JIANWEI REN

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EDUCATION

Beijing University of Posts and Telecommunications (BUPT) *09.2021 - 06.2024*

- **Master** in Information and Communication Engineering
- **GPA**: 91.36 / 100
- **Relevant courses**: Matrix Theory and Methods (PhD.) (89), Information Theory (93), Abstract Algebra and Application (90), Machine Learning (97), Fundamentals of Linux System and Programming (99), etc.

BUPT & Queen Mary University of London (QMUL) *09.2017 - 06.2021*

- **Bachelor** in Telecommunications Engineering with Management
- **GPA**: 87.83 / 100 (13% of 316 students)
- **Relevant courses**: Advanced Mathematics (94), Linear Algebra (94), Probability Theory (91), Engineering Mathematics (92), Signal and Systems Theory (96), Telecoms Systems (96), Electromagnetic Fields and Waves (96), Internet Protocols (93), Interactive Media Design and Production (92), Principles of Communications (99), Image and Video Processing (92), etc.

RESEARCH EXPERIENCE

Autonomous Grand Challenge – Mapless Driving, XIAOMI EV *01.2024- 06.2024*

- Achieving **2nd** place in the CVPR 2024 Challenge leaderboard.
- Achieving **1st** place in the China 3DV 2024 Challenge leaderboard.
- Achieving **1st** place in the CVPR 2023 Challenge leaderboard.
- Using surrounding multi-view images to construct high-definition maps, involving lanes, traffic signs, road boundaries, crosswalks, and the topological relationships between lanes as well as between lanes and traffic signs.
- Detecting vectorized elements using a DETR-based joint training model for "lane-crosswalk-boundary" task allows for a more efficient representation of traffic elements.
- Detecting traffic signs using a YOLOv8-based multi-scale framework.
- Incorporating geometric priors in topological tasks and decoupling detection from topology modeling achieves state-of-the-art (SOTA) results.
- A trust-based ensemble strategy is proposed to significantly enhance the model performance.

Representation Learning for Dense Prediction, BUPT, Independent Research *08.2023- 01.2024*

- Designing a pretext task for an inherently multi-task model whilst maintaining consistency in multi-objective.
- Refining pixel-wise representations with tailored siamese encoders that occupy no extra resources during inference.
- Achieving SOTA performance among CNN architectures in challenging self-supervised monocular depth estimation.
- With good scalability, this method can be extended to other dense prediction tasks or applied in domain adaptation and transfer learning.

Self-Supervised Monocular Depth Estimation, BUPT, Independent Research *07.2022- 08.2023*

- Recovering 3D depth from a single RGB image without supervision.
- Proposing an adaptive learnable module, with which existing CNN backbones could estimate depth in a discrete manner.

- Designing a novel regularization term to constrain the global probability distributions.
- Introducing an activation hyper-parameter to sharpen the local pixel-wise probability distributions.
- The method alleviates the issue of lacking fine-grained supervision to produce higher-quality depth maps than any conventional discretization strategy.

Intelligent Speed Measurement System, BUPT, Team Leader *12.2021- 11.2022*

- Developing a platform to measure ego vehicle speed.
- Estimating the trajectory from a monocular video with classical Structure from Motion methods.
- Organizing cutting-edge academic seminars and providing relevant tutorial guidance to undergraduates.

PUBLICATION AND PREPRINT

- Li Guang*, **Ren Jianwei***, et al. "Leveraging SD Map to Assist the OpenLane Topology." Cvpr workshops. 2024.
- **Ren, Jianwei**. "Adaptive Discrete Disparity Volume for Self-supervised Monocular Depth Estimation." arXiv preprint arXiv:2404.03190 (2024).

SELECTED HONORS AND AWARDS

- **The First Prize Scholarship**, Beijing University of Posts and Telecommunications 2022, 2021
- **The Third Prize**, Graduates' Innovation and Entrepreneurship Competition in BUPT 2022
- **UK First Class Honours Degree**, Queen Mary University of London 2021
- **Outstanding Graduates**, Beijing University of Posts and Telecommunications 2021
- **The Second Prize Scholarship**, Beijing University of Posts and Telecommunications 2020
- **The Third Prize**, College Students' Innovation and Entrepreneurship Competition in Beijing 2019
- **The Third Prize Scholarship**, Beijing University of Posts and Telecommunications 2019, 2018

SKILLS

Communication
TOEFL: 88 (110 target)

Programming Languages and Frameworks
Proficient: Python, Pytorch, MMCV
Competent: Java, C, Tensorflow, LaTeX
Familiar: Arduino, HTML, JavaScript, Matlab

Also Familiar with
Economics, Ancient philosophy, Game design