WANG MA

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EDUCATION EXPERIENCE

Rensselaer Polytechnic Institute (RPI) 08/2024 – 05/2029 (Expected)

- **Ph.D** in **Computer & System Engineering**
- **Adviser:** Prof. Qiang Ji
- **Research Interests:** Uncertainty Quantification, Causal Inference, Generative Models and their applications

Southern University of Science and Technology (SUSTech) 08/2020 – 07/2024

- **B.S.** in **Data Science and Big Data Technology** (Transcripts)
- **Adviser:** Prof. Chao Wang
- **Main Background:** Optimization, Statistics and Machine Learning
- **Main Courses:** Statistical Learning, Multivariate Statistical Analysis, Algorithms for Convex Optimization, Real Analysis, Numerical Analysis, Statistical Linear Models, Operational Research and Optimization, Machine Learning, Mathematical Statistics, Discrete Mathematics, Advanced Linear Algebra, Probability Theory, Mathematical Analysis

University of California, Irvine 03/2023 – 07/2023

- **Exchange Student** (GPA: 4.0/4.0, Transcripts)
- **Courses:** Stochastic Process, Optimization II
- Individual Study on Meta Learning and Reinforcement Learning, supervised by Prof. Hengrui Cai

ACADEMIC PROJECT AND ACTIVITY

Graduate Research Assistant 09/2024 – now
RPI *Troy, NY USA*

- **Adviser:** Prof. Qiang Ji
- **Focus:** Uncertainty Quantification & Causal Inference for Explainable Bayesian Deep Learning
  - Designed and conducted comprehensive experiments on **variational inference**, **deep ensembles**, **mc dropout** (for Bayesian Deep Learning) and **evidential deep learning** for Uncertainty Quantification in complex models. Evaluated their performance on OOD detection.
  - Developed and implemented **gradient-based saliency maps and uncertainty maps**, performing comparative analyses to understand the relationship between model behavior and input data features.
  - Contributed to a project on a project on Causal Saliency Map (working paper), **implemented core algorithms** and **established baseline models** for performance comparison.
  - Conducted readings and experiments on **Bayesian causal discovery** and uncertainty quantification in probabilistic graphical models. Implemented and evaluated models such as DAG No-Tears and DAG-GFlowNet.
  - Developed and implemented **efficient uncertainty quantification** methods for a single model, both theoretically and practically. Theoretically, derived results from NTK theory to effectively quantify uncertainty in regression using only one auxiliary neural network. Practically, implemented and advanced credal interval-based methods for uncertainty quantification.
  - Engaged in in-depth readings on **Uncertainty Quantification for Generative Models**, covering topics such as Diffusion, Transformer/LLMs.

Seminar: AI: Optimization, Theory & Responsibility 07/2024 – 09/2024
SUSTech *Shenzhen, P.R.China*

- As the organizer, under the supervision of Prof. Chao Wang
- My talks on Bayesian Optimization and Bayesian Neural Networks

Project: Image Restoration via Generative Models without Supervision 03/2024 – 08/2024
SUSTech *Shenzhen, P.R.China*

- **Adviser:** Prof. Chao Wang
- **Main Concentration:** : Unpaired Image Denoising via VAE & Diffusion-based Hyperspectral Image Restoration
  - Implemented **Variational Autoencoders (VAE)** for **unpaired image denoising**, optimizing results with Mutual Information Enhancement.
  - Applied a novel combination of **Implicit Neural Representations (INR)** and **Diffusion Models** for hyperspectral image restoration, achieving **self-supervised training**.
- **Undergraduate Thesis:** End-to-end Unpaired Image Denoising Based on Mutual Information Enhancement

Data Science Project: MLB Batting Data Analysis 05/2024 – 06/2024
SUSTech *Shenzhen, P.R.China*

- As the project leader, designed the project plan; we analysed the meaning of and relationship among **Bat Speed**, **Fast-swing Rate**, **Squared-up Rate**, Blast, **Swing Length**, and Swords, 6 metrics Statcast posted in May 2024.
- With the exploration and results before, we finally **classified out the 4 batter types** according to Fast-swing Rate and Squared-up Rate.
- Presentation Slides.
- Project Report.

Seminar: Introduction to and Advances in Self-Supervised Learning 06/2023 – 09/2023
SUSTech *Shenzhen, P.R.China*

- **Organizer:** Prof. Chao Wang, Shengjie Niu
- My talks on Meta-Learning and Optimizers

SKILLS

Programming	Python, Java, Matlab
Software & Tools	Typora (Markdown), LaTex, Linux, PyTorch, MapReduce
Language	Mandarin Chinese, English, Shaanxi Dialect Chinese, Japanese

AWARDS & HONORS

SUSTech Excellent Undergraduate Graduation Project **SUSTech**, 06/2024

- **Thesis Title:** End-to-end Unpaired Image Denoising Based on Mutual Information Enhancement

Second Prize in Guangdong Province in Mathematical Contest in Modeling 2021 **SUSTech**, 10/2021

2021–2022 Excellent Student Scholarship **SUSTech**, 09/2022

2020–2021 Excellent Student Scholarship **SUSTech**, 09/2021