Hansheng Chen

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Education

Master of Science student, Automotive Engineering — Sept 2020 – Present
Tongji University, Shanghai

Bachelor, Automotive Engineering (5-year program) — Sept 2015 – Jun 2020
Tongji University, Shanghai
GPA 4.6/5.0, Tongji Outstanding Graduate, National Scholarship, First Prize of Tongji Excellence Scholarship

Research Experience

My research interest is 3D computer vision for now, while looking forward to entering computer graphics in the future. Currently I am working on image-based 6DoF pose estimation and 3D object detection problems.

Research Intern — June 2021 – Dec 2021
DAMO Academy, Alibaba Group

- Proposed EPro-PnP (*CVPR* 2022 Best Student Paper), a probabilistic Perspective-n-Point layer for end-to-end 6DoF pose learning. The layer outputs the pose distribution with differentiable probability density, so that the 2D-3D correspondences can be learned flexibly by backpropagating the pose loss.

Student Researcher — Sept 2019 – Present
Institute of Intelligent Vehicles, Tongji University Advisor: Prof. Lu Xiong

- Proposed MonoRUn (*CVPR* 2021), a monocular 3D object detection method based on dense 2D-3D correspondences with uncertainty awareness. The main contribution is the uncertainty-aware reprojection loss that helps learning the 3D coordinates without prior knowledge of the object geometry.
- Took 5th place in VisDrone object detection challange (*ECCV* 2020 workshop).
- I was the core member of a team that developed a perception system for parking robots.
- Assisted in several research projects, involving real-time parking slot detection and SLAM system.

Selected Projects

Before I entered computer vision in mid-2019, I devoted my time to aerodynamics engineering in Formula SAE.

Aerodynamics Lead — Mar 2018 – June 2019
TJU Racing, Tongji University

- My main contributions are innovations in design methodology based on simulation and optimization, leading to a 30% increase in downforce in 2018 and steady improvements in the next few years.
- Won Best Aerodynamics Award in FSAE Japan, 2019.

Academic Services

Reviewer for *ICCV Workshop on 3D Object Detection from Images*, 2021.

Publications

Hansheng Chen, Pichao Wang, Fan Wang, Wei Tian, Lu Xiong, Hao Li. EPro-PnP: Generalized End-to-End Probabilistic Perspective-n-Points for Monocular Object Pose Estimation. To appear in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022 (**Oral, Best Student Paper**).

Hansheng Chen, Yuyao Huang, Wei Tian, Zhong Gao, Lu Xiong. MonoRUn: Monocular 3D Object Detection by Reconstruction and Uncertainty Propagation. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

Zhuoping Yu, Zhong Gao, **Hansheng Chen**, Yuyao Huang. SPFCN: Select and Prune the Fully Convolutional Networks for Real-time Parking Slot Detection. In *IEEE Intelligent Vehicles Symposium (IV)*, 2020