Yuan Ma

Chicago, IL | 312-678-6263 | maxisbai@gmail.com

SKILLS

Programming Languages: Python, C/C++, MATLAB, Git.
Technical Skills: Digital Signal Processing, Statistic Signal Processing, Computer Vision, Image Processing.
Machine Learning Tools: PyTorch, Scikit-learn, Pandas, Numpy, Sagemaker, Diffusion Models, Transformers.
Languages: English, Chinese.
Hobbies and Insterests: Piano – 15 years and public performances around Chicago and China, Snowboard, golf.

EXPERIENCE

Applied Machine Learning Engineer, Audialab, Inc.   OCT 2024 – Present
- Developed Emergent Keyboards, a machine learning powered piano that can generate any sound described by a text prompt with diffusion models.
- Optimized model performance by cleaning and relabeling datasets, significantly improving audio quality.
- Fine-tuned Stability AI's pre-trained Stable Audio Open into a commercial product on AWS Sagemaker.

Research Assistant, Multimedia Communication Research Lab, Illinois Tech.   JAN 2023– AUG 2024
Publication: Yuan Ma. Detection Transformer with Multi-Level Decoder. International Journal of Computer Vision. submitted in Oct 2024.
- The proposed method achieves 3.1% more detection precision than state-of-the-art DETRs with no extra computational cost. (The average gain from top works (ECCV, ICCV, CVPR, etc.) is around 1-2%.)
- Implement the Multi-Level Decoder, solving the inefficiency issue in the decoder persists for years.
- The proposed DETR accelerate the convergence of the baseline (DN-DETR) over 100%.

PROJECTS

Build GPT-2 From Scratch | Python, Pytorch   JUN 2024
- Built Open-AI GPT-2 (124M parameters) from scratch in PyTorch.
- Implemented distributed training with torch.distributed for GPT-2 and trained on the Fineweb dataset.
- Achieved competitive accuracy compared to the Open-AI original model with only 10% of the token count.
- Achieved 2% better accuracy than Open-AI's original model on the Hellaswag dataset.

Deep Learning Library Development in C++ | C++   AUG 2023 – DEC 2023
- Crafted a Stochastic Gradient Descent optimization algorithm and demonstrated its performance with CNNs.
- Built a custom C++ neural network backend and used it to construct neural modules, such as 2D convolution.
- Improved processing speeds of models built with this backend by 100% compared to a python backend.

Adversarial Robustness Towards Various Vision Transformers   MAR 2023 – MAY 2023
- Categorized existing Vision Transformer models into distinct groups never before seen in literature.
- Conducted a series of adversarial attacks/adversarial training experiments over various vision transformers including ViT, Swin Transformer, Deformable Transformer, and more.
- Concluded that strong generality and capacity to grasp high-complexity contextual information is crucial for enhancing Vision Transformer robustness.

EDUCATION

Illinois Institute of Technology, Chicago, IL   AUG 2022 – MAY 2024
Master of Science, Image and Signal Processing, GPA: 3.62
- **Relevant Courses:** Machine and Deep Learning, Object-Oriented Programming, Digital Signal Processing II, Statistic Signal Processing, Computer Vision and Image Processing, Video Processing and Communications

Suzhou University of Science and Technology, Suzhou, China   SEPT 2017 – AUG 2021
Bachelor of Science in Electrical Engineering
- **Relevant Courses:** Linear Algebra, Signal and System, Digital Signal Processing, Programming in C language, Statistics.