

Kezhen Chen

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Immigration Status: Permanent Resident (Green Card)

Website: www.kezhenchen.net

creativity, communication, and analytical skills.

Professional Summary

- ❖ Strong research experience in LLM Pretraining & Finetuning, Data Processing, Knowledge Representation&Reasoning, Neuro-Symbolic Reasoning, Vision and Language, Large-scale Multi-Modality Model.
- ❖ Published multiple papers on top-tier AI conferences, such as AAAI, ICML, NeurIPS. Received *Best Paper Award* at KR2ML workshop, NeurIPS 2019.
- ❖ Outstanding problem solving, critical thinking,

Skills & Expertise

- ❖ Programming Language – Python, LISP, Java
- ❖ Analytical/Scientific software – MATLAB
- ❖ Knowledge Graph Ontologies – ResearchCyc, Wikidata, ConceptNet
- ❖ Cloud Architecture – Azure, Google Cloud
- ❖ Research tools – Scikit-Learn, CogSketch, SAGE
- ❖ Deep learning tools: PyTorch, Tensorflow, Huggingface, Jax
- ❖ Operating system – Windows, Linux, MAC OS

Research and Professional Experience

Staff Research Scientist, Together AI

Jan.2024 – present

- ❖ Leading the multi-modality foundation model project and achieved promising results on general and biomedical domain.
- ❖ Working on LLM pretraining project. Conducting data ablation studies to explore the optimal data processing and mixture strategies.
- ❖ Working on the long-context RAG coding generation project. Conducted the RAG-based finetuning to improve the code generation.

Research Scientist, [Google X](#) (collaborated with [Google Deepmind](#))

June.2022 – Jan.2024

- ❖ Conducted researches on large multi-modality foundation models.
- ❖ Developed new approaches for multi-modality instruction tuning and zero-shot open-vocabulary detection.
- ❖ Working on “AI for Science” research. Developing new multi-modality fundamental model in environment domain/ earth science domain (modalities including soil, weather, terrain, language, vision, etc.)
- ❖ Exploring new efficient parameter tuning algorithms to improve the training efficiency, performance, consistency, continuous learning and reasoning abilities of large-scaled foundation models

Visiting Scholar, [UC Santa Cruz](#)

Sept.2023 – present

- ❖ Conducting researches on knowledge-augmented foundation models
- ❖ Developing new AI approaches inspired by human cognition to improve reasoning, interpretability, robustness and few-shot learning abilities of LLMs

Researcher Engineer, Research Intern [Microsoft Research AI, Redmond](#)

May.2019 – May.2021

Research project: Neural-Symbolic Reasoning

Advisor: Paul Smolensky, Qiuyuan Huang, Hamid Palangi, Jianfeng Gao

- ❖ Developed new deep learning models that combine the symbolic representations as inductive bias to improve the structural learning ability and reasoning ability of deep learning models.

Research project: Commonsense Multimodal Understanding

Advisor: Qiuyuan Huang, Daniel McDuff, Yonatan Bisk, Jianfeng Gao

- ❖ Created a new multi-modal architecture for commonsense vision and language question-answering by leveraging knowledge graph information via a unified fusing framework.

Research project: Image Commenting

Advisor: Qiuyuan Huang, Daniel McDuff, Jianfeng Gao

- ❖ Constructed a new vision and language task and dataset, NICE dataset, to promote models to generate emotional comments on images.

