

EDUCATION

- **The Chinese University of Hong Kong**
Doctor of Philosophy, supervised by James Cheng August 2018 - Present
- **NanJing University**
Bachelor of Engineering, Software Institute Top 10%
Sept 2014 - June 2018

RESEARCH INTERESTS

Similarity Search and **Machine Learning**. Typically, I am interested in applying similarity search techniques (LSH, Sketching, Vector Quantization) on large scale machine learning, e.g. **HSQ**.

SKILLS

- **Mathmatical**: matrix theory, probability theory, optimization
- **Programming**: C++(MPI/OpenMP/CBlas), Python(TF, Pytorch, Numpy,), Java, Matlab, Hadoop

PROJECTS

- **Gradient-Quantization** : In this project we first apply Vector Quantization on gradient compression, i.e. **HSQ**, and compare it with classic scalar quantization SignSGD, QSGD, TernSGD.
- **Similarity-Search** : A framework for index based similarity search. Where classic similarity techniques, E2LSH, SRP, ITQ, PQ, IMI, Cross-LSH, indexing techniques for maximum inner product search, L2-ALSH, Sign-ALSH, Simple-LSH, and our papers **Norm-Ranging LSH**, **Rational-LSH** , are implemented.
- **Vector-Quantization** : A framework for vector quantization (PQ, RQ, AQ, and our paper **NEQ**).
- **MPI-TensorFlow** : A library for tensorflow with MPI-support for distributed machine learning.
- **Tensor** : A numpy like computation library for c++.

SELECTED PUBLICATION

- Norm-Explicit Quantization: Improving Vector Quantization for Maximum Inner Product Search
Xinyan Dai*, *Xiao Yan**, *Kelvin K. W. Ng*, *Jie Liu*, *James Cheng* [arxiv] [github] [AAAI 20] [Oral]
- Norm-Ranging LSH for Maximum Inner Product Search
Xiao Yan, *Jinfeng Li*, **Xinyan Dai**, *Hongzhi Chen*, and *James Cheng* [arxiv] [github] [NeurIPS 18]

WORKING PAPERS

- Hyper-Sphere Quantization: Communication-Efficient SGD for Federated Learning
Xinyan Dai, *Xiao Yan*, *Kaiwen Zhou*, *Kelvin K. W. Ng*, *James Cheng* [arxiv] [github]
- Edit Distance Embedding using Convolutional Neural Networks
Xinyan Dai, *Xiao Yan*, *Kaiwen Zhou*, *Yuxuan Wang*, *Han Yang*, *James Cheng* [arxiv] [github]

AWARDS

- **AAAI Travel Award** 2020
- **NeurIPS Travel Award** 2018
- **NJU People's Scholarship** 2016
- **Chinese National Endeavor Scholarship** 2015

TEACHING ASSISTANT

- **Problem Solving By Programming (ENGG1110)** 2018-2019 Term1 & 2, 2019-2020 Term 1