

Tianyou Hu

Email: h.tianyou@wustl.edu **Phone:** (314) 904-6251

Education

Washington University in St. Louis

Sep. 2021 - Present

M.S. in Mechanical Engineering (expected in May 2023)

GPA: 4.00 / 4.00

Chongqing University

Sep. 2017 - Jun. 2021

B.Eng. in Vehicle Engineering

GPA: 3.08 / 4.00

Research Interest

Robotics, Simultaneously Localization And Mapping (SLAM), Motion planning, Computer Vision, Machine Learning, Signal Processing

Publication

[1] **T. Hu**, Y. Deng, Y. Deng and A. Ge, "Fully Convolutional Network Variations and Method on Small Dataset," 2021 IEEE International Conference on Consumer Electronics and Computer Engineering (ICCECE), 2021, pp. 40-46, doi: 10.1109/ICCECE51280.2021.9342059.

Research Projects

Vision-based Exploration of Robot in Fully Unknown Environment

Aug. 2022 - Present

Supervisor: Prof. Yiannis Kantaros from Washington University in St. Louis;

- Setup environment and implemented SLAM and navigation algorithm in Robot Operation System (ROS) simulator;
- Applied SLAM algorithm for building map in unknown environment on TurtleBot3 robot;
- Applied Rapid Exploring Random Tree (RRT) navigation algorithm on TurtleBot3 to navigate in map built by SLAM.
- Combined SLAM and navigation to realize autonomous exploration in unknown map on TurtleBot3;
- Applied YOLOv7 neural network for object detection on TurtleBot3; Applying depth estimation algorithm to obtain coordinate of object.

Computer Vision and Machine Learning with Self-driving Car project

Aug. 2019 - Nov. 2020

Supervisor: Dr. Ian Deng from University of California, San Diego;

- Built Fully Convolutional Networks (FCN) based on VGG16, ResNet and vanilla Convolutional Neural Network (CNN);
- Fed a small dataset containing 367 train images and 101 test images, then tuned kernel size and up-sample algorithm to improve the segmentation accuracy and “mean Intersection over Union” metric for each model. Less training parameters produces higher accuracy, hence bi-linear interpolation is used as up-sample method. Accuracy was increased from 34% to 87%;
- Compared performance of FCNs based on different CNNs, and summarized FCN variations and method on small dataset;

Acoustic Source Identification Algorithm based on Microphones Array under Strong Background Noise

Supervisor: Prof. Zhigang Chu from Chongqing University

Mar. 2021 - Jun. 2021

- Built plane acoustic detection model in by implementing cross-spectrum beam-forming algorithm simulated under theoretically pure environment and noisy environment;
- Added diagonal reconstruction algorithm to enhance disturbance resisting capability under different acoustic frequency;
- Analyze influence of microphones distribution, signal noise ratio and snapshots numbers;

Computer Aid Design on Piston of Internal Combustion Engine

Feb. 2021 - Apr. 2021

- Drew 3D model in Altair Inspire, then added stress and constraints; Ran analyze for the stress distribution;
- Ran optimization to minimum mass; Utilized PolyNurbs to create the optimized model then analyzed stress for it;
- Used Altair Inspire Cast for casting simulation to verify whether model is manufacturable.

Work Experience

Graduate Teaching Assistant

Jan. 2023 - Present

Supervisor: Prof. Vladimir Kurenok from Washington University in St. Louis;

ESE 502 Mathematics of Modern Engineering II:

Hold in-person Office Hour per week; Grade homework and exams for students;

Core content: Fourier Series, Fourier Integral, Fourier Transform, Complex valued series and functions;

Skills

Computer Language: Python (Tensorflow, NumPy, Matplotlib), Java, C, MATLAB, Shell

Software: Robot Operation System(ROS), SolidWorks, Altair Inspire, ANSYS, COMSOL, CAXA, Microsoft Office