GUANZECHAO

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📅 2000-08   ⚥ Male   🏠 Yangjiang City, Guangdong Province

🚩 Member of the Communist Party of China

EDUCATION

Southeast University   2022.09 - 2025.06

Mathematics / Master / College of Mathematics   Nanjing

- **GPA**: 3.49 / 4.0 (Top 20% of colleges)
- **Major Courses**: Statistical Learning (95), Mathematical Foundations and Algorithms for Deep Reinforcement Learning (91), Advanced Numerical Analysis (90)
- **Main Awards**: The Second Prize in the National Postgraduate Mathematical Modeling Competition, The Outstanding Student Second-class Scholarship, The Outstanding Student Cadre

Guangdong University of Technology   2018.08 - 2022.06

Mathematics and Applied Mathematics / Bachelor / College of Mathematics and Statistics   Guangdong

- **GPA**: 4.22 / 5.0 (Top 1% of College)
- **Major Courses**: Machine Learning (100), Pattern Recognition (98), Mathematical Modeling (98), Advanced Algebra (97)
- **Main Awards**: The Second Prize in the National College Student Mathematical Modeling Competition, The Second Prize in the American College Student Mathematical Modeling Competition, Top Ten Young Figures of Guangdong University of Technology, The Outstanding Student First-Class Scholarship, Alpha Outstanding Student Scholarship, and 10 other scholarships.

INTERNSHIP EXPERIENCE

Beijing Sankuai Technology Co., Ltd. (Meituan)   2024.04 - Present

Computer Vision Engineer / Core Local Commerce / Visual Intelligence Department   Beijing

Project 1: Participated in Research of Embodied Intelligence Large Multimodal Models—— RoboUniView and RoboUniView 2.0

- Responsible for unified input from multiple datasets, multimodal output, and model design.
- Key tasks included converting visual images into point clouds and voxels, and using UVFormer to predict voxels for unified visual features. Combined with the OpenFlamingo model to extract visual-text features for predicting robot actions and image content.
- Bulit the unified input pipeline of multiple datasets including Metaworld, Maniskill, CALVIN, etc., and Achieved significant results such as the success rate increase of approximately 10% in CALVIN. Currently co-authoring a related paper.

Project 2: Participated in Multimodal Large Model Application for Pothole Detection in Autonomous Driving

- Responsible for the LLaVA model for pothole data. Conducted pre-training and fine-tuning for LLaVA model, and designed with high-resolution ViT models (e.g., 756 resolution ViT and S2 super-resolution model).
- Compared to LLaVA 1.5, these models improved pothole detection accuracy by 3.2% and 10.1%, respectively.

RESEARCH EXPERIENCE

TopoDiT-3D: Topology-Aware Diffusion Transformer with Bottleneck Structure for 3D Shape Generation   2024.01 - Present

The main person in charge

- This research investigates the DiT for 3D point clouds, addressing issues such as excessive tokens that lead to extended model training times and the need to extract and integrate global topological information for feature learning.
- Responsible for model design and implementation. Proposed a novel diffusion transformer architecture featuring a bottleneck structure designed with Perceiver Resampler and used Persistent Homology to extract 3D point cloud topological features. This approach effectively reduces the Token count by 82% and achieves state-of-the-art performance. The Paper is currently being submitted (2025 AAAI conference, first author).

3D TopoLDM: Diffusion model based on topological loss regularization for 3D point cloud generation   2023.12 - Present

The main person in charge

- This research addresses the inefficiencies in the current 3D point cloud generation model, particularly the lack of practical shape feature representation typically generated by the PointNet model.

- Responsible for designing and implementing a two-stage 3D point cloud generation model. The first stage involves extracting topological features from the 3D point cloud using Persistent Homology and encoding them in a persistence image (PI). A diffusion model is then trained to generate the PI of the 3D point cloud. The second stage employs a DDPM framework for 3D point cloud generation based on the PI and topology loss regularization. Currently co-authoring a related paper.

Unmanned equipment multi-modal fusion positioning, autonomous planning and 3D point cloud recognition   2022.08 - Present

The main person in charge

- This research focuses on the collection of 3D point cloud data via depth cameras on unmanned vehicles, leveraging topological modal and deep learning models for 3D point cloud recognition.
- Responsible for deep Learning of point clouds, to achieve **classification** and **segmentation tasks**. Utilizing topological data analysis and designing **a universal neural network layer——TopoLayer,** for extracting topology Information, which can plug and play to mainstream point cloud deep neural networks including **pointMLP, PointNet++.** The paper is currently being submitted (2025 AAAI conference, first author).

Research on Robustness indices of graphs and their application in complex networks   2020.12 - 2022.12

The main person in charge

- This research studies the correlation robustness index of mesh graph, triangle graph and honeycomb graph, and **evaluates the importance** of different complex network edges by **mathematical derivation.**
- Responsible for the main research work, including the study of three types of graphs of the Laplace matrix properties, and designing algorithms to measure the importance of different sides to complex networks. This project has received the Guangdong Province Climbing Program and National college student innovation funding.

Skills

- With solid mathematical knowledge and **modeling** ability, with **data mining, CV, machine learning, optimization, complex network** and other algorithm principle knowledge. Fluent in English (CET-4, CET-6), and have achieved the national second prize in both the national graduate and undergraduate mathematical modeling competitions.
- Experienced in 3D point cloud deep learning models and well-versed with generative models including GAN, VAE, DDPM, and LDM. Additionally, familiar with discriminative models such as PointMLP, Point Transformer, PointNet/PointNet++, Transformer, and CNN.
- Skilled in Python, commonly used machine learning models, and Pytorch deep learning frameworks, with good programming habits.
- Proficient in NLP and CV models like GPT, Bert, and ViT, as well as multimodal models such as CLIP, OpenFlamingo, Stable Diffusion, and LLaVA. Also well-versed in embodied intelligence models including RoboFlamingo, RT-1, RT-2, and OpenVLA.

practical activities

Graduate student association, school of mathematics, southeast university   2022.09 - Present

Minister Academic Department   Nanjing

- Responsible for planning and coordinating academic activities, hosting the best research series and other activities, has invited off-campus guests to hold 3 school-level lectures, the number of participants 800 or more.

Shenzhen Industry-University-Research Practice Team, Southeast University   2023.04 - 2023.04

Participating personnel

- Participated in Pengcheng Laboratory, Shenzhen Big Data Research Institute, Ping An Insurance and other enterprises research and practice, and won the Southeast University summer social practice excellent team.

Math and applied mathematics class 2   2018.09 - 2022.06

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- During the tenure, accolades such as the top 100 Excellent League Cadres at Guangdong University of Technology, Outstanding Student Cadre, and Student Work Advanced Individual were received.
- The class was led to achieve the Top Ten Class Group and Top Ten League Branch awards at Xingyao University of Technology, as well as the Advanced Class Group award from the College of Applied Mathematics, resulting in a total of seven awards.