Hongrui (Steven) Guo

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Interested in Machine Learning, Time Series, Image processing, and other Interdisciplinary topics

Education

Duke University GPA: 3.3/4.0 08/2021 – 05/2023

Master of Engineering in Electrical and Computer Engineering NC, USA

Core courses: Data Structures and Algorithms, Random Signals and Noise, Machine Learning, Deep Learning, Image and Signal Processing, Data Science, Statistical Computation

Nipissing University GPA: 3.6/4.0 09/2017 – 06/2021

Bachelor of Science Honours in Computer Science (with distinction) ON, Canada
Minor: Physics, Certificate in Game Design and Development Class Rank: 1st/7

Work and Research Experience

Mevion Medical Systems JS, China

Software Engineer Intern 05/2022 – 08/2022

- Coded a MATLAB prototype for X-ray image postprocessing including automatic contrast adjustment, automatic tone mapping, and edge enhancement by implementing methods used in research papers
- Implemented the aforesaid prototype in Python with OpenCV to replace the existing proprietary image processing toolkit

Nipissing University ON, Canada

Research Assistant 10/2020 – 06/2021

- Delivered a web app prototype for organizing information both geographically and temporally using Web WorldWind for the English department to visualize historical events and maps
- Made the prototype for the particle swarm optimization part of a C++ toolkit for response surface models with GSL library using radial basis function approach for simplifying complex models
- Wrote technical documentations, literature review, and tutorials

Research Assistant 10/2018 – 04/2020

- Multi-agent simulation and agent-oriented programming in Java and AnyLogic to assign missions for disaster rescue with multiple UAVs using E-CARGO model
- Designed an algorithm using multi-objective optimization for Group Role Assignment in E-CARGO model
- Wrote technical documentations, literature review, and proofreading

Research, Course, and Side Projects

- Generating custom keyboard layouts using evolutionary algorithm to improve typing efficiency
- Implemented a MATLAB program to detect watermelons in images using conventional computer vision methods
- Implemented the RetinaNet in PyTorch for pneumonia detection and localization with several improvements which are validated using ablation study
- Recover images from sparse random samples using compressed sensing by solving their discrete cosine transform (DCT) coefficients with orthogonal matching pursuit (OMP)
- Visualizing high-dimensional functions for analyzing surrogate models using python VTK and ParaView
- Parallelized particle swarm optimization (PSO) for high dimensional models and functions using message passing interface (MPICH)
- Lower-limb movement classification from multi-channel surface electromyography (sEMG) signals using InceptionTime neural network implemented in Keras
- Color mapping and ECG signal clustering/classification with self-organizing map implemented in python
- Mangrove identification from remote sensing images using region of interest and convolutional neural network (CNN) implemented in Keras

Scholarship and Awards

- J.W. Trusler Proficiency Award 2021
- Carl Sanders Scholarship 2017-2020

Skills

- *Programming Languages*: Python, MATLAB, C/C++, JavaScript, Java, C#
- 2 yr. experience of *High-Performance Computing* on SHARCNET/Compute Canada clusters
- *Libraries and Tools*: PyTorch, OpenCV, Keras, scikit-learn, MPICH, ParaView, Valgrind, Linux, Shell, Git, Unity, SQL, WebGL, SOLIDWORKS, Photoshop
- *Languages*: English, Chinese – native speaker