Xiangzhuo Ding

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EDUCATION

Columbia University, *New York, NY* Sept. 2018 ~ Dec. 2019
Master of Science in Mechanical Engineering, GPA: 3.96

Hunan University, *Changsha, CN.* Sept. 2014 ~ Jun. 2018
Bachelor in Engineering Mechanics, GPA: 3.5 (Top 10%)

SKILLS

Programming: Python (PyBullet, TensorFlow, PyTorch, Spark), C++ (Eigen), Matlab.

Software & Platform: ROS, Linux, Docker, Git, Google Cloud Platform, Ansys, Abaqus, NX UG, Inventor, SolidWorks.

WORK EXPERIENCE

Teaching Assistant for Introduction to Robotics, *Columbia University* Feb. 2019 ~ Dec. 2019

- Tutor over 180 students in coding projects and maintain the course website.

Robotics Algorithm Engineer Intern, *RVBUST Inc.* Jun. 2019 ~ Aug. 2019

- Developed a novel algorithm to generate a proper distribution of a 6-axis robot arm collision data in the configuration space using Flexible Collision Library (FCL).
- Trained a Deep Neural Network using Pytorch to predict collision results with high accuracy.
- Wrote a fast inference engine using C++ and Eigen, which can produce the output within 300 nanoseconds.
- Designed a hybrid Motion Planning algorithm, which saves up to 70% of the time compared to the state-of-the-art RRT algorithm in the Open Motion Planning Library.

RESEARCH EXPERIENCE

Vehicle Pose Estimation Based On Monocular Vision Sept. 2019 ~ Dec. 2019

- Constructed a system to estimate the position and pose of vehicles in 3D space. The model has several convolution layers along with EfficientNet module to generate an output with eight channels.
- Applied attention units in the model to improve the performance.
- Created a pipeline to preprocess input images, get predictions from the model, extract information from output, and visualize the results.

Gait Analysis Based on Deep Learning Feb. 2019 ~ Jun. 2019

Advisor: Prof. Sunil K. Agrawal & Antonio Prado

- Wrote an automatic script to preprocess the data collected by multiple insole sensors. Sensors in one shoe includes three piezoresistive sensors, an accelerometer, and a gyroscope.
- Trained a Deep Neural Network using Tensorflow to analyze the gait of subjects using an Encoder-Decoder module and recurrent layers. The finalized model can predict a gait cycle percentage within a 7% error at 30Hz.

Optimization of Unmanned Aerial Vehicle Using Evolutionary Algorithm Dec. 2017 ~ Jun. 2018

Advisor: Prof. Pengfei Hou

- Built a precise model of a real-world unmanned aerial vehicle using SolidWorks.
- Examined the stability and strength of UVA fuselages made of different materials using Abaqus.
- Applied the Evolutionary Algorithm to optimize the carbon fiber laminates using Abaqus Python API and eigenvalue buckling analysis module. The critical buckling load of the frame increased threefold after the optimization.

PUBLICATIONS & PATENTS

- Prado, A., Cao, X., Ding, X. and Agrawal, S.K., 2019. Prediction of Gait Cycle Percentage Using Instrumented Shoes with Artificial Neural Networks. *IEEE International Conference on Robotics and Automation* (under review)
- Smart Electric Self-Balancing Scooters, CN Utility Patent ZL 2016 2 1091311.4