

# QIANHAO ZHANG

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## 🎓 EDUCATION

<b>Carnegie Mellon University - School of Computer Science</b>	Pittsburgh, PA
M.S. in Computer Vision   Current GPA: 4.22/4.3	Dec. 2020
<b>Beihang University - School of Computer Science and Engineering</b>	Beijing, China
B.Eng. in Computer Science and Technology   GPA: 3.78/4, Graduation with Honors	Jul. 2019
<b>University of Toronto - Faculty of Applied Science and Engineering</b>	Toronto, ON
Scholarship-Funded Exchange Program   GPA: 3.88/4	Dec. 2017

## 💼 PROFESSIONAL EXPERIENCES

<b>SenseBrain Technology LLC</b>	San Jose, CA
Research Intern   C++, Bash, Python	May. 2020 - Aug. 2020
Compression and quantization of neural networks for camera-related CV tasks on smartphones	
<ul style="list-style-type: none"><li>• <b>50%</b> channel-pruning compression of CNN to obtain fine-grained quad bayer captured by 2x2 on-chip lens (<a href="#">🔗 product-link</a>), enhanced the light-weight model (Python) for low-exposure frames with hard example fine-tuning</li><li>• <b>5x speedup</b> of CNN for bayer demosaicking on Xiaomi phone's raw data, achieved by mixed-bitwidth (16-bit activation and 8-bit weight) quantization-aware training (Python) with AIMET toolbox</li><li>• Developed the deployment pipeline for CNN models on smartphones (C++ and bash scripts), verified the model performance on the <b>DSP/CPU</b> of an Oppo Reno 2 and a google Pixel 3 with SNPE toolchain</li></ul>	
<b>SenseTime Co., Ltd.</b>	Beijing, China
Research Intern   C, C++, Python	Feb. 2018 - Jul. 2019
Performance optimization and pipeline automation for deep learning frameworks and packages	
<ul style="list-style-type: none"><li>• Developed pytorch-onnx-caffe conversion and profiling package (Python) supporting <b>all neural network layers</b>, effectively bridged the gap between research teams (training) and engineering teams (deployment)</li><li>• Designed easy-to-use, modularized APIs that successfully worked with models within a wide variety such as pedestrian re-ID, face verification, car detection, etc. (number of users soon <b>exceeded 300</b> since first release in a month)</li><li>• Implemented novel neural network layers (time-shift operation, correlation convolution, etc.) in Caffe (C++) with research teams, <b>halved the train-test-deploy response cycle of any new model</b></li><li>• Developed inference framework (C) optimized for x86 processors with MKL-DNN, <b>2x speedup</b> compared to regular Caffe, used as deployment framework on development boards and light-weight chips</li></ul>	

## 📖 ACADEMIC PROJECTS

<b>Image-Based Localization for Autonomous Drones</b> <a href="#">🔗 project-link</a>	Pittsburgh, PA
Carnegie Mellon University   Supervised by Prof. John Galeotti	Feb. 2020 - May. 2020
Develop stateless relocation module to fight the drifting problem in long-range flights	
<ul style="list-style-type: none"><li>• Implemented a fully convolutional neural network for scene coordinate regression, and applied <b>differentiable RANSAC with PnP algorithm</b> on scene coordinates for pose estimation</li><li>• Leveraged GPS and structure-from-known-motion with OpenMVG to obtain <b>high-quality ground truth</b> for training</li><li>• Averagely <b>&lt;3m, &lt;0.3° error</b> tested on 10-kilometer flight data, <b>&lt;1m, &lt;0.1° error</b> tested on 2-kilometer flight data</li></ul>	
<b>Feature-Pyramid Siamese Network as Loop Closure Detector</b> <a href="#">🔗 arxiv-link</a>	Berkeley, CA
University of California, Berkeley   Supervised by Dr. Allen Yang	Jul. 2018 - Oct. 2018
Design loop closure detection module and improve localization module for the lost track problem in VR/AR scenarios	
<ul style="list-style-type: none"><li>• Designed a <b>feature-pyramid siamese network</b> for loop closure detection w/ comparable performance to ORB-SLAM</li><li>• Synthesized a <b>large-scale</b> (~150,000 images) indoor environment dataset with Unity3D and SunCG for train &amp; test</li><li>• Implemented <b>ICP algorithm</b> for OpenARK's SLAM module, stabilized the trajectory on texture-sparse frames</li></ul>	

## ♡ AWARDS AND CERTIFICATES

An Image Retrieval System Based on Natural Language Captioning, <b>CN Patent</b> <a href="#">🔗 patent-link</a>	Aug. 2019
• Automatic image captioning upon uploading, used BLEU score as the key for retrieval, enabling descriptive search	
<b>1<sup>st</sup>-place Winner</b> with ¥10,000 (~\$1,500) Prize, BeyondSoft Tech Challenge on Motion Evaluation	Nov. 2018
• Designed neural network to evaluate motion quality for athletes / rehabilitating patients on inertial data	
<b>National Scholarship</b> for Academic Excellency, Chinese Ministry of Education	Nov. 2017
• Top-level scholarship awarded nationally to recommended students for their academic excellency	

## 💻 SKILLS

Python, C, C++, Bash; Pytorch, SciKits, Caffe, Caffe2, ONNX, OpenCV, OpenMVG