

Charles Hetterich

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Software Engineer specialized in data science & artificial intelligence. Over 7 years of professional software development experience.

Languages: Python, C++, SQL/CQL, R, TypeScript, JavaScript, Java, Golang, C#, Swift

Frameworks: PyTorch, Tensorflow, CUDA, Scikit-learn, Git, Docker, AWS, LaTeX, Cassandra, React/React Native

Topics & Interests: Data Pipelines, Transformers, Computer Vision, Reinforcement Learning, Knowledge distillation, Low-rank factorized networks, Natural Language Processing, Interaction design, Entrepreneurship

Education

University of Texas at Austin | *Masters of Science in Data Science*

2022 - 2023

University at Buffalo | *Bachelors of Science in Computer Science*

2017 - 2020

Professional Experience

OCAI LTD | AI/ML Contractor

Austin, TX | 2024 - Present

Python, Pytorch

- Familiarize myself with the landscape of techniques for modern generative video & talking head models
- Build large-scale data ingestion pipelines to download, clip, and crop samples across several 'talking head' datasets
- Develop custom multimodal Latent Diffusion Transformer architecture for real-time talking-head video generation, given an audio sample & reference photo

E Source | Software Engineer

Buffalo, NY | 2021 - 2022

Python, Java, AWS, Docker, Cassandra, SQL

- Refactored weather data pipeline, improving query speed by an order of magnitude, from hours to seconds
- Worked closely with data scientists to design effective Cassandra query patterns that optimally fit their needs
- Formalized guidelines and CI/CD pipelines to rapidly create, develop, test, and deploy python packages/services, as well as frequently offering assistance, enabling faster/cleaner development within my team as we moved from Java
- Develop and orchestrate multiple microservices across AWS technologies

Ethics In AI (course) | Learning Facilitator

Austin, TX | 2024

- Led a pod of 40 students within a larger cohort of over 400, facilitating discussions and engagement
- Encouraged critical thinking and ethical reasoning among students through curated feedback, providing broader technical and ethical context, enhancing students' understanding of ethics in AI

Personal Projects

SenNet + HOA - Hacking the Human Vasculature in 3D

2024

- Trained a neural network for accurate segmentation of human kidney blood vessels in large 3D scans
- Proposed several variants of the UNET architecture & optimized inference pipeline for speed & accuracy

Point Cloud Network: An Order of Magnitude Improvement in Linear Layer Parameter Count

2023

[arXiv:2309.12996]

- Wrote a paper that discusses an alternative architecture to *MLP linear layers*, and presents experimental results
- Trained variant of *AlexNet* that contains 99.5% less linear unit parameters than the original architecture
- Contributed open-source code and detailed implementation guidelines to use the Point Cloud Network architecture
- Developed experimental CUDA kernels to be integrated within PyTorch's Autograd feature

3D Brain Extraction Tool (BET) Using 3-Dimensional Morphological Geodesic Active Contours

2023

- Collaborate with medical peer to develop toolage for brain segmentation on CT scans with SOTA performance
- Refactored processing steps and core algorithm to leverage GPU acceleration to achieve over 20x speed up