Yuhang Lu

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EDUCATION

- **Beijing University of Posts and Telecommunications** — Beijing, China
  Bachelor of Engineering in Internet of Things Engineering; GPA: 87.9/100 — *Sept. 2018 – Jun. 2022*
  Main Courses: Linear Algebra(90), Discrete Mathematics(97), Probability Theory and Stochastic Processes(87), Data Structures(94), Operating System(83), Database(86), Network and Protocols(97), Cloud Computing(92).

- **Queen Mary University of London** — London, UK
  Bachelor of Engineering in Internet of Things Engineering; First Class Degree — *Sept. 2018 – Jun. 2022*

WORK EXPERIENCE

- **ShanghaiTech University** — Shanghai, China
  Research Assistant (Supervisor: Yuexin Ma) — *Aug. 2022 - Present*
  - Led and contributed to cutting-edge research in 3D visual perception, focusing on developing label-efficient and memory-optimized perception systems for autonomous driving.
  - Conceptualized and proposed novel solutions to enhance model performance, improving accuracy and efficiency in specific tasks.
  - Spearheaded the implementation of key project code and played a lead role in drafting, revising, and submitting research papers for publication.

RESEARCH INTERESTS

My research focuses on advancing AI's ability to understand the 3D world with human-like perception. Currently, I am working on:

- Developing resource-efficient perception algorithms with minimal annotations and low memory overhead.
- Leveraging VLMs' reasoning abilities to improve model performance and generalization.
- Incorporating rule-based constraints into autonomous driving planning models to ensure safe and comfortable decision-making.

PUBLICATIONS

- **Yuhang Lu**, Yichen Yao, Jiadong Tu, Jiangnan Shao, Yuexin Ma, Xinge Zhu. **Can LVLMs Obtain a Driver's License? A Benchmark Towards Reliable AGI for Autonomous Driving**. Arxiv preprint(Under Review)

- **Yuhang Lu**, Xinge Zhu, Tai Wang, Yuexin Ma. **OctreeOcc: Efficient and Multi-Granularity Occupancy Prediction Using Octree Queries**. Conference on Neural Information Processing Systems (NeurIPS), 2024

- **Yuhang Lu**, Qi Jiang, et al. **See More and Know More: Zero-shot Point Cloud Segmentation via Multi-modal Visual Data**. Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), 2023.

RESEARCH EXPERIENCE

- **Research on multimodal zero-shot point clouds segmentation**
  ICCV 2023 Poster(Supervisor: Yuexin Ma) — *Jun. 2022 - Feb. 2023*
  - Proposed a novel multimodal zero-shot approach for point cloud semantic segmentation.
  - Designed an effective feature-fusion method with semantic-visual feature enhancement, improving alignment between visual and semantic features for better recognition of unseen classes.
  - Achieved state-of-the-art performance on SemanticKITTI and nuScenes datasets.

- **Research on efficient camera-based occupancy prediction**
  NeurIPS 2024 Poster(Supervisor: Yuexin Ma and Tai Wang)   *Mar. 2023 - Oct. 2023*
  - Introduce a 3D occupancy prediction framework using multi-granularity octree query, which sparsifing space, reducing necessary voxels and preserving vital spatial information.
  - Develop a semantic-guided octree initialization module and an iterative structure rectification module to provide the network with optimal initialization and dynamic octree adjustments for enhanced representation.
  - Achieve state-of-the-art performance while reducing around 20% computational overhead

- **Research on driving knowledge data and its boost for downstream VLMs**
  Under Review(Supervisor: Yuexin Ma and Xinge Zhu)   *Mar. 2024 - Sep. 2024*
  - Introduce IDKB, the first large-scale vision-language dataset explicitly containing both driving theory and practical knowledge.
  - Evaluated 15 leading Large Vision-Language Models (LVLMs) on the IDKB dataset, providing a comprehensive analysis of their driving capabilities.
  - Led a team of three co-authors to successfully complete the project, overseeing all phases of development and research.

SKILLS SUMMARY

- **Languages**: Chinese (native), English (IELTS 7)
- **Programming Tools**: Python, Java, Pytorch, GIT
- **Hobbies**: Basketball, billiards