Selected Publications & Research Papers

- ❖ Yang, D., Rao, J., **Kezhen Chen**, Guo, X., Zhang, Y., Yang, J., and Zhang, Y. "[IM-RAG: Multi-Round Retrieval-Augmented Generation Through Learning Inner Monologues](#)" accepted by SigIR, 2024
- ❖ Gao, C., **Kezhen Chen**, Rao, J., Sun, B., Liu, R., Peng, D., Zhang, Y., Guo, X., Yang, J., and Sub, V "[Higher Layers Need More LoRA Experts](#)" preprint by *arXiv2402.08562*, 2024
- ❖ **Kezhen Chen***, Guo, X.*, Rao, J., Zhang, Y., Sun, B., and Yang, J. "[LOWA: Localize Objects in the Wild with Attributes](#)" preprint by *arXiv2305.20047*, 2023
- ❖ Diji Yang*, **Kezhen Chen**, Rao, J., Guo, X., Zhang, Y., Yang, J., Zhang, Y. "[Tackling Vision Language Tasks Through Learning Inner Monologues](#)" preprint by *arXiv:2309.04041*, 2023
- ❖ Jiaying Lu*, Rao, J., **Kezhen Chen**, Guo, X., Zhang, Y., Sun, B., Yang, J. "[Evaluation and Mitigation of Agnosia in Multimodal Large Language Models](#)" preprint by *arXiv:2308.09970*, 2023
- ❖ **Kezhen Chen***, Forbus, K. Srinivasan, B., Chhaya, N., and Usher, M. "[Sketch Recognition via Part-based Hierarchical Analogical Learning](#)" accepted by *IJCAI 2023*
- ❖ **Kezhen Chen***, Forbus, K. "[Visual Relation Detection using Hybrid Analogical Learning](#)" accepted by *AAAI 2021*
- ❖ **Kezhen Chen***, Huang, Q., McDuff, D., Gao, X., Palangi, H., Wang, J., Forbus, K., Gao, J. "[NICE: Neural Image Commenting with Empathy](#)" accepted by *Findings of EMNLP2021*
- ❖ **Kezhen Chen***, Huang, Q., Palangi, H., Smolensky, P., Forbus, K., Gao, J. "[Mapping Natural-language Problems to Formal-language Solutions using Structured Neural Representations](#)" *ICML 2020*
- ❖ **Kezhen Chen***, Forbus, K., Gentner, D., Hespos, S., and Anderson, E. "[Simulating Infant Visual Learning by Comparison: An Initial Model](#)" *CogSci 2020*
- ❖ **Kezhen Chen***, Rabkina, I., McLure, M., and Forbus, K. "[Human-like Sketch Object Recognition via Analogical Learning](#)" *33th AAI preceeding, Jan, 2019*
- ❖ **Kezhen Chen***, Huang, Q., Palangi, H., Smolensky, P., Forbus, K., Gao, J. "[TP-N2F: Tensor Product Representation for Natural to Formal Language Generation](#)" *KR2ML workshop, NeurIPS 2019 (Best Paper Award)*
- ❖ **Kezhen Chen***, Huang, Q., Bisk, Y., McDuff, D., Gao, J., "[KB-VLP: Knowledge Based Vision and Language Pretraining.](#)" accepted by *PMLR workshop ICML 2021*
- ❖ **Kezhen Chen***, Huang, Q., Smolensky, P., Forbus, K., Gao, J. "[Learning Inference Rules with Neural Tensor Product Rules](#)" *Babymind workshop, NeurIPS 2020*
- ❖ **Kezhen Chen*** and Forbus, K., "[Action Recognition from Skeleton Data via Analogical Generalization over Qualitative Representations](#)" *32th AAI preceeding, Feb, 2018*

Education

Northwestern University, Evanston, IL

Sept.2016 - June.2022

Ph. D. candidate in Computer Science.

❖ *Working in Qualitative Reasoning Lab.*

❖ Research area: Knowledge Graph Reasoning, Multiple-modality understanding, Neuro-Symbolic, LLM, Analogical Reasoning

❖ PhD Mentor: [Prof. Kenneth D. Forbus](#)

❖ Research Advisors: [Prof. Dedre Gentner](#), [Prof. Bryan Pardo](#), [Prof. Han Liu](#)

University of Rochester, Rochester, NY

Sept.2012 - May.2016

Bachelor of Science in Computer Science, Minor of Arts in Economics and in Mathematics

❖ *Highest Honor degree*

❖ Dean's List for 3 semesters (2013-2015)

❖ Research Advisors: [Prof. Jiebo Luo](#), [Prof. Henry Kautz](#), [Prof. Ehsan Hoque](#)

Services

❖ Senior Program Committee, AAAI, 2024

❖ ACL Rolling Reviewer (ARR), 2021 - present

❖ Program Committee, ACL 2023

❖ Program Committee, EMNLP 2022 - 2023

❖ Program Committee, NeurIPS 2023

❖ Program Committee, ICML 2022 - 2023

❖ Program Committee, AAAI 2020 - 2023