Chunhua Ying

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Education

Washington State University — Pullman, WA
Ph.D. in Mechanical Engineering focusing on optimization algorithms, GPA 3.97/4.0 — *Sep. 2019 – Dec. 2023*

Washington State University — Pullman, WA
M.S. in Statistics specialized in deep learning, GPA 4.0/4.0 — *Sep. 2021 – Dec. 2022*

Experience

Graduate Research Assistant — Sep. 2019 – Present
Washington State University — *Pullman, WA*

- **Conducted cutting-edge research in numerical optimization for large-scale optimization problems and deep learning algorithm:** Explored various of optimization algorithms like Gradient Descent, Stochastic Gradient Descent, Adam, BFGS, quick-min Verlet and other numerical optimization methods, pushing forward the the study of safer lithium batteries for electronic vehicles.
- **Performed hierarchical parallel computation for large-scale optimization problems:** Implemented a hierarchical parallerization which is 4-5 times faster compared to normal parallelization: 1. Fully utilized the memory by distributing processors into intermediate structures; 2. Subpartitioned processors into a group of integration points; 3. Distributed series solutions of Schrödinger equation to groups.
- **Spearheaded analytical research in statistical inference and probabilistic methods:** Played around with the state of art probabilistic methods like stochastic based Bayesian technique, Markov chain Monte Carlo method, Metropolis-Hastings algorithm to solve forefront industrial engineering problems, especially inverse transient heat transfer problem for electronic cars, electronic devices and nuclear reaction and so on.

Selected Projects

Feedback Prize - Evaluating Student Writing | Github — Feb. 2022 – Apr. 2022
Constructing NLP-based model to help young writers develop, assist teachers and educational organization.

- Visualized the rhetorical and argumentative elements in the essay by self-coded coloring program, and word/n-grams frequency analysis by pandas, Numpy, and matplotlib etc.
- Tried out with bidirectional Recurrent Neural Network NLP model with long-short-term-memory methods to build up a baseline model in TensorFlow.
- Implementing Transformer-LongFormer natural language processing model with encode-decode, embedding, attention technique, NER tokenization.

Google Brain - Ventilator Pressure Prediction | Github — Oct. 2021 – Dec. 2021
Developed deep learning model to help overcome the cost barrier of controlling the mechanical ventilator.

- Carried out exploratory data analysis for the ventilator dataset , such as various of summary statistics, data visualization, data wrangling, and correlation analysis using matplotlib, seaborn and plotly in Python.
- Extracted new features to more robustly describe the ventilator process. Like cumulative inhale velocity increase and certain setup of ventilator parameters by data wrangling techniques and pandas in python.
- Implemented deep learning model with bidirectional neural networks and long-short-term-memory methods using TensorFlow. Fine tune the parameters with grid search method achieving a 0.32 mean square error during training and 0.53 MSE error during validation.

Human Protein Atlas – Single Cell Classification | Github — Mar. 2021 – May. 2021
Built up a Convolutional Neural Network for protein classification in human cell microscopic images

- Carried out data wrangling and visualization with pandas, Matplotlib and seaborn packages in Python.
- Built a Computer Vision classifier using ResNet-50 backbone in TensorFlow to move forward the front line research in human biology.
- Post-analysis and model evaluation by precision-recall metrics, cross-validation. Finally yielded a model with 0.82 F1 score on the validation data.

Technical Skills

Languages: Proficient - Python, R, SQL, MATLAB; Experienced - Java, C#, HTML, CSS
Technologies: Git, Visual Studio, Tensorflow, Pytorch, Keras, Trax, pandas, NumPy, Matplotlib