Yuhang Lu

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Education

- **The University of Hong Kong** — Hong Kong, China
  Ph.D. in Musketeers Foundation Institute of Data Science — *Oct. 2025 – Sep. 2029 (Expected)*
- **Beijing University of Posts and Telecommunications** — Beijing, China
  Bachelor of Engineering in Internet of Things Engineering; GPA: 87.9/100 — *Sept. 2018 – Jun. 2022*
- **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 - Apr. 2025*
  - 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.
- **OpenDriveLab, Shanghai AI Lab** — Shanghai, China
  Research Intern (Supervisor: Li Chen) — *Jun. 2025 - Present*
  - Contributed to cutting-edge research in autonomous driving, focusing on developing robust and efficient solutions for real-world challenges.

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 3D perception algorithms minimizing annotation needs and memory overhead.
- Leveraging human-like reasoning abilities to improve model performance and generalization.
- Designing highly adaptive autonomous driving algorithms capable of autonomous self-evolution from driving experience for diverse scenarios.

Publications

- **Yuhang Lu**, Jiangnan Shao, Xinge Zhu, Yuexin Ma. **ReAL-AD: Towards Human-Like Reasoning in End-to-End Autonomous Driving**. Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), 2025.
- Ziyang Yan, Wenzhen Dong, Yihua Shao, **Yuhang Lu**, Liu Haiyang, Jingwen Liu, Haozhe Wang, Zhe Wang, Yan Wang, Fabio Remondino, Yuexin Ma. **RenderWorld: World Model with Self-Supervised 3D Label**. 2025 IEEE International Conference on Robotics and Automation (ICRA 2025)
- **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**. Thirty-Ninth AAAI Conference on Artificial Intelligence (AAAI-25)
- **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*, Runnan Chen, Yuenan Hou, Xinge Zhu, Yuexin Ma. **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**
  AAAI 2025 (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.

- **Research on human-like end-to-end autonomous driving systems**
  ICCV 2025 (Supervisor: Yuexin Ma and Xinge Zhu) *Oct. 2024 - Mar. 2025*
  - Developed ReAL-AD, an end-to-end autonomous driving framework with hierarchical cognitive alignment, integrating human-like decision-making into trajectory planning.
  - Designed three core components: Strategic Reasoning Injector (VLM-driven decisions), Tactical Reasoning Integrator (structured controls), and Hierarchical Trajectory Decoder (motion refinement); maintained full execution consistency.
  - Achieved 30%+ improvement in safety metrics and planning accuracy, surpassing baselines on *NuScenes* and *Bench2Drive* datasets.

Miscellaneous

- **Languages**: Chinese (native), English (IELTS 7)
- **Technical Toolkit**: Python, Git, PyTorch, Linux/Shell, LaTeX
- **Academic Services**: Reviewer for CVPR, ICCV, NeurIPS, AAAI, ICRA, etc