

HAOTIAN HUANG

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omnscent.github.io

github.com/omnscent

Education

Sun Yat-sen University

Sep. 2022 – Present

B.S. in Mathematics, School of Mathematics

Guangzhou, China

- Major GPA: 91.53/100, Major Rank: 11/84, Last Year (2022-2023) Rank: **2/84**
- Scholarship: **National Scholarship** (Top 0.2% national-wide), First-class Scholarship (Top 8% university-wide)
- Outstanding Courses: Digital Image Process (100) 🏆, Real Analysis (100), Differential Geometry (99), Partial Differential Equations (98), Functional Analysis (97), Data Structure (95)

Awards and Honors

Provincial 1st Prize in The Chinese Mathematics Competitions 2022

Provincial 2st Prize in Contemporary Undergraduate Mathematical Contest in Modeling 2022

First Class Merit Student Scholarship of Sun Yat-sen University 2023

Research Experience

Research on self-supervised learning

Aug. 2023 – Present

Intern, Supervised by Yisen Wang, Peking University

Beijing, China

- Proposed an improvement method for MAE that effectively enhances its performance on ImageNet-100 dataset through Boltzmann sampling.
- Studied the relationship between the upstream and downstream performance of MAE, analyzed the features extracted by MAE, and proposed a novel approach to unify the distribution of MAE upstream and downstream tasks.
- Investigated the reasons for performance differences between autoregressive models and mask models at various scales.

Research on AI for science

Oct. 2021 – Present

Intern, Supervised by Ting Tian, Southern China Center for Statistical Science, Sun Yat-sen University

Guangzhou, China

- Conducted a study on machine learning methods for the diagnosis of Alzheimer's disease.
- Proposed a new method that effectively extracts features from Alzheimer's patient MRI images using a self-supervised learning approach.

Projects

Digital Image Process

Mar. 2023 – Jul. 2023

Individual, Supervised by Jia Li, Sun Yat-sen University

Guangzhou, China

- Wrote a review on deep learning, examining the early development of deep learning and various early networks including LeNet, AlexNet, ResNet, etc. Replication was conducted on datasets such as CIFAR-10 using PyTorch.
- Researched the development of deep learning in the field of super-resolution, replicated models including SRCNN, DRCN, VDSR using PyTorch, and evaluated these models on a customized dataset.
- Explored various deep learning models in the field of semi-supervised learning, replicated models including Temporal Ensembling, Pi model, Mean Teacher using PyTorch, and delved into self-supervised learning. Also, conducted research on machine learning with noisy datasets, applying various algorithms for denoising the dataset, including traditional clustering algorithms and deep learning skills.

Contemporary Undergraduate Mathematical Contest in Modeling

Sep. 2022

Team Leader, Co-developer with a Team of 3

Guangzhou, China

- Our team conducted research on the problem of drone array deployment. We studied passive localization of drones, taking into account signal interference. We modeled this using methods such as triangulation and performed numerical simulations using the Monte Carlo method.
- Provided a method for drone position adjustment using only a small number of drones as signal sources and analyzed the stability and portability of the method.

Mathematical Contest in Modeling

Jul. 2022

Team Leader, Co-developer with a Team of 3

Guangzhou, China

- Our team modeled athletes in cycling races and provided an improved power-duration curve for athletes based on existing research. We presented a model for predicting athlete performance and simulated our model using numerical methods. We compared our model with actual race results and achieved a good level of consistency.
- Provided an assessment of the impact of various conditions on athlete performance. We conducted an evaluation on a simple track, and the results demonstrated the robustness of our approach.

Skills

Programming Languages: Python, C++, MATLAB

Deep Learning Framework: PyTorch

Other: L^AT_EX, Markdown

Leadership

School of Mathematics Student Union

Oct. 2021 – Present

President

Sun Yat-sen University

- Led the Student Union to receive the Excellent Student Union Award from Sun Yat-sen University (awarded to only 10 out of 67 faculties).
- Received multiple university-level awards as the president.