

HAOZE HE

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EDUCATION

New York University (NYU)

New York, U.S.

Master of Science, Specialized in Computer Engineering

May, 2023

- **Courses:** Machine Learning, Deep Learning, High Performance Machine Learning, Natural Language Processing

The Chinese University of Hong Kong (CUHK)

Shenzhen, China

Bachelor of Science, Specialized in Computer Science and Engineering

May 2020

- **Courses:** Software Engineering, Discrete Mathematics, Computer Architecture, Operating System

PUBLICATIONS

- **Haoze He**, Parijat Dube, “[Accelerating Parallel Stochastic Gradient Descent via Non-blocking Mini-batches](#)”, Conference on Machine Learning and Systems (MLSys), Submitted, Oct.2022
- **Haoze He**, Parijat Dube “[RCD-SGD: Resource-Constrained Distributed SGD in Heterogeneous Environment via Submodular Partitioning](#)”, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Submitted, Oct.2022
- Chaoxun Guo, Zhixing Jiang, **Haoze He**, David Zhang, “[Pulse Signal Acquisition and Analysis for Disease Diagnosis: A review](#)”, Computers in Biology and Medicine, Accepted, Nov. 2021
- **Haoze He**, Anna Choromanska, “[Adjacent Leader Decentralized Stochastic Gradient Descent](#)”, International Conference on Machine Learning (ICML), to be submitted, Nov.2022

RESEARCH EXPERIENCE

Adjacent Leader Decentralized Stochastic Gradient Descent

New York, U.S.

Researcher, Instructor: Prof. Anna Choromanska

Sep. 2022–present

- Proposed a novel Adjacent Leader decentralized SGD and a gradient step method to accelerate decentralized SGD training convergence while avoiding convergence decelerations.
- Designed a dynamic topology network to improve the performance of workers with less degree.
- Increased the final test accuracy by 5.8% for worse performance workers and by 2.1% in the output model when training ResNet-50 on CIFAR-10.

Accelerating Parallel Stochastic Gradient Descent via Non-blocking Mini-batches

New York, U.S.

Researcher, Instructor: Prof. Parijat Dube

May. 2022–Oct. 2022

- Proposed a non-blocking algorithm applied on distributed machine learning baselines to obtain faster convergence, fewer delays, and resolve the straggler problem.
- Suggested the general non-blocking algorithm, which is extendable to most (de)centralized SOTA algorithms and federated learning.
- Reported theoretical complexity, efficiency, and convergence analysis of the decentralized non-block SGD and compared it to decentralized SOTA algorithms including MATCHA and D-PSGD.
- Experimented the non-blocking algorithm in a heterogeneous environment and achieved $2 \times$ speedup.

Resource-Constrained SGD in Heterogeneous Environment via Submodular Partitioning

New York, U.S.

Researcher, Instructor: **Prof. Parijat Dube**

Aug. 2022–Oct. 2022

- Proposed a novel Resource-Constrained SGD algorithm to partition datasets across workers in proportion to their computational capabilities while achieving similarity in class-level feature distribution and maintaining class balance.
- Addressed the straggler problem of earlier partitioning algorithms and reduced the computational complexity by a factor proportional to the number of classes.
- Obtained up to 32% speedup in wall-clock time when compared with SOTA baselines, as RCD-SGD converged faster and communicated less.
- Improved the accuracy of the final model by 1.1%, attaining a better training loss.

Pulse Signal Acquisition and Analysis for Disease Diagnosis

Shenzhen, China

Member, Instructor: **Prof. David Zhang**

Aug. 2020–May 2021

- Utilized a four-layer wavelet filter to eliminate the inevitable noise caused by human jitters, respiratory waves, and electromagnetic noise from circuits and sensors.
- Implemented LSTM, 7-layer CNN, SVM, SVC, Nu-SVC, Linear SVC, KNN, and Bayesian in pulse wave datasets.
- Contributed to writing a survey paper, which including pulse wave signal pre-processing, feature extraction, and pulse signals classification.

Improvement on the Deep Affinity Network (DAN)

Shenzhen, China

Member, Instructor: **Prof. Rui Huang**

Sep. 2018–Feb. 2019

- Programmed and improved the tracking of the DAN with PyTorch.
- Connected the DAN-based tracking implementation to the detection on the server.
- Visualized and evaluated the tracking results in three inputs, which were created based on detecting the MOT17 dataset using DPM, FRCNN, and SDP detector respectively.

Biometrically Enhanced Intelligent Smartphone Locking Control System

Shenzhen, China

Chief Technology Officer, Instructor: **Prof. Rui Huang**

May 2016–Dec. 2017

- Established product designs and managed the smart lock system's process.
- Developed a QR code scanning and identification function in Raspberry Pi using Python.
- Implemented an encryption function for the Android operating system by using Java.

PATENTS

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- **Haoze He**, Rui Huang, Xiang Zhang, *Biometrically Enhanced Intelligent Smartphone Locking Control System*, China, 201811345387.9, 2019-03-01.
 - Zhixia Zheng, **Haoze He**, Saiqin Huang, *Anode Bonding Device*, China, 201720512308.3, 2018-06-12.

AWARDS

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- Top 1% among 1000 teams and received 500,00 dollars venture capital from Shenzhen Galaxy Holding Group, The 10th China Innovation & Entrepreneurship International Competition, Aug. 2018

SKILLS

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- **Programming Languages:** Proficient in Python, Java, C, C++, MATLAB, and R
 - **Open-Source Software Library:** PyTorch, MPI4PY, CuPy, Keras, TensorFlow, OpenCV, scikit-learn, IM Learn