Muru Zhang

Seattle, WA (206) 245-7454
nanami17@cs.washington.edu - https://nanami18.github.io/

Education

University of Washington – Seattle, WA September 2022 – June 2024
M.S. in Computer Science GPA: 3.96
Advisor: Noah A. Smith

University of Washington – Seattle, WA September 2020 – June 2022
B.S. in Computer Science, B.A. in Mathematics GPA: 3.95
Honor and Award: James Hewitt Endowed Scholarship

Publication

Li, Y., **Zhang, M**., Grotz, M., Mo, K., & Fox, D. (2023). STOW: Discrete-Frame Segmentation and Tracking of Unseen Objects for Warehouse Picking Robots. *CORL 2023*, URL: https://sites.google.com/view/stow-corl23

Zhang, M., Press, O., Merrill, W., Liu, A., & Smith, N.A. (2023). How Language Model Hallucinations Can Snowball. *Under Review,* URL: https://arxiv.org/abs/2305.13534

Walsman, A., **Zhang, M**., Choudhury, S., Farhadi, A., & Fox, D. (2023). Impossibly Good Experts and How to Follow Them. *ICLR 2023,* URL: https://openreview.net/forum?id=sciA_xgYofB

Press, O., **Zhang, M**., Min, S., Schmidt, L., Smith, N.A., & Lewis, M. (2022). Measuring and Narrowing the Compositionality Gap in Language Models. *EMNLP 2023 Findings,* URL: https://arxiv.org/abs/2210.03350

Walsman, A., **Zhang, M**., Kotar, K., Desingh, K., Farhadi, A., & Fox, D. (2022). Break and Make: Interactive Structural Understanding Using LEGO Bricks. *ECCV 2022*, URL: https://arxiv.org/abs/2207.13738

Research Experience

University of Washington – Noah's ARK March 2022 – Present
Supervisor: Noah A. Smith

- **How Language Model Hallucinations Can Snowball:** Designed datasets and evaluation pipeline to investigate how hallucinations in language models can snowball. Found that when conditioned on previous hallucinations, state-of-the-art models can generate hallucinations that they can recognize as wrong when prompted separately.
- **Measuring and Narrowing the Compositionality Gap in Language Models:** Developed a multi-hop question-answering dataset to assess compositionality in large language models. Observed that model size growth doesn't enhance knowledge composition. Introduced a novel prompting method that boosts compositionality.
- **On continued pretraining for better and faster fine-tuning performance:** Research on leveraging the optimizer state used in the language model pretraining to achieve faster and better few-shot full-parameter fine-tuning and parameter-efficient fine-tuning.

Applied Scientist Intern – Amazon Web Services (AWS) CodeWhisperer June 2023 – September 2023

- **Towards Long-Range Context Modeling and Generation for LLMs:** Designed and implemented a new transformer architecture that aims to model long-context more efficiently. Trained a series of models up to 1.3B parameters, achieved up to 6x speedup at the inference time compared with vanilla transformer on the range of 16k context length and is able to maintain up to 92% of the performance.

University of Washington – Robotics and State Estimation Lab/Amazon June 2022 – March 2023
Supervisor: Dieter Fox, Maya Cakmak, Joshua Smith

- **STOW: Discrete-Frame Segmentation and Tracking of Unseen Objects for Warehouse Picking Robots:** Worked on the perception part of a robotics project on developing a grasping pipeline in warehouse settings, replicating tasks performed by Amazon workers. Built a transformer-based video segmentation and tracking model based on Detectron2 that better utilizes memory information to handle ambiguous detection scenarios and allow object re-identification even with large movements and occlusion.

University of Washington – Robotics and State Estimation Lab September 2020 – September 2022
Supervisor: Dieter Fox

- **Impossibly Good Experts and How to Follow Them:** Considered the sequential decision-making problem of learning from an expert that has access to more information than the learner, demonstrated that existing imitation learning and policy distillation algorithms can't achieve good performance. Designed a new distillation approach that overcomes this problem while retaining the efficiency of imitation learning.
- **Break and Make: Interactive Structural Understanding Using LEGO Bricks:** Designed a dataset based on fan-based LEGO CAD models to evaluate model performance on complex structural visual understanding. Built a fully interactive 3D simulator that allows learning agents to assemble, disassemble and manipulate LEGO models. Showed that there is a large space for improvement on this challenging task.
- **Geometric and Spatial Reasoning Dataset:** Using Blender, built a Visual Question-Answering (VQA) dataset based on synthetic objects. Focuses on geometric relationship reasoning. Founded that existing VQA models can't deal with the complex relationship (eg: containment) in the dataset.

University of California San Diego – Perception and Cognition Laboratory July 2020 – January 2021
Supervisor: John Serences

- **Sensory Adaptation Phenomenon in Human Visual Perception:** Designed a web-based experiments to research on various sensory adaptation phenomenon in human perception system. Analyzed data from around 400 participants and found that attractive serial dependence dominates the other mechanisms.

Teaching Experience

Teaching Assistant, *University of Washington – Computer Science and Engineering Department*

- **CSE 447/517: Natural Language Processing** December 2023 - present
- **CSE 421: Introduction to Algorithms** September 2022 – December 2023
- **CSE 311: Foundations of Computing I** January 2022 – June 2022
- **CSE 417: Algorithms and Computational Complexity** September 2021 – December 2021

Other Experience

Software Engineer Intern, *Noonum* September 2021 – December 2021

- Designed and implemented automated end-to-end tests for existing web application with Protractor and Jasmine
- Contributed new features to the web application using Angular and integrate with databases using Python

Translator/Coordinator, *Coursera Global Translator Community* May 2019 – September 2020

- Translated courses related to Computer Science with over 30000 words
- Led the translation group of the course Python Data Structure and translated over 90% of the course

Professional Service

- **EMNLP 2023**: Emergency reviewer for 3 papers