Xiangzhuo Ding

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EDUCATION

Columbia University, *New York, NY* Sept. 2018 ~ Dec. 2019
Master of Science in Mechanical Engineering, GPA: 4.0

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

SKILLS

Programming: Proficient in Python (TensorFlow/PyTorch/Numpy) and Matlab; familiar with C++ (Eigen).
Experienced with Docker, Git, SVN, Conda, CMake, GCP.

Platform & Software: Linux(Ubuntu/Debian), ROS(Rivz/MoveIt), Ansys, Abaqus, NX UG, Inventor, SolidWorks.

WORK EXPERIENCE

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

- Tutored over 180 students in coding projects and maintained the course website.

Robotics Software 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 & PROJECTS

Recommendation System Using Facial Analysis and Collaborativs Filtering Nov. 2019 ~ Dec. 2019

- Designed and built the framework of the recommendation system. The system personalizes media recommendations using user's history data and facial sentiment data.
- Trained and deployed four separate CNN modules to recognize, identify the user, and analyze facial expression.
- Merged the collaborative filtering function written by PySpark and the BigQuery database into the back-end.

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.

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* (accepted)
- Smart Electric Self-Balancing Scooters, CN Utility Patent ZL 2016 2 1091311.4