Kevin Guo

khguo@usc.edu

EDUCATION

University of Southern California Jan 2023 — May 2025
Bachelor of Science in Computer Science GPA: 3.72/4.00

Irvine Valley College Aug 2021 — Dec 2022
Mathematics and Computer Science (Honors) GPA: 4.00/4.00

RESEARCH EXPERIENCE

Irimia Laboratory, USC Aug 2023 — Present
Research Assistant — Advised by Andrei Irimia

- Designed 3D-CNN for biological brain age (BA) estimation from T_1w MRIs.
- Conducted qualitative and quantitative analysis of attribution-based saliency methods' capacity for robust neuroanatomic insights during BA estimation using 3D-CNNs on T_1w MRIs.
- Artificially perturbed MRIs to dilate the lateral ventricles in proportion to age; thus creating a measurable benchmark (ability to capture corresponding dilations) in saliency map insights for aging.
- Led and first-authored *Anatomic Interpretability in Neuroimage Deep Learning: Saliency Approaches for Typical Aging and Traumatic Brain Injury* in Neuroinformatics Journal
- Currently investigating aging and cognitive decline through local (voxel-level) BA estimations across various social determinants of health and cardiovascular conditions.

NASA Ames Research Center, NASA Aeronautics Research Institute Aug 2022 — May 2024
AI/ML Research Intern — Advised by Stephen Clarke and Krishna Kalyanam

- Designed and engineered hybrid neural network/rule-based inverse text normalization framework to format telecon transcripts from written to readable form. Decreased Word, Capitalization, and Punctuation Error Rate from 54% to 5.47%.
- Created the first database of capture group recipes for aviation phraseology using rule-based methods created with Regular Expressions.
- Tuned transformer-based models like BERT and DistilBERT to address conversational English within air traffic control speech. Achieved Capitalization Error Rate of 2.00%.
- Led and first-authored *Inverse Text Normalization of Air Traffic Control System Command Center Planning Telecon Transcriptions.*

Health Information Privacy Laboratory, Vanderbilt University Medical Center May 2023 — Aug 2023
NSF REU Fellow, Biomedical Informatics — Advised by Bradley Malin

- Investigated split learning's capacity for privacy-preserving distributed deep learning across healthcare organizations.
- Conducted model inversion attacks at the cut layer where latent data representations are passed from the client half to the server half of the global model
- Trained and tested pilot models using MNIST, EMNIST, FEMNIST. Quantified privacy-protection through image reconstruction accuracy.
- Orchestrated visualizations and PCA and t-SNE dimensionality reductions of smash-layer data
- Trained split neural network on MIMIC-IV clinical datasets to explore potential information leaks in electronic health records.

California Polytechnic University, Pomona October 2021 — May 2023
Research Assistant — Advised by Dr. Yu Sun

- Developed pose analysis application to aid youth athletics and education: Utilized Mediapipe Pose to track landmark joints of the human body. Implemented k-Means algorithmn to cluster pose data within participant videos and identify similar poses between two participants (typically a student and a coach).
- Academic literature simplifier: Developed a tool to streamline dense academic texts into digestible outlines for younger audiences. Implemented transformer and sentiment analysis framework.

PUBLICATIONS

[1] K. Guo, N. Chaudhari, T. Jafar, and A. Irimia, **Anatomic Interpretability in Neuroimage Deep Learning: Saliency Approaches for Typical Aging and Traumatic Brain Injury**., Neuroinformatics Journal, Nov. 2024.

[2] K. Guo, S. Clarke, and K. Kalyanam, **Inverse Text Normalization of Air Traffic Control System Command Center Planning Telecon Transcriptions**, Proceedings of AIAA Aviation, Aug. 2024.fd

PRESENTATIONS

[1] Inverse Text Normalization of Air Traffic Control System Command Center Planning Telecon Transcriptions, AIAA Aviation Forum, (July 2024).

[2] Comparing Brain Age Saliencies Generated by Deep Neural Networks from Magnetic Resonance Imaging. USC CURVE Research Symposium (April 2024).

[3] Measuring the Privacy Utility Trade-offs of Split Learning. Vanderbilt University Medical Center, Department of Biomedical Informatics Summer Research Symposium (Aug 2023).

AWARDS

CURVE Fellowship Aug 2023-May 2024
$2500 – Supports USC undergraduates with potential for significant contributions in engineering.

NSF REU Fellowship May 2023-Aug 2023
$6000 + Housing and Food Stipend – Supports exceptional undergraduates for one summer at an external institution

TEACHING

Coding Minds Aug 2021 — May 2023
Lead Assessment Instructor, AI Project Lead

- Conducted 100+ one-on-one student assessments to place students into best-fit course plan. Trained 10+ peer instructors on conducting course assessments and developing initial course plans.
- Ideated and led introductory AI-focused projects in computer vision and natural language processing for advanced high-school students.
- Developed and delivered lessons in Python, Java, and C++ classes to students in elementary to high school.

LEADERSHIP/COMMUNITY OUTREACH

HackSC March 2023 — Present
Product Manager

- Led three-SWE team in backend migration of Hibiscus, HackSC's open-source event management platform
- Designed and deployed Hibiscus microservices, REST APIs, and their documentation
- Managed teams of product designers and engineers to ensure smooth collaboration between teams and deployment of products.

Service

- Pioneered HackSC X, Southern California's flagship AI Hackathon with over 200 participants
- Led community outreach events like HackSC Jr. in partnership with the National Society of Black Engineers to make technology and programming more accessible for populations historically marginalized in engineering

Relevant Coursework and Skills

Computer Science and Mathematics: Machine Learning, Artificial Intelligence, Probability Theory, Algorithms and Theory of Computing, Linear Algebra, Differential Equations, Multivariable Calculus/Analytic Geometry, Data Structures and Object Oriented Design, Discrete Methods, Embedded Systems, Computer Systems, Smart Devices: Electronics/Wearables, Software Development, Operating Systems
Sciences: General Chemistry I and II, Intro Biology, Physics I
Techincal Skills: PyTorch, Tensorflow, Cuda, Python, MATLAB, Java, C++, HTML/CSS