Shouwei Gao

Email: gaosho@oregonstate.edu | Phone: (1)-7868707963 | https://github.com/shwgao | Corvarllis, OR

EDUCATION BACKGROUND

08/2023-Now **Oregon State University**

Degree: Doctoral in Computer Science

09/2020-06/2023 **University of Electronic Science and Technology of China**

Degree: Master of Engineering in Electronic Information

09/2014-06/2018 **Xi Hua University**

Degree: Bachelor of Science in Energy and Power Engineering

PROJECTS

Efficient AI foundation models

- Researched scientific models such as ClimaX, Enformer, and ClimODE, etc., identifying memory bottlenecks in memory-bound operators like Multihead attention, Convolutional, and Softmax, etc.
- Implemented strategies including operator fusion, micro-batching, in-place operators, and pipeline optimization to resolve memory bottlenecks.
- Improved model throughput by increasing batch size, reducing memory bottlenecks, and optimizing GPU utilization.
- Enabled broader accessibility to foundational models for users without advanced hardware resources.

Self-Guided Pruning for Scientific AI Models (Paper under review (IPDPS25))

- Designed a self-guided, user-friendly framework for feature selection and model compression using semi-stochastic gating parameters and dynamic reparameterization during single-step training.
- Evaluated the framework across 14 SciML models spanning fields such as Cosmology (CosmoFlow), Material Science (DMS), Biology Science (PPA), and Chemical Science (Molhiv).
- Achieved 71.71% parameter reduction, 7.58x speedup, and 50.69% energy savings on average across 14 SciML models.

Research on defect detection based on deep learning. (ICSMD 2022)

- Developed an automatic real-time defect detection system achieving high precision and recall rates.
- Utilized C++ for data pre-processing and integrated a deep learning algorithm for defect detection using a spatiotemporal self-attention mechanism and ECA Testing.
- Proposed a spatiotemporal self-attention network and built the detection interface using Qt.

Eddy Current Array for Defect Detection in Finely Grooved Structure. (Sensors)

- Designed MSTSA-Net, a Multi-scale SpatioTemporal Self-Attention Network, combining Temporal Attention (TA) and Spatial Attention (SA) to efficiently detect defects of varying sizes in finely grooved structures of spinning cylinders.
- Achieved superior performance over traditional methods (e.g., YOLOv3-SPP, Faster R-CNN) with fewer parameters, lower FLOPs, and improved Recall and F1 scores through optimized multi-scale feature extraction and attention mechanisms.

Hurricane tracks generation (arXiv)

- Developed a hybrid methodology combining ARIMA, K-MEANS, and Autoencoder techniques to analyze historical tropical cyclone behaviors and predict future trajectories and intensities.
- Demonstrated improved performance in modeling hurricane tracks and forecasting with reduced error rates.

TECHNICAL SKILLS

AI Frameworks: PyTorch, Caffe, TensorFlow.

Programming Language: Python (Daily use), C++, Java, QT (Familiar).