

Bitan Hou | Curriculum Vitae

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Profile

Deep Motion

Full Time Employee, Deep Learning R&D Engineer

Beijing, China

Nov 2018 – Present

Microsoft Research

Intern, System Research Group

Beijing, China

July 2018 – Nov 2018

Shanghai Jiao Tong University (SJTU)

Bachelor of Engineering, Outstanding Graduate (Top 3%)

Shanghai, China

Sep 2014 – July 2018

- School: Electronic Information and Electrical Engineering, Department: Electronic Engineering (EE)
- GPA of Upper Division Work: **3.83/4.3(89.59/100)**, Standing: **4/60**

Publication

- **Bitan Hou**, Yujing Wang, Ming Zeng, Shan Jiang, Ole J. MengShoel, Yunhai Tong, Jing Bai.
Customized Graph Embedding: Tailoring Embedding Vectors to different Applications. [arXiv]

Work&Research Experience

Work on Edge Computing for Autonomous Driving

Supervisor: Kuiyuan Yang (Chief Scientist) and Zhiwei Li (Chief Technology Officer)

Nov 2018 – present

- **Model Acceleration & Deployment (100k+ lines of C++)**
 - Experience using various popular Deep Learning Edge Devices for practical applications, such as NVIDIA Xavier, TX2, Nano, HUAWEI Atlas200DK and TDA3x of Texas Instruments (TI)
 - Deployed 80+ models with expertise in the NVIDIA **TensorRT** platform for high-performance inference
 - Familiar with both ARM and x86 architectures, both CPU and GPU instructions for ML Deployment
- **Quantization**
 - Dived into QNNPACK, a Caffe2 8-bit quantization framework, and applied to algorithms within one month of its release from Facebook;
 - Widely used due to its highly efficient performance (**1/4 size, 5x speed, only 1% AP drop**)
 - Given the theoretical analysis of quantization in different tasks (Cls., Seg., Det., Depth) by using the newest INT8 Quantization feature in PyTorch1.3; Deployed 10+ INT8 models based on TorchScript
- **Deep Learning Framework Development**
 - Got familiar with Google XNNPACK, a highly optimized library of neural network inference operators
 - Developed a lite deep learning framework (inference only) for edge devices deployment which needs strong skill on Google FlatBuffers, memory management, topology optimization, etc.
- **Neural Architecture Search (NAS)**
 - Reproduced DARTS, Proxyless NAS (Song Han), Auto-DeepLab (Feifei Li) and Random NAS
 - Extended NAS to **dense image prediction**
- **Training Efficiency**
 - Reduced the training time from 28 GPU-days to 4 GPU-days on GTX-1080Ti by using NVIDIA Data Loading Library (**DALI**) without accuracy reduction (Train ImageNet from scratch)
 - Used **Mixed Precision Training** based on *Tensor Cores* and introduced by Volta Generation of GPUs, to enlarge 8x through put and no accuracy reduction
- **Misc.** (All of them are implemented for widely use within our company.)
 - Developed a python package for model conversion between DL frameworks (**10k+ lines of .py**)
 - Self-developed an OpenCV (GPU) package to get ride of redundant dependencies (**2k+ lines of .cu**)
 - Python Binding: Created **100+ bindings** of existing C++ code, using C++ code through python API
 - Developed a C++ library for Caffe parser using Google Protocol Buffers (**2k+ lines of .cpp**)

- Developed a toolchain for CNN debugging with expertise in python features: hook and decorator

Work on Semi-Supervised ML

Supervisor: Yujing Wang(Microsoft Research) and Ming Zeng(CMU, Facebook)

July 2018 – Nov 2018

o Graph Embedding

- **Reproduced** papers related to graph embedding, such as DeepWalk, Node2Vec, and Plantoid
- Proposed a novel semi-supervised approach, **Customized Graph Embedding**, which significantly improved the performance of clustering and representation
- Submitted a **first-author paper** to 29th International Joint Conference on Artificial Intelligence (IJCAI) 2020

Work on Computer Vision

Advisor: Professor Weiyao Lin(SJTU)

Nov 2017 – Jun 2018

o Face Recognition (CNN)

- Independently developed a face recognition system for a commercial applications, such as city security
- **Excellent** performance in both face comparison(95.53% on YTF) and identity verification(99.95%)

Work on Semi-Conductor Devices

Advisor: Professor Chun Jiang(SJTU)

Jun 2017 – Jun 2018

o Photonic Crystals

- Completed **research** on Photonic Crystals; analysed results using MEEP(MIT open-source package) **simulation** experiments; consolidated findings in the **report**: *Dynamic control of optical pulse delay time*
- Honored by Tsung-Dao Lee Chinese Research Program with the title "Distinguished Scholar"
- Selected from the top 3% of applicants to this program supported by Tsung-Dao Lee

Honors & Awards

Outstanding Graduate of SJTU (Top 3%, performances over four years are considered)	2018
Honorable Mention of Mathematical Contest in Modeling(MCM), America	2017
Second Prize in National Undergraduate Electronics Design Contest(Shanghai) (Top 10%)	2017
Tsung-Dao Lee Scholarship (Top 3%, sponsored by the recipient of Nobel Prize in Physics)	2017
Ji Hanbing Alumnus Scholarship (Only 1 in my major, honoring academic excellence)	2017
Liu Yongling Fellowship(Hong Kong) (Only 1 in my major, honoring academic excellence)	2017
Academic Excellence Scholarship (Second Class) of SJTU (Top 3 in my major)	2017
The Merit Student of SJTU (Only 1 per year, comprehensive evaluation)	2016
National Endeavor Fellowship of Shanghai Jiao Tong University (Top 1%, national level)	2016
Third Prize in Texas Instruments(TI) Cup Electronic Design Contest (SJTU) (Top 10)	2016

Conferences, Short-Term Programs, Voluntary and Social Activities

Computing in the 21st Century Conferences & MSRA Faculty Submmit

Invited Audience. One-on-one talk with Kai-Fu Lee and Harry Shum, respectively.

2018

Building Bridges Education Support Program, with Yale U(Organizer), Hong Kong U, Peking U

Team Leader. Certificated by the Aixin Foundation Inc. of the United States.

2017

Tsinghua University(THU) Summer Camp: Nano-OptoElectronics Lab

Certificate as Outstanding participant by Department of Electronic Engineering, THU

2017

Career & Leadership Development Program

Served as Coach. Certified by China Soong Ching Ling Foundation, Liaison Department.

2015

Shanghai International Marathon

Volunteer. Served thousands of athletes and running enthusiasts from all over the world.

2014 - 2016

Skills

- o **Programming:**Python, C++11/14, CUDA, Verilog/VHDL, HTML, JS, CSS, Java, Neon
- o **Dev. SKills:** Linux OS, Git, Modern CMake, GDB, Shell Script(bash, Zsh), Vim, Emacs
- o **DL Frameworks:**PyTorch, Caffe, Caffe2; Familiar with Theano, Keras, Tensorflow, MxNet
- o **Interests:** Guitar, Reading, Traveling, Badminton, Biking, Swimming