# Yicheng Qiao

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## Education

**Tsinghua University**, Beijing,China 03/2023 – 06/2024

Joint Undergraduate Student, School of Vehicle and Mobility, Tsinghua University

**Beijing Sport University**, Beijing, China 09/2020 – 06/2024

B.Eng. in Data Science and Big Data Technology, GPA: **3.83**/4.0 (WES)

**Key grades:** Discrete Mathematics (99), Computer Vision (97), Neural Network Design and Programming (97), Applied Statistical Methods (97), Visual Perception and Virtural Reality (96), Python Programming (96)

## Research Experience

**State Key Laboratory of Automotive Safety and Energy** Tsinghua University, Beijing

Research Assistant 03/2023 – 08/2024

- Served as the corresponding author and main contributor to a paper on driving style prediction, proposing a novel driving behavior classification network named *FMDNet*, which has been published in *IEEE Transactions on Computational Social Systems (TCSS)*.
- Led the development of *MMTL-UniAD*, integrating a multi-axis attention network and dual-branch multimodal embeddings to mitigate task conflicts, with potential for publication in ***CVPR***.
- Designed *UDM-Net*, proposing PMANet and RDF methods to enhance feature extraction and fusion, demonstrating its effectiveness in Traffic Context Recognition, and expected to be published in *IEEE Transactions on Intelligent Transportation Systems (T-ITS)*.
- Developed *SAMOccNet*, the first to integrate the Segment Anything Model (SAM) into occupancy networks, refining predictions with a residual attention mechanism and demonstrating its effectiveness on the nuScenes-Occupancy dataset.

**Remote sensing and Medical imaging with X-features (REMEX) Lab** Beijing

Research Assistant 05/2022 – 07/2023

- Proposed the development of *DLAFNet* that efficiently performs semantic segmentation of remote sensing images by leveraging Multispectral images and LiDAR point cloud data.
- Led *SeMask-Mask2Former*, an advanced approach that significantly improved the performance of semantic segmentation in remote sensing images.
- Secured a Chinese patent for a novel method of "Semantic Segmentation Fusion in Remote Sensing using Optical Images and LiDAR Point Clouds."
- Awarded the **First Prize** in the BUPT College Students' Innovation and Entrepreneurship Program Exchange.

**XuLab** Carnegie Mellon University, Pittsburgh

Intern, Computational Biology Department 12/2023 – 02/2024

- Worked collaboratively using Slack to complete tasks related to biomedical image recognition and 3D reconstruction during the internship.

## Work Experience

**Computer Network Information Center of the CAS** Chinese Academy of Sciences (CAS)

Intern, Algorithm Engineer, Company of Security Technology 12/2022 – 03/2023

- Implemented the "A Webshell Detection Method Based on Naive Bayes Algorithm."
- Contributed to a patent on "XGBoost-based False Alarm Detection with Automatic Orchestration Response."
- Assisted in deploying the Suricate server and software development tasks.

## Publications & Preprints

1 **Yicheng Qiao**[*], Wenzhuo Liu[*], Zhiwei Li, Wei Zhang, Jiayin Zhu, Li Wang, Hong Wang, Huaping Liu, and Kunfeng Wang, "UDM-Net: Unified Assistive Driving Multi-task Perception Network based on Multimodal Fusion," under **review** in IEEE **Transactions** on Intelligent Transportation Systems (T-ITS), 2024,[*]Co-first authors.

2 Wenzhuo Liu[*], Wenshuo Wang[*], **Yicheng Qiao**[*], Qiannan Guo, Jiayin Zhu, Pengfei Li, Zilong Chen, Huiming Yang, Zhiwei Li, Lening Wang, Tiao Tan, Huaping Liu "MMTL-UniAD: A Unified Framework for Multimodal

and Multi-Task Learning in Assistive Driving Perception," under **review** in Conference on Computer Vision and Pattern Recognition **(CVPR)**, 2025,*Co-first authors.

