Huitong Yang

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Education

- **Liaoning University of Technology** — Liaoning, China
  Bachelor of Engineering in Control Engineering — *Sept. 2015 – Jun. 2019*
- **Guangdong University of Technology** — Guangdong Guangzhou, China
  Master's degree of Optical Engineering — *Sept. 2019 – Jun. 2022*

Work Experience

- **ShanghaiTech University** — Shanghai, China
  Research Assistant (Supervisor: Yuexin Ma) — *Mar. 2022 - Dec. 2022*
  - Survey Vision-Centric bird's eye view(BEV) Autonomous Driving perception architecture
  - Implementation of LiDAR-Camera fusion perception framework and related validation
  - Research unsupervised domain adaptation system for 3D scene understanding
- **Tsinghua University** — Beijing, China
  Research Assistant (Supervisor: Hang Zhao) — *Jan. 2023 - Now*
  - Propose an unified architecture for self-driving motion forecasting and planning
  - Investigate End-to-End 3D Detection, Tracking and Motion Forecasting in bird's eye view(BEV)

Paper List

- Vision-Centric BEV Perception: A Survey
  Yuexin Ma, Tai Wang, Xuyang Bai, **Huitong Yang**, Yuenan Hou,Yaming Wang, Yu Qiao, Ruigang Yang, Dinesh Manocha, Xinge Zhu
  Submitted to IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE(TPAMI)[1] 2022
- Polar-based Adaptive BEV Perception for Autonomous Driving
  Huitong Yang, Xuyang Bai, Xinge Zhu, and Yuexin Ma
  Accepted by IEEE International Conference on Robotics and Automation(ICRA) 2023
- GAMNet: Global Attention Via Multi-scale Context for Depth Estimation Algorithm
  Huitong Yang, Qi Wang, Liang Lei
  Submitted to Measurement Science and Technology(MST) 2022

Research Experience

- **Vision-Centric BEV Perception: A Survey**
  TPAMI Submission. Fourth Author (Supervisor: Yuexin Ma) — *Jun. 2022 - Aug. 2022*
  - To the best of our knowledge, this is the first survey to review the recent progress in solving the view transformation between the perspective view and bird's eye view(BEV).
  - We present the most recent related methods of vision-centric BEV perception, clearly classifying them according to the core idea and downstream vision tasks. Detailed analysis and comparison on performance and limitation for these methods are also provided.
  - We propose extra extensions of BEV perception works, including the multi-task learning strategies,fusion operations in BEV, and empirical training tricks, to facilitate the implementation and development of related approaches.
- **Polar-based Adaptive BEV Perception for Autonomous Driving**
  ICRA 2023 accept. First Author (Supervisor: Xinge Zhu & Xuyang Bai) — *Jun. 2022 - Sep. 2022*
  - We propose a novel Polar-based BEV perception method, which can adapt to various computing budgets for multiple deployments based on one training.
  - We leverage the information interaction among multi-scale features to enhance the feature representation for better adaptation.

[1] https://arxiv.org/pdf/2208.02797.pdf

- Our method achieves state-of-the-art generalization capability of inferring novel scale of feature maps for 3D detection on large-scale autonomous driving dataset.

- **GAMNet: Global Attention Via Multi-scale Context for Depth Estimation Algorithm**
  Measurement Science and Technology Submission. First Author *Jan. 2021 - Jun. 2021*
  - We design a lightweight global duple attention module for aggregating the global information from the horizontal and vertical spatial dimensions, and capturing the cross-channel relationships efficiently along the channel dimension.
  - We introduce a multi-scale fusion module to reconstruct the feature pyramid, promoting the spatial coherence among the adjacent scales, and aligning the contexts from multiple scales.
  - We apply a 3D densely connected module in cost aggregation to refine matching feature representation and promote the sensitivity to salient matching details.
  - We propose a linear measurement strategy on spatial grasping point to verify the relative 3D reconstruction accuracy of the end-to-end stereo algorithms in actual application scenarios.[2]

Award-winning Experience

- **Academic Scholarships**
  - Guangdong University of Technology Academic Third Class Scholarship for Master's Degree Students for the academic year 2018-2021.

- **Competition Awards**
  - National Third Prize of the 8th National Student Optoelectronic Design Competition.
  - National Seconde Prize of the "Huawei Cup" 17th China Post-Graduate Mathematical Contest in Modeling.

[2]The video of 3D reconstruction visual guidance system based on GAMNet: https://www.bilibili.com/video/BV19r4y1U7oR/