Ken, Jia-Quan Yu

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RESEARCH INTERESTS

Computer Vision, Image Segmentation, 3D Object Detection, Multi-robot System

EDUCATION

National Taiwan University (NTU), Taipei, Taiwan Jun. 2023
Master of Science, Communication Engineering, GPA: 4.23/4.3

- Thesis: *Image Recognition in Driving Scene: Monocular 3D Object Detection and Image Segmentation*
- Selected Courses: Machine Learning, Deep Learning in Computer Vision, Digital Visual Effects

National Taiwan University, Taipei, Taiwan Jun. 2017
Bachelor of Science, Mechanical Engineering, Selected Courses GPA: 3.87/4.3

- Selected Courses: Computer Programming, Program Design, Automatic Machine Design

PUBLICATION

Panoptic-Depth Color Map for Combination of Depth and Image Segmentation 2023
Jia-Quan Yu, Soo-Chang Pei
IPPR Conference on Computer Vision, Graphics, and Image Processing (CVGIP)
arxiv.org/abs/2308.12937

Perspective-aware Convolution for 3D Object Detection 2023
Jia-Quan Yu, Soo-Chang Pei
IPPR Conference on Computer Vision, Graphics, and Image Processing (CVGIP)
arxiv.org/abs/2308.12938

RESEARCH EXPERIENCE

Digital Image Processing Lab, National Taiwan University Mar. 2021 – Aug. 2023
Master's student, Advisor: Prof. Soo-Chang Pei

- Monocular 3D Object Detection: Developed a convolutional module that guides the neural network to exploit visual clues like road landmarks to assess object's distance to the camera. This innovation yielded a +1.4% improvement in average precision (AP)
- Segmentation plus Depth: Combined panoptic segmentation and depth estimation into a unified, end-to-end network architecture. Visualized segments' depth with color map to enhance autonomous driving safety

- Scene-aware Data Augmentation: Integrated segmented objects into different scenes to reuse their training labels. Used depth maps as references to ensure realistic object label generation, resulting in +2.35% in AP
- Safety Metric for Object Detection: Calculated weights to on-road objects based on their relevance to driving safety. Utilized the weighted average precision to better evaluate performance of object detection algorithms

System Optimization Lab, National Taiwan University Mar. 2020 – Oct. 2020

Research assistant, Advisor: Prof. Kuei-Yuan Chan

- Devised and implemented an innovative autonomous multi-robot system that can transport 75 kg payload with single robot and can transport 140 kg payloads with two robots work collaboratively
- Developed and refined robotics localization and navigation algorithm based on Visual SLAM and Visual Odometry, enabling the robot to scan maps during exploration and achieve 50mm localization precision
- Led a research team of four graduate students to develop multi-robot system and monitor project progress

System Optimization Lab, National Taiwan University Jun. 2017 – Nov. 2017

Undergraduate research, Advisor: Prof. Kuei-Yuan Chan

- Created a self-driving 1:10 racing car model, which is equipped with LiDAR and camera to sense surroundings and avoid obstacles to research goals autonomously

PROFESSIONAL EXPERIENCE

Software Engineer, MediaTek Inc., Hsin Chu, Taiwan Sep. 2023 - Present

- Maintain camera driver to ensure image warping algorithm and its I/O run as efficient as possible

Robotic Software Engineer, Advanced Robotics CO., LTD., Taipei, Taiwan May 2018 – Mar. 2019

- Assisted to develop navigation and localization algorithm for autonomous luggage-carried robots that served over 200 customers and were capable of traversing a hotel with 250+ rooms
- Device software and hardware of an elevator control system, allowing robots to take elevators to 8 floor
- Deployed and maintain hotel robot in four Chinese cities. Resolved issues for customers on-site

AWARDS

- CVGIP Best Paper Competition – Honorable Mention 2023
- Taiwan Innovative Mechanism Design Competition - Merit Award 2016

SKILLS

- Software: PyTorch, Linux, Python, C, C++, OpenCV, Pandas
- Hardware: Raspberry Pi, STM32 board, NVIDIA Jetson Nano, Arduino
- Languages: Mandarin (native), English (fluent, TOFEL iBT 110/120)