MUHAO GUO

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EDUCATION

Arizona State University, United States *Jan 2021 - Expect 2024*
Ph.D. student in Electrical, Computer and Energy Engineering; Fellowship
Research Field Machine Learning, Deep Learning, Neural ODE, GNN, Quantum Computing

University of Southern California, United States *Jan 2019 - Dec 2020*
Master of Electrical and Computer Engineering

Shandong University, China *Jul 2014 - Jun 2018*
Bachelor of Communication Engineering

TECHNICAL STRENGTHS

Python, PyTorch, Tensorflow, Keras, MySQL, Linux, Java, Git, Qiskit, HTML/CSS, C/C++, Shell, Sklearn

RESEARCH EXPERIENCE

Machine Learning Research Assistant | ASU *Jan 2021 - Current*

- **Quantum Machine Learning.** (1) Define a quantum LSTM structure through quantum circuits, performing the feed-forward propagation on a quantum computer/simulator. (2) Achieved above 90%+ of test score in four weather prediction tasks. The best one achieved 99%+. (3) Using Quantum Support Vector Machine (QSVM) for classification and clustering problems and achieved state-of-the-art performance on several datasets.
- **Neural Ordinary Differential Equations.** (1) Implement Neural ODE and augmented Neural ODE to learn the Latent differential equations based on time series data. (2) Implement ResNet-based CNN and NODE-based CNN for image classifcations in datasets like Minst, CIFAR-10 and ImageNet. Achieved state-of-the-art performance.
- **NLP based model for signal fault detection.** (1) Represent signals by vectors based on the the Fourier transform. (2) Detect incipient fault signals based on Continuous Bag Of Words (CBOW) model. (3) Published Paper: Transform Waveforms into Signature Vectors for General-purpose Incipient Fault Detection.

WORK EXPERIENCE

Software Developer Intern | MOEV Inc | Los Angeles *May 2020 - Aug 2020*

- Build a server and clients for a Central Management System and Electric Vehicle Charging Stations. Realized instant full-duplex communication between them based on WebSocket protocol. Using JSON to improve data transmission efficiency in this model.
- Developed and designed 30+ functions such as Boot Notification, Authorize, etc based on Open Charge Point Protocol (OCPP). Build Web GUI of Central Management System for visualization.

Software Development and Test Engineer | Array Networks Ltd. | Beijing *July 2018 - Oct 2018*

- Designed and executed thousands of test cases for module test, fixed 90+ existed bugs. Module test including: MAC/IPv4/IPv6 address configuration, DNS/routing/gateway detection, concurrent connections between server and clients, and time-zone synchronization.

SELECTED PROJECTS

Multivariate LSTM-FCNs: Do data cleaning, data mining and feature engineering for real time-series-based EV data. Then Multivariate LSTM-FCNs model is applied for electric vehicle classification. Achieved 100% test score in identifying whether a EV is in good condition or not.

Reinforcement Learning: Optimize the cumulative return of the stock market by allowing RL trading agent buy, sell and hold the stock using pre-knowledge of stock such as balance and close price. A ensemble learning method which combines 5 different Actor-Critic RL algorithms (A2C, PPO, DDPG, SAC, TD3) is implemented for stock trading agents and achieved excellent performance.