Zhongxiang(Zhong) Wang

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Education

University of Pennsylvania, MSE in Electrical Engineering   Aug 2022 – May 2024
- **Relevant Coursework:** Convex Optimization, Linear Systems Theory, Machine Learning, Modern Statistics

The University of Iowa, BS with Honors in Computer Science, BA in Mathematics   Aug 2017 – May 2022
- **Relevant Coursework:** Algorithms, Optimization Techniques, Artificial Intelligence, Statistical Analysis

Research Experience

SAT Solver Project, University of Pennsylvania   Jan 2024 – Present
Advisor: Dr. Pratik Chaudhari
- Developed and optimized algorithms using Python, C++, and shell scripting for the Integrated Quantum-Inspired Photonic Solver, focusing on improving computational efficiency and scalability.
- Improved solver performance by 30% through the implementation of cube-and-conquer methods, using Survey Propagation and a modified Gradient Descent approach.
- Leveraged Survey Propagation to create efficient cubes, and mapped SAT sub-instances to the Ising Hamiltonian, employing an optical solver to identify low-energy solutions rapidly.

Optimization in Decision-Making Algorithms, University of Pennsylvania   Aug 2023 – May 2024
Advisor: Dr. Rakesh V. Vohra
- Initiated and spearheaded a comprehensive analysis of Weitzman's Pandora's Box, enhancing decision-making strategies by developing advanced optimization techniques.
- Collaborated in designing innovative algorithms that improved the efficiency of sequential and simultaneous search problems by 15%, enhancing field understanding.
- Compared, analytically and computationally, different strategies for searching and selecting among costly projects with uncertain rewards.

Interactive Tech Boosts Preschoolers' Executive Functions, University of Iowa   Jan 2021 – May 2021
Advisor: Dr. Juan Pablo Hourcade
- Orchestrated the development of innovative features to enhance user interactions in voice-activated systems, integrating complex language models and context-aware text suggestions using Python.
- Conceptualized and implemented a data-driven approach for analyzing user interaction patterns, which informed the design of a more intuitive voice interface.
- Developed a deep learning-based sentiment classification model utilizing the bAbI project tasks.
- Enhanced the system's capability by leveraging Transformer models for text prediction, significantly improving the accuracy of intent recognition and the user experience.

Projects

Sentiment Classification Project
- Developed sentiment analysis model using BERT fine-tuning, achieving a 22% increase in precision and analyzing 180,000 product reviews.
- Achieved 82.38% accuracy on the test set, significantly outperforming the previous baseline.
- Collaborated closely with senior auditors to iteratively improve model interpretability, enhancing its robustness in identifying fraudulent content.

Graph Neural Networks Application
- Led the development of a GNN-based model to analyze graph-structured data, achieving a 30% improvement in predictive accuracy.
- Developed an advanced recommendation system using GNNs, resulting in a 40% improvement in product recommendation accu

- Applied Graph Convolutional Networks (GCN) to optimize resource allocation in wireless networks, leading to a 20% improvement in communication quality.

Audio-Visual Speech Recognition Analysis

- Conducted research on the McGurk effect using AVHubert models, significantly advancing understanding of human-like AV speech perception.
- Integrated audio and visual data processing, improving the accuracy of AVSR systems by 30%.
- Utilized Transformer Encoder for masked segment prediction, boosting transcription accuracy by 35% through effective noise augmentation and model fine-tuning.

Publications

A Comparison of Sequential and Simultaneous Search (under review), Journal of Operational Research, 2024

Technologies

Programming Languages: C++, Python, Java, MATLAB, etc.

Machine Learning Tools: PyTorch, GNN Library, Fairseq, ResNet18, Transformer Models

Optimization & Data Analysis: Linear Optimization tools, Network Optimization Software, SQL, Google Analytics

Software & Platforms:: AWS, Microsoft Office, Linux, Logisim, Angular, Bootstrap

Leadership and Teaching Experience

TA in Linear Systems Theory & Static for Data Science, University of Pennsylvania	Aug 2023 – May 2024
Undergraduate Tutor, University of Iowa	Aug 2020 – May 2022
President of Operations, Chinese Students and Scholars Association of Pennsylvania (CSSAP)	Aug 2023 – May 2024
Member, Phi Beta Delta Honor Society for International Scholars	Aug 2020 – May 2022