JIANWEI REN

jvren42@gmail.com ◇ personal page

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.

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

- **Bachelor with First Class Honours** 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

Diffusion-Based Simulation Agents for Scalable Autonomous Driving,
Institute for Interdisciplinary Information Sciences, Tsinghua University *09.2024- present*

- Modeling joint multi-agent state distributions, enabling the generation of realistic and scalable driving scenarios to validate algorithms cost-effectively and safely.
- Leveraging diffusion foundation models as the backbone of a stochastic virtual world to underpin agents' behavior logic.

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

- Only **2** members in our team. I am the *primary participant*.
- 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, and to model relationships between lanes as well as between lanes and traffic signs.
- Our data-efficient DETR-based joint training framework allows multiple tasks to share intermediate representations, achieving comparable performance to the leading model with only **1/3** parameters.
- Decoupling detection from topology modeling avoids error accumulation. Incorporating geometric priors 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*

- Representation alignment avoids inconsistencies in learning objectives between perception and reconstruction tasks.
- 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.

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 attention module that equips the model with the ability to discretize depth.
- Designing an adversarial objective function to prevent learning collapse.
- Alleviating the issue of lacking fine-grained supervision to produce higher-quality depth maps than any conventional discretization strategy.

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
- **Outstanding Graduates**, Beijing University of Posts and Telecommunications 2021
- **The Second Prize Scholarship**, Beijing University of Posts and Telecommunications 2020
- **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, Git, Linux, MMCV
Competent: Java, C, TensorFlow, Docker, LaTeX
Familiar: Arduino, HTML, JavaScript, Matlab

Also Familiar with
Economics, Ancient philosophy, Game design