Kexin Chen

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Education

University of California, Irvine Irvine, CA

PhD, Cognitive Neuroscience 2018 - 2023

Advisor: Dr. Jeffrey Krichmar

Thesis: Computational Approaches Towards Understanding a Multi-Region Brain Circuits Role in Spatial Navigation

University of California, San Diego San Diego, CA

BS, Cognitive Science - Computation. Minor: Mathematics 2014 - 2017

Research Experience

Graduate Researcher Sept 2018 - present

Cognitive Anteater Robotics Laboratory, UC Irvine Irvine, CA

- Designed and implemented neural network models for visual motion perception and self-navigation based on inspirations from the brain
- Designed experiments to test the robustness of the models and conducted statistical analyses on model outputs and empirical data
- Developed and maintained an open source spiking neural network simulator written in C++ and utilized CUDA
- Collaborated in a multi-functional group and integrated cross-disciplinary approaches to tackle research problems
- Led lab sections for a robotics class with 100 students and guided students to realize project ideas with Python code

Research Assistant Apr 2017 - Sept 2017

Systems Neuroscience Lab, UC San Diego San Diego, CA

- Researched on machine learning techniques and quantitative methods to analyze high-dimensional neural data
- Applied a non-parametric feature space analysis technique that was not applied to neural data before to find activity patterns in the data
- Examined results from the model and performed statistical analyses to infer the internal structure of the data
- Led the data analysis portion of the project and initiated iterations of the analysis to improve the results

Industry Experience

Machine Learning Engineer Internship June 2022 - Sept 2022

Meta Menlo Park, CA

- Developed scalable end-to-end data pipelines for trending event detection, media sourcing, and trend delivery for timely and high-quality recommendations of video contents
- Generated user-to-video embeddings with TTSN models and utilized KNN clustering to facilitate personalized content delivery
- Evaluated detection algorithms with online and offline experiments and identified optimal parameters that led to consistent growth in creation and consumption metrics
- Collaborated with cross-functional team members and analyzed engagement data thoroughly to understand product objectives and user preferences

Machine Learning Engineer Internship June 2021 - Sept 2021

Facebook Remote, CA

- Developed an Ads ranking model that utilized feature selection and led to significant lifts in key metrics including app install SAV (+40 %) and in-app purchase SAV (+6 %)
- Conducted a comprehensive feature analysis that informed an effective feature roadmap
- Designed and conducted online A/B Testing experiments and analyzed the online revenue gain
- Adapted a Multi-Task-Multi-Label network architecture that increased data efficiency, mitigated the label sparsity issue, and reduce complexity in model maintenance
- Incorporated a wide component into the deep neural network that captured implicit correlations between features which led to $\sim 0.2\%$ NE gains

Software Engineer <div align="right">Sept 2017 - Aug 2018</div>

DeepRadiology Inc. <div align="right">Santa Monica, CA</div>

- ○ Focused on a deep learning computer vision project that used deep convolutional neural networks to perform pathology detection with medical images such as X-ray or CT scans
- ○ Integrated a channel attention mechanism into the existing network architecture to improve network performance with light additional computation cost
- ○ Evaluated the added module against our existing implementation with quantitative methods
- ○ Created a label sorting method to automatically resolve conflicts in the data labels caused by human mistakes

Publications

- **Chen K**, Beyeler M, Krichmar JL (2022). *Cortical motion perception emerges from dimensionality reduction with evolved spike-timing dependent plasticity rules.* Journal of Neuroscience. DOI: 10.1523/JNEUROSCI.0384-22.2022

- Niedermeier, L, **Chen, K**, Xing, J, Das, A, Kopsick, JD, Scott, EO, Sutton, N, Weber, K, Dutt, N, Krichmar, JL (2022). *CARLsim 6: An Open Source Library for Large-Scale, Biologically Detailed Spiking Neural Network Simulation.* IJCNN 2022.

- Kopsick, JD, Tecuatl, C, Moradi, K, Attilli, SM, Kashyap, HJ, Xing, J, **Chen, K**, Krichmar JL, Ascoli, GA (2022). *Robust Resting-State Dynamics in a Large-Scale Spiking Neural Network Model of Area CA3 in the Mouse Hippocampus.* Cogn Comput. https://doi.org/10.1007/s12559-021-09954-2

- **Chen K**, Johnson A, Scott, EO, Zou X, De Jong KA, Nitz DA, Krichmar JL (2021). *Differential Spatial Representations in Hippocampal CA1 and Subiculum Emerge in Evolved Spiking Neural Networks.* IJCNN 2021.

- Zou X, Scott, EO, Johnson A, **Chen K**, Nitz DA, De Jong KA, Krichmar JL (2021). *Neuroevolution of a recurrent neural network for spatial and working memory in a simulated robotic environment.* GECCO 2021.

- Xing J, Nagata T, **Chen K**, Neftci E, Krichmar, JL. (2021) *Domain Adaptation In Reinforcement Learning Via Latent Unified State Representation.* AAAI 2021.

- **Chen K**, Hwu T, Kashyap HJ, Krichmar JL, Stewart K, Xing J and Zou X (2020) *Neurorobots as a Means Toward Neuroethology and Explainable AI.* Front. Neurorobot. 14:570308. doi: 10.3389/fnbot.2020.570308

Honors & Awards

- John I. Yellott Scholar Award - Honorable Mention. 2019. 2020.

- Google Phd Fellowship - Campus Nomination. 2019.

Academic Service

- **Co-Organizer & Program Committee:** NeuroVision Workshop at CVPR 2022

- **Guest Editor:** Biological Cybernetics Special Issue: What can Computer Vision learn from Visual Neuroscience?

Conferences & Presentations

- Oral presentation: "Differential Spatial Representations in Hippocampal CA1 and Subiculum Emerge in Evolved Spiking Neural Networks". IJCNN 2021

- Poster presentation: "MSTd-like response properties emerge from evolving STDP and homeostatic parameters in a Spiking Neural Network (SNN) model". Neuroscience 2019.