

Sheng'an Xu

☎ (+86) 18913620825 ✉ samuel_xu2024@163.com or 211840035@smail.nju.edu.cn

Education

-
- | | |
|---|------------------------|
| Nanjing University
<i>BS in Applied Mathematics</i> | Sept. 2021 – July 2025 |
| <ul style="list-style-type: none">◦ GPA: 4.66/5.00 (Rank 1/48 in major, 2/132 in department)◦ Selected Coursework: Real Analysis (94), Partial Differential Equations (96.3), Topology (96), Advanced Algebra (98), Probability Theory (97), Numerical Analysis (90), Advanced Optimization (in progress) | |
| University of Wisconsin, Madison (Exchange Program) | Jan. 2024 – May 2024 |
| <ul style="list-style-type: none">◦ GPA: 4.0/4.0◦ Coursework: Real Analysis II, Complex Analysis, Lie Algebra, Stochastic Processes, Differential Geometry, Algebraic Topology | |

Honors & Awards

-
- **Meritorious Prize, American Mathematical Contest in Modeling** (2023)
 - **National Scholarship** (0.2% in China, 2021-2022)
 - **Guo-Xie-Birong Scholarship** (Highest Honor in department, 2023-2024)
 - **Special Scholarship of Basic Sciences, Nanjing University** (Top 10% in department, 2022, 2023, 2024)
 - **Excellent Freshman Student, Nanjing University** (2021-2022)
 - **Outstanding Leader, Tian-Jian Voluntary Association, Nanjing University** (2022-2023)

Research Experience

-
- | | |
|---|------------------------|
| Optimization Based on Diffusion Models
Advisor: Prof. Caihua Chen, Nanjing University | April 2024 – Nov. 2024 |
| <ul style="list-style-type: none">◦ Aimed to increase optimization efficiency and eliminate the innate uncertainties in black-box scenarios by converting black-box optimization into conditional sampling.◦ Transformed the generation of a single output solution into the production of a distribution of high-quality solutions, addressing key issues like the instability of one-step methods and the limited adaptability of traditional numerical approaches.◦ Employed iterative methods to generate a trajectory of (point, value) pairs for special integer programming problems; Trained a conditional diffusion model on this trajectory dataset, facilitating the generation of feasible solutions for integer programming problems with variable parameters.◦ Applied the discrete diffusion model to optimization problems with graph structures and combined with heuristic sampling methods to improve the quality of the resulting solutions. | |

Professional Experience

-
- | | |
|--|-----------------------|
| Machine Learning Engineer
<i>Nanjing Huihu Intelligence Technology Co., Ltd</i> | June 2024 – Aug. 2024 |
| <ul style="list-style-type: none">◦ Natural Language Processing: Implemented a real-time system to identify, separate, and extract audio clips from videos and audio streams based on distinct voice profiles, ensuring subtitle generation commenced before the halfway mark of each clip; formulated the audio recovery task as a composite optimization problem and applied the accelerated proximal gradient algorithm to tackle it.◦ Computer Vision: Assessed the stability of video footage recording law enforcement activities using optical flow techniques; utilized SlowFast and YOLOv10 models to track and evaluate law enforcers' movements, achieving scenario classification accuracy exceeding 80%. | |

Projects

Recommendation Algorithm-Guided Database Platform

Sept. 2022 – Jan. 2023

Group Leader

Led a project on MySQL database design, achieving top course scores (93%) and implemented video recommendation features.

- Developed targeted video recommendations using user profiles, browsing history, video quality, novelty, publicity metrics, and calendar-based event dates.
- Designed a top video ranking system with features like video screening and grading, keyword research, and modes optimized for eye comfort and teenagers.
- Managed database security, including comprehensive backup and restoration procedures.

User Stickiness and Game Complexity

Feb. 2023 - March 2023

Modeler

Awarded the Meritorious Prize in American Mathematical Contest in Modeling.

- Modeled user engagement, collaborated on code implementation, and contributed innovative data-driven insights.
- Predicted charades player growth trends using ARIMA models and analyzed players' guessing behaviors through kernel density estimation.
- Established a word difficulty criterion via the entropy weight method and Embedding techniques, achieving 81.6% accuracy in grading using a linear probability model, after benchmarking against the Fisher linear discriminant model.

Theoretical Design for Laser Charging Components

Sept. 2021 - Jan. 2022

Group Leader

Demonstrated the potential of the laser charging industry and scored 95% in the oral defense of a seminar course.

- Organized regular discussions on the feasibility of laser charging and led the theoretical design of laser chargers.
- Designed a laser emitter with safety features, balancing cost and performance, and evaluated semiconductor materials for efficient energy conversion and heat dissipation in photovoltaic cells.
- Designed a photovoltaic-equipped receiver and energy module, optimizing for real-world applications.

Skills

Programming Languages: C++, Python, MATLAB, R

Tools: Excel, GitHub, LaTeX, Mathematica, MySQL

Selected Readings

Convex Optimization by Stephen Boyd and Lieven Vandenberghe

Convex Optimization: Algorithms and Complexity by Sébastien Bubeck

Lectures on Modern Convex Optimization by Aharon Ben-Tal and Arkadi Nemirovski

Real Analysis: Modern Techniques and Their Applications by Gerald B. Folland

Essentials of Stochastic Processes by Richard Durrett