

XIANGLONG XU

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Education

University of Pittsburgh

Master of Science in Information Science

August 2023 – May 2025

GPA: 3.95/4.0

North China Electric Power University

Bachelor of Science in Computer Science - Specialization in AI

September 2019 – June 2023

GPA: 3.59/4.0

Skills

Languages and Tools: Python, Bash, Git, Scikit-learn, Torch, PyTorch Lightning, Tensorflow/Keras, Pandas, Numpy, Matplotlib, Seaborn, Scipy, AWS, Unix, Pytest, SQL, R, MATLAB, Java, HTML, CSS, JavaScript

Machine Learning and Algorithms: Linear and Logistic Regression, Naive Bayes, decision trees, support vector machines, principal components analysis, Hidden Markov Models, Neural Networks, Boltzmann Machines, Variational Autoencoders, Stable Diffusion, Transformer, Reinforcement Learning, Generative Adversarial Networks

Experience

Vosyn Inc.

AI Software Developer Intern

May 2024 – August 2024

Chicago, Illinois(Remote)

- Designed and implemented an end-to-end Python-based Speaker Diarization System to gradually replace the pyannote library due to its long runtime, enabling faster identification of multiple speakers' timelines in audio.
- Implemented a Chinese Restaurant Process-based approach in the clustering, achieving 10x faster execution time than pyannote, and trained a Speaker Change Detection model, enabling more accurate speaker timelines.
- Integrated WebRTC's Voice Activity Detection with a ring buffer to reduce detection errors by considering contextual frames and employed temporary files with io.BytesIO for large audio files to minimize memory usage.
- Developed evaluation using the AMI Meeting Corpus datasets to calculate Diarization Error Rate, providing a metric for developers to assess the improvements made to the system, enabling continuous optimization.

Yunnan Gold Mining Group Co. LTD.

Information Engineer Intern

February 2022, August 2022

Kunming, Yunnan(Onsite)

- Implemented a Flask and SQLite-based employee data management web application for internal HR operations.
- Designed relational tables to meet HR requirements by establishing relationships among employees, departments, and positions, minimizing redundancy and accommodating future needs without altering core structures.
- Created a visualizations dashboard leveraging Chart.js, allowing users to view real-time data, including the number of employees in each department and position distribution, with detailed information displayed on hover.

Projects

Music Generation with Deep Learning 🎧

September 2024 – December 2024

- Designed and implemented a dual-model music generation system that leverages Stable Diffusion and Restricted Boltzmann Machines for generating roll plots from music MIDI files, which are then converted to MIDI files.
- Preprocessed plots for training by truncating the x-axis representing time, expanding the y-axis (music pitch range) by replicating pitch rows to match input dimensions, and applying color-coding to increase dimensions.
- Designed a Stable Diffusion training pipeline using a UNet2DModel with adaptive pixel-wise weighted loss, dynamic noise scheduling, and checkpoint management, with architecture aligned to the preprocessing of plots.
- Designed an RBM for denoising, treating each pixel as a visible node with a hidden layer of half the visible nodes, while incorporating adaptive noise generation, multi-type noise injection, and contrastive divergence training.
- Engineered an image-to-MIDI conversion pipeline that transforms generated plots into binary representations through adaptive thresholding, translating pixel data into MIDI note sequences with time and pitch mapping.

AI Snake 🐍

March 2024 – May 2024

- Optimized a reinforcement learning AI agent for the 'Snake' game using Proximal Policy Optimization with MLP and CNN architectures, enhancing the reward-punishment mechanism and achieving a 5% score improvement.
- Engineered a Markov chain model to analyze the game process by treating each time step as a Markov state, suggesting that compressing the snake's body to reduce the space it occupies is one potential optimization.
- Developed a recursive territory calculation algorithm inspired by Go game rules to compute the empty cells enclosed by the snake's body, using the number of enclosed cells as a penalty criterion to train the agent.