3 Wenzhuo Liu, Jianli Lu, Junbin Liao, **Yicheng Qiao***, Guoying Zhang, Jiayin Zhu, Guoying Zhang, Jiayin Zhu, Bozhang Xu, and Zhiwei Li"FMDNet: Feature-attention-embedding-based Multimodal-fusion Driving-behavior-classification Network," in IEEE **Transactions** on Computational Social Systems **(TCSS)**, 2024, ***Corresponding author**, [Github] [PDF]

4 **Yicheng Qiao**, Wei Liu, Bin Liang, Pengyun Wang, Haopeng Zhang and Junli Yang, "SeMask-Mask2Former: A Semantic Segmentation Model for High Resolution Remote Sensing Images," in IEEE Aerospace Conference, 2023.[Github] [PDF]

5 Zhiwei Li, Wenzhuo Liu, Han Bi, **Yicheng Qiao**, Yanhuan Jiang, Qiannan Guo, Jingwei Wang, Huaping Liu, Kunfeng Wang, "SAMOccNet: Refined SAM-based Surrounding Semantic Occupancy Perception for Autonomous Driving," under **review** in EXPERT SYSTEMS WITH APPLICATIONS, 2024

6 Wei Liu, He Wang, **Yicheng Qiao**, Junli Yang, Haopeng Zhang, "DLAFNet: Direct LiDAR-Aerial Fusion Network for Semantic Segmentation of 2D Multispectral Aerial Image and 3D LiDAR Point Cloud," under **review** in IEEE Journal Of Selected Topics In Applied Earth Observations And Remote Sensing **(J-STARS),** 2024[Github]

7 Wei Liu, He Wang, **Yicheng Qiao**, Bin Liang, Haopeng Zhang and Junli Yang, "DLAFNET: A Direct Fusion Method Of 2D Aerial Image And 3D Lidar Point Cloud For Semantic Segmentation," in International Geoscience and Remote Sensing Symposium **(IGARSS Oral),** 2023[Github] [PDF]

8 Wenzhuo Liu, **Yicheng Qiao**, Jing Liu, Yongqi Gan, Zongze Li and Guoying Zhang, "Froth edge segmentation in flotation images," in NONFERROUS METALS Mineral Processing Section, 2023

9 Mingyan Yin, **Yicheng Qiao**, Dexiao Long Zhang, Jiashun Guo, Minyi Zhu, Can Wang, "Data Augmentation Based on Style Transfer," in Information Technology and Informatization, Issue 11, 2023

## PATENTS

- A remote sensing semantic segmentation method based on the fusion of optical images and LiDAR point clouds. CN Patent Application 202310312734.2, filed March 28, 2023. Patent Pending (co-inventor).
- A 3D semantic occupancy perception method and device for complex environments. CN Patent Application 202410858652.2, filed June 28, 2024. Patent Pending (co-inventor).

## SELECTED AWARDS

- Merit Student (top5%) 2021 - 2023
- National Encouragement Scholarship (top5%) 2021 - 2023
- Mathematical Contest In Modeling (MCM) Meritorious Winner 2022
- Second Prize in China Computer Design Competition for University Students 2022
- Silver Prize as team leader, National "Chuangyi Cup" Innovation and Entrepreneurship Competition 2022
- Bronze Prize as team leader, "Challenge Cup" Capital University Student Entrepreneurship Competition 2022

## SELECTED PROJECTS

### 3D Reconstruction and Segmentation based on Large Vision Models using 3DGS and NeRF

Undergraduate Thesis 06/2023 – 06/2024

- Introduced an innovative approach to 3D reconstruction of dynamic entities within the sports domain.
- Utilized the advantages of the SAM in 2D imaging for masks, further achieving segmentation in 3D.
- Developed a custom dataset and optimized NeRF for enhanced methodology.

### Data Augmentation Based on Style Transfer Intercollegiate Cooperation

Main Contributor 06/2022 – 06/2023

- Led the implementation of neural transfer algorithms, from Traditional to Neural Style Transfer.
- Authored "Data Augmentation Based on Style Transfer" for "Information Technology and Informatization."
- Recognized for **excellence** in the 2022 Beijing University Student Innovation and Entrepreneurship Training Interschool Cooperation Plan.

## SKILLS

**Languages:** Mandarin (native), English (CEFR C1 / TOEFL: 107)
**Programming Languages:** Python, C/C++, Bash, HTML/CSS, JavaScript, R(ranked by proficiency)
**Tools and Frameworks:** PyTorch, TensorFlow, LaTeX, CloudCompare, Matlab, Stata, Hadoop, NoSQL, Tableau, Docker, Git