Zehao Xu

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EDUCATION

Zhejiang University *B.S.E. in Automation* Sep. 2015 – June 2019

- Current GPA: 3.93/4.00 • Ranking: 2/121 • Major GPA: 4.00/4.00
- Relevant Coursework: Data Structure, Object-Oriented Programming Technology, Data Analysis and Algorithm Design, Computer Networks, Principles of Database Systems, Software Technology, Machine Vision.

University of California, Los Angeles *Summer Research* July 2018 – Sep. 2018

WORK EXPERIENCES

Hangzhou Hikvision Digital Technology Co., Ltd (C++) Nov.2018 - Present

Software Development Intern, Advanced Graphics and Vision

- Designed and implemented a cloud visualization dashboard to render raw point cloud data for development.
- Built a point cloud preprocessing tool that performs denoising and amends dynamic distortion of input signal.
- Detected features by SURF and SIFT algorithms separately and compared the time cost of computing descriptors.

RESEARCH EXPERIENCES

Model-based Trajectory Optimization with Nonlinear Programming (C++ & Python) **Prof. Tao Gao**

Research Assistant, Center for Vision, Cognition, Learning, and Autonomy, UCLA July 2018 – Sep. 2018

- Researched on trajectory optimization for feeding to large-scale nonlinear optimizer IPOPT.
- Extracted the cost function from physics engine Mujoco and calculated the violation with numerical methods.
- Designed a data visualization module that can interactively render 3D trajectory animations.
- Optimized the calculation of Jacobian matrix based on profiling data to improve cache and fix memory leaks.

VFH+ Obstacle Avoidance Algorithm and Simulation Based On EKF-SLAM (MATLAB) **Prof. Rong Xiong**

Research Assistant, Robotics Laboratory, Zhejiang University Dec. 2017 – May 2018

- Established a robot simulation environment, including obstacle map, omnidirectional mobile robot, and a simulated ultrasonic detector to detect nearby obstacles using cutting-edge EKF-SLAM algorithms.
- Matched the nearest point of the sensor to the rigid body transform based on ICP (Iterative Closest Point).
- Implemented the design in MATLAB and successfully conducted simulation tests on various conditions.
- Combined the EKF-SLAM and VFH+ algorithms and achieved superior results in various simulated environments.

Drone Autopilot Based on Computer Vision and Machine Learning (C++ & Python) **Prof. Dongqin Feng**

Team Leader, Micro Aerial Robot Team Laboratory, Zhejiang University Jun. 2016 –Jan. 2018

- Developed key modules of embedded flight control system, including sensors signal processing tools, cascade PID control algorithms and Pulse Width Modulation, on a self-designed flight controller.
- Built a real-time multiscale face recognition system on the four-rotor drone using Haar features, LBP features.
- Trained CNN model in TensorFlow for object detection applicable to targets not just limited to human faces.
- Migrated to a real-time compatible solution based on Single Shot MultiBox Detector using Caffe.
- Implemented optical flow algorithm on flight controller Pixhawk, and conducted secondary development of PX4 firmware to achieve vision-based navigation.

Multi-layer Perceptron Classifier Development (C++) **Prof. Yu Pan**

Team Leader, Course Project, OOP, Zhejiang University

- Developed a MLP classifier from scratch in C++ based on the design principles in TensorFlow.
- Designed the system that can automatically generate the network, ingest training data, and output the optimal weighting parameters for the trained model.
- Employed OOP principles and designed the class inheritance tree, modularized project based major classes.

TECHNICAL SKILLS

- Programming Languages: C++, C, Python, MATLAB, HTML, SQL, Java, JavaScript, Assembly
- Tools and Frameworks: TensorFlow, Linux, LabView, AWS EC2, Git, GTest/GMock, OpenCV, Caffe, CMake