Yuanhao JIANG

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Intro

- Current MSc Statistics student with an interest in statistical machine learning, modelling and reinforcement learning, particularly generative modelling and computer vision. Research experience in score-based generative modelling with stochastic differential equations (SDEs) and reinforcement learning with applications to quantitative finance.
- Able to undertake both theoretical and computational works, e.g., software development, statistical inference and modelling, Bayesian inference and data analysis, operational research and optimization, pure mathematics works including algebra, analysis, differential equations, SDEs, and so on.

Education

- **University of Oxford** — Oxford, England, UK
  MSc in Statistical Science — *Sep. 2024. - Present*

- **The University of Edinburgh** — Edinburgh, Scotland, UK
  BSc (Hons) in Mathematics and Statistics — *Sep. 2020 - May. 2024*
  - ***Qualification:*** *First Class, average grade 86%.* ***Ranked 1st of 71 students.***
  - ***Prizes and Medals:***

    2021/22: School of Mathematics College Vacation Scholarship

    2022/23: James Ward Prize for distinguished performance in the Degree Examinations in Mathematics & Statistics

    2022/23: Arthur Erdelyi Prize for distinguished performance in the Degree Examinations for Mathematics

    2022/23: School of Mathematics College Vacation Scholarship

    2023/24: Lawley Memorial Prize. Awarded to the candidate with the most distinguished performance in the final degree examinations of the joint honours degree in Mathematics and Statistics.
  - ***Dissertation:*** *Score-Based Diffusion Techniques and Diffusion Map Method for Generative Modelling.*

- **Hong Kong Baptist University** — Hong Kong, China
  BSc in Mathematics (Year 1) — *Sep. 2019 - May 2020*
  - ***Grades:*** *Year 1 cGPA: 3.72/4*
  - *Withdrew after successfully finishing year 1 and began at the University of Edinburgh*

Research

- ***Score-Based Diffusion using Constrained Dynamics***
  Supervisor: Prof. Benedict Leimkuhler — *June 2024 - Present*
  - We are trying to apply constrained SDEs in score-based diffusion models to restrict the data points on Riemannian manifolds, potentially allowing more structural and controllable data perturbation and data generation.

- ***Score-Based Diffusion & Numerical Methods for Stochastic Differential Equations***
  Supervisor: Prof. Benedict Leimkuhler — *May 2023 - Sep. 2023*

- Applied innovative approaches, especially the Leimkuhler-Matthews discretization method, for solving SDEs, to both the perturbation process and denoising process. Compared sample quality and training efficiency with traditional numerical SDE solvers including the Euler-Maruyama method, the Milstein method, the stochastic Runge-Kutta method and so on.
- Embedded the diffusion coefficient function in perturbation SDE with spatial information to allow potentially higher perturbation flexibility.

- ***Mathematics of Reinforcement Learning with Applications to Quantitative Finance***
  Supervisor: Prof. Lukasz Szpruch *Jun. 2022 - Sep. 2022*
  - Constructed interactive environment to model specific quantitative finance scenario.
  - Implemented various model-free algorithms, including Actor-Critic, REINFORCE, and Proximal Policy Optimization (PPO), to train our pricing policy. Compared different algorithms for training efficiency and effectiveness.
  - **GitHub repository:** github.com/Yuanhao-JIANG/RL-in-QF

Skills

- **Core softwares:** Python, R, Java, Haskell, HTML, CSS, LaTeX, C, Processing, MIPS assembly, Swift, Docker, Node.js, Pacman, Vim, Git, Conda, PyTorch, LWJGL, Bootstrap, Jekyll, ...

Experience

- **London Mathematical Society Undergraduate Summer School 2023**
  Summer School Delegate *16th - 28th Jul. 2023*
  - Nominated by the School of Mathematics at the University of Edinburgh as one of the 50 students in the UK to attend.
  - Consists of a combination of short lecture courses with problem-solving sessions and colloquium-style talks from leading mathematicians, covering various fields of mathematics including probability theory, statistics, information theory, complex analysis, mathematical physics, computational number theory, Uncertainty quantification for computer models and so on.

- **Careers Service, The University of Edinburgh** Part time
  WeChat Assistant *Sep. 2021 - Sep. 2022*
  - Managed the UoE Careers Service WeChat account with more than 1500 students each year, grouped fresh students on their matriculation, and maintained alumni groups.
  - Searched, examined, shared and posted job opportunities and career events across UK and China.
  - Kept in touch with employers, built employers groups to provide more and better opportunities with up-to-date information.

Personal Projects

- **Translation with RNN/Transformer model**
  - AI translators utilizing RNN or Transformer models, able to translate from English to Chinese. The program is written in Python with PyTorch and Fairseq.
  - Repository: github.com/Yuanhao-JIANG/ml-translation
- **Handwriting recognition with CNN structure (LeNet)**
  - A handwriting recognition program utilizing a simple convolutional neural network, LeNet. The program is written in Python with PyTorch package.
  - Repository: github.com/Yuanhao-JIANG/ml-handwriting-recognition
- **Lightweight game engine**
  - A lightweight Java game engine that supports OpenGL. The engine is still under construction.
  - Repository: github.com/Yuanhao-JIANG/Java_game_engine
- **For more projects visit my GitHub site: github.com/Yuanhao-JIANG**