CHENHAO YANG

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EDUCATION

Carnegie Mellon University *Pittsburgh, US*
Master of Science in Computational Design & Manufacturing *Aug.2021-Dec.2022(expected)*
Concentration: Perception, Robotics | GPA: **4.0**

Technion - Israel Institute of Technology *Haifa, Israel*
Bachelor of Science in Mechanical Engineering *Sept.2017-Aug.2021*
Cumulative GPA: **93.3/100** | Rank: **1st** | Honor: Summa Cum Laude

RESEARCH EXPERIENCE

Dynamic Obstacle Detection and Tracking for UAV inspection in Tunnel *Ongoing*
Advised by Prof. Kenji Shimada | Computational Engineering and Robotics Lab, UAV group, CMU

Objective: Develop a fully autonomous UAV for tunnel inspection.
Core Contents:

- Designed, assembled autonomous drone, set up flight controller, sensor fusion in PX4, and developed fail-safe mechanism for inspection algorithm;
- Set up drone - ground laptop communication and remote control, real-time data transmission and visualization based on ROS system;
- Implemented real-time vision-based dynamic obstacle detection and tracking algorithm using U-depth map and YOLO detector;

Cone Detection for Autonomous Formula Using Deep Learning Methods *2021 Spring*
Advised by Prof. Anath Fischer & Ronit Schneor | CAD & LCE Lab, Technion

Objective: Cone detection and localization using point cloud with method of deep learning.
Core Contents:

- Created realistic simulation of point cloud scanning datasets for formula student cone detection task;
- Implemented classical detection algorithms based on canny edge detection;
- Designed and built deep neural network based on Point-pillars structure for cone detection;
- Acquired 94.8% accuracy in testing dataset, performance and analysis of algorithms with noisy input.

PROJECT EXPERIENCE

Kinematics, Dynamics and Control Analysis of a 6 DOF Robot in Simulation

- Computed forward and inverse kinematics of a 6 DOF serial manipulator;
- Formulated dynamics of serial manipulator with both Lagrange and Newton-Euler methods.
- Performed trajectory planning, Lyapunov stability analysis and designed PD + gravity compensation controller for uncertain systems.

Augmented Reality with Homography Computation

- Detected and matched features between two images using DoG detector and BRIEF descriptor, computed homography matrix using RANSAC algorithm;
- Warped and blended images based on calculated perspective to create desired effects.

COMPUTATIONAL SKILLS

Languages	`Python, C/C++, MATLAB`
Software/Library	`ROS, Simulink, Pytorch, OpenGL, Numpy, PySINdy, Git, OpenCV, CAD`