Lingji Kong

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EDUCATION

Northwestern University, McCormick School of Engineering **Evanston, IL**
M.S. in Computer Science Sep. 2022 – Mar. 2024

- Cumulative GPA: 3.88 / 4.00
- Relevant Coursework: Deep Learning, Generative Models, Natural Language Processing

University of Washington Seattle, Paul G. Allen School of Computer Science & Engineering **Seattle, WA**
B.S. in Computer Science
B.S. in Applied and Computational Math & Science (Data Science & Statistics) Sep. 2018 – Jun. 2022

- Cumulative GPA: 3.84/4.00
- Dean's List: 2018-2022

INTERNSHIP & RESEARCH EXPERIENCE

Xenobot Lab, Northwestern University **Evanston, IL**
Researcher Mar. 2023 - Present

- Lead a group of 3 in the Text-to-Robot initiative, pioneering the application of Large Language Models (LLMs) in robotics; designed a novel pipeline that automates robot design and training using text prompt.
- Designed and optimized prompts using in-context learning and Chain of Thought prompting within the LangChain framework, improving text-to-3D generation quality and generating reward functions for robot training.
- Applied CMA-ES evolutionary algorithms to explore complex design spaces and evolve text-generated robots.
- Collaborated with a team of 5 to develop a Soft-and-Rigid Simulator, focusing on generating and simulating animal-like robots with freeform endoskeletal structures. Utilized variational autoencoders and Bayesian optimization to innovate in freeform robot design.

Chinese Academy of sciences, Suzhou Institute of Biomedical Engineering and Technology **Suzhou, China**
Machine Learning & Software Engineer Intern May 2021 – Sep. 2021

- Collaborated with a team of 9 to manage the Digital Breast Tomosynthesis (DBT) project by proposing and testing a novel deep learning model, achieving an unprecedented 80% accuracy.
- Enhanced a convolutional neural network with transformer-based attention mechanism for 3D medical image classification tasks and co-authored an academic paper in IEEE.
- Developed a graphical user interactive application for medical professionals to view 3D breast images along with model predictions, improving diagnostic efficiency.

PUBLICATIONS & ACHIEVEMENTS

- **Silver Medalist** in Kaggle Competition: LEAP - Atmospheric Physics using AI (ClimSim), July 2024.

- H. Sun et al., "SAH-NET: Structure-Aware Hierarchical Network for Clustered Microcalcification Classification in Digital Breast Tomosynthesis," in IEEE Transactions on Cybernetics, vol. 54, no. 4, pp. 2345-2357, April 2024, doi: 10.1109/TCYB.2022.3211499.

ACADEMIC PROJECTS

Text-To-Soft-Toy Web Application Northwestern University Sep. – Dec. 2023

- Implemented text input bars and a 3D preview widget using JavaScript and CSS, enabling users to type prompts and select generated toy designs within the user interface.
- Developed an AWS Lambda function to process text prompts and generate 3D printable molds of toy designs in STL format, triggered by PUT events in the S3 bucket for uploading text files. Enabled users to pour silicone into these molds to create physical soft toys from their text prompts.
- Leveraged PySQL for database interactions, supporting key operations such as file upload, download, and user management tasks including account creation, login, and account switching.

Fine-Tuning LLMs for Complex Tasks Northwestern University Jan. 2023– July 2024

- Fine-tuned GPT-2 with PyTorch and advanced prompt engineering on the MultipleQA datasets, achieving a 43% accuracy rate on multiple-choice questions.
- Applied LoRA to fine-tune Gemini, enabling the model to accurately recover prompts from original and modified texts, achieving a 0.66 similarity score between the recovered and original prompts.
- Utilized QLoRA with 4-bit quantization to fine-tune Gemini 2, enhancing its ability to select the most human-preferred output between competing LLM outputs.

Cross Domain Text Summarization Project Northwestern University Mar. – July 2023

- Integrated 6 datasets from diverse domains—including news headlines, scientific abstracts, dialogues, stories, and legal texts—to create a balanced cross-domain summarization benchmark.
- Collaborated with a team of 5 to apply Sentence-BERT for retrieving the most relevant documents, which enabled incremental fine-tuning of the PEGASUS model and led to improvements in ROUGE scores (R-1/R-2/R-L) from 34/14/24 to 35/17/27, outperforming the original state-of-the-art model.
- Utilized Retrieval-Augmented Generation to generate document embeddings and applied few-shot learning on LLMs to produce more human-preferred summaries.

3D Farming Game Demo Northwestern University Sep. – Dec. 2022

- Independently developed a 3D game demo inspired by Stardew Valley using Unity and C#, managing all aspects of development from sculpting the landscape to coding game mechanics.
- Integrated free visual and sound assets to create an engaging and immersive player experience.

Text Autocompletion University of Washington Jan. – Mar. 2022

- Developed a novel model for predicting the Unicode character with a top-three accuracy rate of 36.1% across 9 languages.
- Implemented a Recurrent Neural Network with Long Short-Term Memory cells within PyTorch framework to make the word-level prediction.
- Optimized the model's performance by integrating a Trie data structure for efficient character-level pruning.

Big Data Analysis Summer School University College of London, UK July 2019

- Cleansed datasets from the 2019 World Happiness Report.
- Analyzed structured, key-value, and unstructured text data using R.
- Utilized ggplot2 for data visualization, creating comprehensive reports with clear, data-driven charts and graphs.

EXTRACURRICULAR ACTIVITIES

"One Day" Project Weget Magazine **Seattle, WA**

Group Leader Aug. 2019 - Aug. 2022

- Researched and Crafted 23 articles to uncover various ways to spend "One Day" in Seattle, including hidden gems in the city with the focus on culturally diverse neighborhoods, local festivals, and unconventional shops.
- Promoted cross-cultural environment and encouraged over 2,500 readers to explore outside their comfort zones through compelling storytelling and narratives.
- Led and coordinated a team of 10 contributors, ensuring multidisplinary collaboration, timely content delivery, and alignment with magazine's vision.

Major Fair University of Washington **Seattle, WA**

Organizer Sep. 2019 – Sep. 2021

- Hosted 3 non-profit events called Major Fair from 2019 to 2021.
- Invited Juniors and Seniors as guest speakers to share their academic experience and insights to freshman.
- Outreached sponsorship and raised fund for $4,000.

SKILLS

Programing Languages: Python, Java, C#, Javascript, Typescript, SQL, Bash
Frameworks: Git, AWS, Docker, PyTorch, PyTorch Lightning
Data Analysis Languages: R, Matlab
Language: Mandarin (Native), English (Advanced)