Bitan Hou | Curriculum Vitae

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Profile

Deep Motion **Beijing, China**
Full Time Employee, Deep Learning R&D Engineer *Nov 2018 – Present*

Microsoft Research **Beijing, China**
Intern, System Research Group *July 2018 – Nov 2018*

Shanghai Jiao Tong University (SJTU) **Shanghai, China**
Bachelor of Engineering, Outstanding Graduate (Top 3%) *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. Submitted to *the* 29^{th} *International Joint Conference on Artificial Intelligence (IJCAI), 2020.* [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
- **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
- **Neural Architecture Search (NAS)**
  - Reproduced DARTS, Proxyless NAS (Song Han), Auto-DeepLab (Feifei Li) and Ramdom 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**)

Work on Semi-Supervised ML
Supervisor: Yujing Wang(Microsoft Research) and Ming Zeng(CMU, Facebook) *July 2018 – Nov 2018*

- **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 29^{th} *International Joint Conference on Artificial Intelligence (IJCAI) 2020*

Work on Computer Vision
Advisor: Professor Weiyao Lin(SJTU) *Nov 2017 – Jun 2018*

- **Face Recognition**
  - Independently developed a face recognition system by Convolutional Neural Network(**CNN**) 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*

- **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

Excellent Employee of Deep Motion *2019*
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*

Top China Summer Program: Building an Inclusive Society and Our Responsibility
Team Leader. Certificated by the International Student Center of SJTU. *2016*

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

- **Programming**:**Python, C/C++, CUDA, Verilog/VHDL, HTML**, JS, CSS, Java, Neon, Modern CMake
- **DL Frameworks**:**PyTorch, Caffe, Caffe2**; Familiar with Theano, Keras, Tensorflow, MxNet
- **Interests**: Guitar, Reading, Traveling, Badminton, Biking, Swimming