Ziye Chen

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Education

Boston University, MS in Artificial Intelligence — Sept 2023 – Jan 2025

- GPA: 3.6/4.0
- **Coursework:** Artificial Intelligence, Deep Learning, Natural Language Processing, Image and Video Computing

Nanjing Tech University, BS in Mathematics — Sept 2019 – June 2023

- GPA: 3.5/4.0
- **Coursework:** Machine Learning, Deep Learning, Mathematical Analysis, Advanced Algebra, Analytic geometry, Mathematical Optimization

Research Interest

Large Language Model: LLM Frameworks, Prompt Engineering, Multimodal LLMs

Theory of Deep Learning: Transformer, KANs (Kolmogorov-Arnold Networks)

Research Experience

Large Language Models for Mathematical Analysis — Ongoing

- Developed the `DEMI-MathAnalysis` dataset, a specialized collection of proof-based problems in mathematical analysis, sourced from *Problems in Mathematical Analysis* by Demidovich and *Problems and Solutions in Real Analysis* by Hata, to fine-tune large language models (LLMs).
- Designed and implemented a guiding framework for LLMs, integrating problem classification, dynamic prompt construction, and a domain-specific Knowledge Base, to improve their ability to generate rigorous and complete solutions to mathematical analysis problems.
- Established a robust evaluation standard using GPT-4o, assessing models based on correctness, completeness, clarity, relevance, and insight, and compared performance across fine-tuned models such as Llama 3.2, Qwen 2.5, and OpenAI's state-of-the-art models.

P300 EEG Signal Shape-Type Function Research — Spring 2023

- Developed a P300 signal energy detector based on the Neyman-Pearson theorem and GLRT, successfully filtering out white noise and improving signal detection accuracy
- Employed the AMPD algorithm for effective peak detection, identifying significant peaks in EEG data and isolating potential P300 signals
- Implemented clustering analysis with an enhanced correlation distance method, accurately deriving the shape-type function of the P300 signal, which distinguishes between the growth and decline phases

Project Experience

Kaggle Competition: Child Mind Institute — Problematic Internet Use — Fall 2024

- Achieved a **Silver Medal** by developing an ensemble of machine learning models to predict problematic internet use in children
- Engineered features and conducted advanced hyperparameter tuning to enhance model performance
- Applied model stacking and blending to integrate diverse algorithms for robust predictions
- Analyzed feature importance to identify key physical activity patterns linked to internet use behaviors

Chinese OCR through a CRNN Architecture with Attention — Spring 2024

- Implemented a Convolutional Recurrent Neural Network (CRNN) architecture, enhancing the contextual understanding of the text
- Enhanced the model with an attention mechanism to improve focus on relevant segments of the input
- Make schematics of the model structure

Election Narratives through Prompt Engineering with GPT Spring 2024

- Used Gmail API to extract the required emails from election related email accounts as data
- Creating charts to analyze basic information about political parties
- Used prompt to analyze emails merged every week

UBC Ovarian Cancer Subtype Classification and Outlier Detection Fall 2023

- Compressed images by Gem pooling (each image in the dataset is larger than 1GB in size)
- Enhanced image compression techniques and trained an EfficientNet_b0 model to increase classification accuracy
- Utilized boosting techniques for the model and increased accuracy from 65% to 85% with boosting (Ten independently trained EfficientNet_b0 models voted results)

Technologies

Languages: Proficient in Python, MATLAB, R, C, **Basic** in C++, Java, SQL

Machine Learning: Proficient in PyTorch, TensorFlow

Tools: Visual Studio Code, PyCharm, Github

Scholarships And Awards

Silver Medal in the "Child Mind Institute — Problematic Internet Use" Kaggle Competition

Nanjing Tech University The First Prize Scholarship in 2022-2023

The First prize of C/C++ Programming in Jiangsu Division of the 11th Lanqiao Cup National Software and Information Technology Talent Contest

The Excellent Award of C/C++ Programming in National Finals of the 11th Lanqiao Cup National Software and Information Technology Talent Contest

Other Experience

Vice-Chairman of Programmers Association in Nanjing Tech University 2020 - 2022

- Organized the Python course for beginners
- Organized the forum for solving programming problems

Boston University Badminton Player

Nanjing Tech University Badminton Player