Chuanbeibei Shi

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Address: No. 5, South Street, Zhongguancun, Haidian District, Beijing

Education

Beijing Institute of Technology (Project 985&211) **Beijing, China**

B.Eng. in Mechatronics Engineering (English Teaching Major) 09/2018~present

Computer Skills: C, Python, HTML, C++, MATLAB.

North Carolina State University **Raleigh, USA**

Data Mining and Analysis for Dockless E-scooter Sharing Systems Based on Python 07/2021~08/2021

Supervised by Prof. Muhamad Shahzad and Hassan Ali Khan

- ✧ Utilized the spatiotemporal data of the supply and utilization of 12 electric scooters sharing systems to study and identify similarities and differences in the use of such systems in 11 different cities.
- ✧ Used Python to conduct data mining and analyze the situation of the dockless e-scooter sharing (DES) system, helping users understand the differences in urban traffic behavior and the use of micro-transport platforms.
- ✧ Total Grade: 96/100.

Massachusetts Institute of Technology **Cambridge, USA**

Machine Learning & Artificial Intelligence 07/2019~08/2019

- ✧ Mastered decision-making and the application of classic algorithm Q-learning through participating in the summer school of machine learning and artificial intelligence courses.
- ✧ Used the artificial neural network to identify the author by inputting the picture of the painting.
- ✧ Total Grade: 98/100.

Publication

- ✧ Yushu Yu, **Chuanbeibei Shi**, Yuwei Ma, Dong Eui CHANG. Constrained Control for Systems on Lie Groups with Uncertainties via Tube-based Model Predictive Control on Euclidean Spaces, International Conference on Cognitive Systems and Information Processing (ICCSIP 2021), *published and awarded as the best paper finalist.*
- ✧ Kaidi Wang, Yishen Qi, **Chuanbeibei Shi**, Yushu Yu, Fuchun Sun, Dongjun Lee. Towards Expandable Aerial Vehicles Assembly: Trajectory Linearization Geometric Control Design and Real-world Prototype Implementation, IEEE/ASME Transactions on Mechatronics, submitted.
- ✧ **Chuanbeibei Shi**, Yushu Yu, Ganghua Lai, Mauro Bellone, Vincezo Lippiello. Real-time Multi-modal Active Vision for Object Detection on UAVs Equipped with Limited Field of View LiDAR and Camera, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022), submitted.
- ✧ Yushu Yu, **Chuanbeibei Shi**, Vincenzo Lippiello, Yi Yang. Hierarchical Robust Tube-based Model Predictive Control of Multiple Aerial-Vehicle Transportation Systems with Uncertainties and State/Input Constraints. Applied Mathematical Modelling, submitted, in revision

Research Experience

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Active Vision for Object Detection on UAVs with Camera and LiDAR 07/2019~present

Advisor: Prof. Yushu Yu, Prof. Vincenzo Lippiello and Dr. Mauro Bellone

- ✧ Derived and completed the preprocessing code for transforming the point cloud into multiple-channel images including point cloud accumulation, projection, and upsampling point cloud images.
- ✧ Tested the early fusion, cross fusion, and late fusion of the images transformed from the point cloud and captured by cameras, and trained the early fusion object detection CNN based on Darknet.
- ✧ Derived the perception constraints to keep the region of interest in the Field-of-view (FOV) of the camera and LiDAR, and designed the model predictive control from the perception constraints.

Geometric Tube-based MPC for Aerial Robot 07/2019~03/2021

Advisor: Prof. Yushu Yu

- ✧ Proposed original ideas on tube-based MPC for systems on the manifold and proved the stability of the entire control algorithm.
- ✧ Finished the simulation coding on MATLAB, applied the methodology to aerial robots, developed the real-world program of the MPC for aerial robots, and finished related academic papers.

Innovation Practice-Intelligent Robots I - Obstacle Avoidance Car Based on Raspberry Pi and Arduino 09/2020~05/2021

Advisor: Prof. Zhangguo Yu and Prof. Qing Shi

- ✧ Called camera on Raspberry Pi based on Keras, TensorFlow, OpenCV, and YOLOv3 for real-time deep learning to identify cars and blocks and distance measurement of multi-target colored wood blocks.
- ✧ Avoided obstacles automatically based on camera on Raspberry Pi and ultrasonic and infrared sensors by rotating the motor through PID control after detecting the obstacles via serial communication from Raspberry Pi to Arduino.

Artificial Neural Network Design and Programming Practice with Python 11/2019~12/2019

Advisor: Dr. Hao Wu

- ✧ Realized data training through Jupyter notebook and Python based on anaconda, improved the performance of the neural network and acquired the pictures of the neural network brain.

Dragon Slayer Mini Game Design 02/2019~04/2019

Advisor: Prof. Fengnian Zhao

- ✧ Utilized C to write the small game Dragon Slayer suitable for the software Easy Graphics Engine (EGE).
- ✧ Improved the code running speed by modifying the function nesting and realized the picture quality coordination.

Grade Management System Design 12/2018~02/2019

Advisor: Prof. Qing Xue

- ✧ Implemented a score statistics management system to arrange the input score data using C language.