Held office hours, maintained the course GitHub group, and graded assignments and exams.

CS577 Deep Learning TA *Aug 2024 – Dec 2024*
College of Computing, Illinois Institute of Technology Chicago, IL
- Held office hours, hosted a guest lecture, and graded assignments and exams.

CS584 Machine Learning TA *Jan 2024 – May 2024*
College of Computing, Illinois Institute of Technology Chicago, IL
- Held office hours, taught a lab session, designed and graded assignments and exams.

Digital Imaging Processing Sole TA *Feb 2023 – Jun 2023*
School of Computer and Information Technology, Beijing Jiaotong University Beijing, China
- Independently designed programming assignments to improve student understanding of course content, and graded assignments and exams.

Skills

Programming Languages	C++, Python, C#, R
ML Frameworks	PyTorch, TensorFlow/Keras, Hugging Face
Web & App Frameworks	Django, Unity3D
Databases	MySQL, MongoDB
Tools & Platforms	Docker, Git, LaTeX, Linux, Windows, Android
Interests & Specialties	Large Language Models, Virtual/Augmented Reality, HCI, Computer Vision, Digital Image Processing, Object Detection, Pose Estimation, Medical Imaging, Machine Learning, Statistical Modeling

Professional Service

Peer Reviewing	ACM Symposium on Virtual Reality Software and Technology (VRST)	2025
Peer Reviewing	Journal of Medical Internet Research	2025
Peer Reviewing	Pattern Recognition	2025