# Yanqing Shen

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## EDUCATION

**Xi'an Jiaotong University**                                                        Sep. 2019 ~ Present

Ph.D. Candidate of Institute of Artificial Intelligence and Robotics | Research with CAE Academician **Nanning Zheng** and Dr. **Sanping Zhou** | Control Science and Engineering | GPA: 3.69/4.0 (88.8/100)

**Xi'an Jiaotong University**                                                        Sep. 2015 ~ Jun. 2019

Bachelor of Electronic and Information Engineering | Major: Automation | **GPA: 4.06/4.3 (93.2/100)**

## RESEARCH INTERESTS

Research interests mainly include visual representation learning, place recognition, and autonomous driving.

## ACADEMIC EXPERIENCE

Visiting student at Robotic System Lab, ETH, Switzerland, Dec. 2023 – Dec. 2024.

Poster presentation at CVPR2023 academic conference, Canada, Jun. 2023.

Oral presentation at ITSC2019 academic conference, New Zealand, Oct. 2019.

## MAIN PUBLICATIONS

- **Yanqing Shen**, Sanping Zhou, Jingwen Fu, Ruotong Wang, Shitao Chen, Nanning Zheng. "StructVPR: Distill Structural Knowledge with Weighting Samples for Visual Place Recognition", CVPR 2023

- Ruotong Wang†, **Yanqing Shen**†, Weiliang Zuo, Sanping Zhou, Nanning Zheng. "TransVPR: Transformer-based place recognition with multi-level attention aggregation", CVPR 2022. †: Equal contribution.

- **Yanqing Shen**, Ruotong Wang, Weiliang Zuo, Nanning Zheng. "TCL: Tightly Coupled Learning Strategy for Weakly Supervised Hierarchical Place Recognition", IEEE Robotics and Automation Letters, 2022.

- **Yanqing Shen**, Chao Xia, Zhiqiang Jian, Shitao Chen, Nanning Zheng. "An integrated localization system with fault detection, isolation and recovery for autonomous vehicles", ITSC 2021.

- Chao Xia, **Yanqing Shen**, Yuedong Yang, Xiaodong Deng, Shitao Chen, Jingmin Xin, Nanning Zheng. "Onboard Sensors-Based Self-Localization for Autonomous Vehicle with Hierarchical Map", IEEE Transactions on Cybernetics, 2022.

- Wenjie Gao, Jiawei Fu, **Yanqing Shen**, Haodong Jing, Shitao Chen, Nanning Zheng. "Complementing onboard sensors with satellite map: A new perspective for HD map construction", ICRA 2024.

- Jiawei Fu, **Yanqing Shen**, Zhiqiang Jian, Shitao Chen, Jingmin Xin, Nanning Zheng. "InteractionNet: Joint Planning and Prediction for Autonomous Driving with Transformers", IROS 2023.

## PAPERS UNDER REVIEW

**Yanqing Shen**, Sanping Zhou, Jingwen Fu, Ruotong Wang, Shitao Chen, Nanning Zheng. "StructVPR++: Distill Structural and Semantic Knowledge with Weighting Samples for Visual Place Recognition"

## HONORS AND AWARDS

**National Scholarship**, Xi'an Jiaotong University, (2016, 2017, 2018, 2020, 2021, 2023)

Freshman Scholarship & Academic Scholarship, Xi'an Jiaotong University, 2019

Outstanding Undergraduate Graduates in Xi'an Jiaotong University, 2019

First Prize of Contemporary Undergraduate Mathematical Contest in Modeling in Shaanxi Province, 2017

Outstanding Student, Xi'an Jiaotong University, (2016, 2017, 2018, 2020)

# RESEARCH EXPERIENCE

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|---|---|
| **Now**<br>**Jan. 2024** | **LiDAR Place Recognition for Robots in Forests**<br>*Supervisor: Dr. Cesar Cadena, Dr. Olga Vysotska*<br>✧ To improve the place recognition performance in Forests, which have similar scenes.<br>✧ Propose to use BEV density images to extract some unique features, representing the 2D geometric distributions of trees. |
| **Jan. 2024**<br>**Feb. 2023** | **Distill Structural and semantic Knowledge for VPR**<br>*Supervisor: Prof. Nanning Zheng, Assoc. Prof. Sanping Zhou*<br>✧ To further enhance semantic knowledge in RGB features and thus improve feature stability in a changing environment.<br>✧ Introduce the explicit label features into enhanced global features, thereby achieving better semantic alignment between image pairs. |
| **Now**<br>**Sep. 2019** | **Autonomous Driving Vehicle Platform Development**<br>*Supervisor: Professor Nanning Zheng, Assistant Professor Shitao Chen*<br>✧ In Nov. 2019 and Nov. 2020, our team (Pioneer) won the championship in both **Intelligent Vehicle Future Challenge** competitions. Responsible for multi-sensing fusion localization algorithms.<br>✧ In Sep. 2022 and Nov. 2023, our team (Pioneer) won the championship in both competitions. As the team student leader, lead and manage the entire team to develop the autonomous vehicle system. |
| **Nov. 2022**<br>**Jan. 2022** | **Distill Structural Knowledge for VPR**<br>*Supervisor: Prof. Nanning Zheng, Assoc. Prof. Sanping Zhou*<br>✧ To enhance structural knowledge in RGB features and thus improve feature stability in a changing environment.<br>✧ Propose a sample-based selective knowledge distillation method to distill the high-quality knowledge from segmentation to RGB.<br>✧ Achieve SOTA performance using only global retrieval and even outperforms two-stage methods. |
| **Nov. 2021**<br>**Mar. 2021** | **Transformer-based Attention for VPR**<br>*Supervisor: Prof. Nanning Zheng, Assoc. Prof. Sanping Zhou*<br>✧ To adaptively select distinctive regions in an image with only image-level supervision.<br>✧ Propose a Transformer-based model that can jointly extract both patch-level and global image representations by aggregating multi-level attentions. |
| **Oct. 2021**<br>**Mar. 2021** | **Tightly Coupled Learning Strategy for VPR**<br>*Supervisor: Prof. Nanning Zheng*<br>✧ To tightly couple global and local descriptors thus improving the global perception capability, enriching local details, and improving their consistency.<br>✧ Propose a bidirectional search DTW method with path assumptions to mine spatial information. |

# SKILLS

**Languages**: English (CET-6 544), Mandarin Chinese
**Techniques**: Python, C++, MATLAB, Visio

# PROFESIONAL SERVICES

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| Reviewer | CVPR, ECCV, ICCV, ICRA, RA-L, IROS, ACCV, ICPR, ITSC, and IV |