Wenwen Hou

📞 (86)182-9190-9359   ✉ hollyhou423@gmail.com

Education

The Chinese University of Hong Kong   Sept 2023 - May 2024
M.S. in Mathematics (GPA: 3.68/4.00)   *Hong Kong, China*
- **Coursework:** Optimization Theory (Ph.D Level **A**), Computational Mathematics (**A**), Topics in Differential Equations (**A**), Mathematical Image Processing, Linear Algebra, Probability and Stochastic Process

Xi'an Jiaotong University   Sept 2018 - July 2022
B.Eng. in Engineering Mechanics & B.S. in Economics (Double major) (GPA: 3.30/4.00)   *Xi'an, China*
- **Coursework:** Stochastic Process (89), Numerical Computational Methods (87), Introduction to general Scientific Software (88), Fluid Mechanics, Macroeconomics, Microeconomics

Research Experience

Subdivision Iteration and Optimization Algorithm   Dec 2021 – June 2022
Graduation thesis (A-), School of Aerospace, Xi'an Jiaotong University   *Xi'an, China*
- Solved several typical nonlinear multi-objective optimization problems with Python based on the Cell Mapping algorithm and optimization theory; acquired global Pareto optimal solutions
- Upgraded performance of vibration absorbing device shown by comparing the power spectral density function images of the system before and after optimization

Nonlinear Dynamical System Research   Dec 2020 – July 2021
Scientific Research Training (Score: 99), State Key Lab of Strength and Vibration   *Xi'an, China*
- Developed global analysis methods of high-dimensional nonlinear dynamical systems with Cell Mapping algorithm
- Improved the subdivision algorithm to make it more in line with dynamics studies, using hash tables to optimize its data structure; saved more than 10 times the computation time and memory space
- Proposed a new subdivision interpolation algorithm; replaced long integration process by the interpolation method on the basis of subdivision algorithm; increased computational speed
- Wrote corresponding codes with C++

Projects

Pneumonia Detection with Chest X-ray Images | *Python, Pytorch, CNN, ResNet34, EfficientNetV2*
- Used simplest fully connected neural network with one hidden layer to classify the Pneumonia and Normal images
- Applied data augmentation techniques to increase the diversity of our training dataset; improved the program with CNN structure with F1 score being 84%
- Adopted pre-trained ResNet34 model and EfficientNetV2 model with F1 score being 92%
- Reorganized the program structure, such as adding the validation set, setting the learning rate scheduler and early stopping checkpoint to prevent overfitting

Detection of malignant tumors in the lungs with CT scans | *Pytorch, Unet, LUNA Dataset*
- Data processing: convert node center coordinates in patient coordinates (X,Y,Z) to array indexes (indexes, rows, columns)
- Image segmentation: used Unet to segment the CT data and determine whether a pixel is a nodule or not
- Image classification: predicted whether a nodule is malignant using classification models

Autonomous Outdoor UAVs Grasping System | *C++, Control System, Mathematical modelling*
- Edited codes of the control module with C++
- Mathematical modelling for optimal path; ensured accurate tracking of the optimal path and resistance to external environmental interference with the model predictive control

Skills

Language: Mandarin (native), English (Fluent)
Programming: Python, C++, Matlab, R Language