

SIBO ZHU

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EDUCATION

BRANDEIS UNIVERSITY

Waltham, MA

M.S in Computer Science

2018 - 2020

- Honors: Graduate Research Award Recipient, Merit Scholarship Recipient
- Related Coursework: Machine Learning, Autonomous Robotics, Natural Language Processing, Data Mining

BOSTON UNIVERSITY

Boston, MA

B.A. in Computer Science

2014 - 2018

B.A. in Pure & Applied Mathematics

- Honors: Dean's List Student, UROP Scholarship Recipient
- Related Coursework: Calculus, Computer Algorithm, Computational Game Theory, Linear Algebra, Discrete Mathematics
- Clubs: Director of Technology of Chinese Student and Scholars Association for 2 years

RESEARCH INTERESTS

Efficient Computing

Robotics

Computer Vision

Data Mining

EXPERIENCE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY - Efficient Computation

Cambridge, MA

Research Assistant@Prof. Song Han's Group

Jan 2020 – Present

- Developed End-To-End autonomous driving framework with LiDAR sensor as only input, deployed on full scale vehicle
- Designed an offline PyTorch-based extrinsic calibration network, without need for any annotation; achieved re-projection error of 0.9448 degree; went from three hours manual calibration, to one second neural network inference ([demo video](#))
- Deployed a state-of-the-art LiDAR perception framework "PVCNN" from PyTorch to ROS; increased accuracy from 95% to 99.93%, latency from 5ms to 3.4ms, detection range from 8 meters to 12 meters ([demo video](#))

MIT DRIVERLESS - Student-led Organization For Autonomous Racing

Cambridge, MA

Perception Lead

Sep 2019 – Present

Perception Core Engineer

Jan 2019 – Sep 2019

- Own the entire perception system (LiDAR and Camera) for a full scale on-track autonomous racing vehicle, leading 10 student-engineers and managing the entire perception production process, including:
 - Data collection, annotation, NN customization, integrating NN into ROS and inferring with TensorRT (C++)
 - QA and testing by running developed perception system on our 25% scale testbed vehicle and full scale vehicle
- Helped team win 3rd place in Formula Student Germany, which had unmapped tracks bounded by colored cones
- **Open-sourced** codebase (Python, C++), dataset and tutorial of using our camera perception system for autonomous racing
- Propose and lead a framework that employs camera and LiDAR inputs to predict future LiDAR frames ([demo video](#))
- Replicated the state-of-the-art sensor fusion perception model "PointPainting" for autonomous racing ([demo video](#))
- Customized SOTA object detection NN for autonomous racing with custom preprocessing, NN pruning, and quantization; improved mAP accuracy from 66.97% to 89.35%, inference speed from 120ms to 30ms; deployed on ROS and C++

BRANDEIS UNIVERSITY - Data Mining and Computer Vision

Waltham, MA

Research Assistant@Prof. Hongfu Liu's Group

Sep 2018 – Jan 2020

- Developed an outlier detection algorithm with direction awareness of each data point's K nearest neighbors using Numpy
- Achieved positive improvements ranging from 2% to 46% on average

BOSTON UNIVERSITY - Computer Vision

Boston, MA

Research Assistant@Prof. Sang ("Peter") Chin's LISP

June 2017 – May 2018

- Developed a TensorFlow based neural network for motion blur detection; resulted in 92% accuracy of blurry batch detection
- **Open-sourced** the project and received over 100 Github stars

PUBLICATION

CONFERENCES

- **Accurate, Low-Latency Visual Perception for Autonomous Racing: Challenges, Mechanisms, and Practical Solutions**
Kieran Strobel, [Sibo Zhu](#), Raphael Chang, Skanda Koppula
International Conference on Intelligent Robots and Systems(IROS), Oral, 2020.
[*Paper](#) [*Code](#) [*Dataset](#) [*Slides](#) [*Video](#) [*Tutorial](#)

IN SUBMISSION

- **IPOF: An Extremely And Excitingly Simply Outlier Detector Via Infinite Propagation (TKDE)**
[Sibo Zhu](#), Hongfu Liu
- **PatchNet - Efficient Template Matching for Fast Video Recognition (CVPR), 2021**
Huizi Mao, [Sibo Zhu](#), Song Han, Bill Dally
- **End-To-End Annotation Free Extrinsic Calibration Network (ICRA), 2021 (demo)**
[Sibo Zhu](#), Zhijian Liu, Song Han
- **End-To-End LiDAR Based Autonomous Driving (ICRA), 2021**
Zhijian Liu, Alexander Amini, [Sibo Zhu](#), Daniela Rus, Song Han

ACADEMIC SERVICES

Review papers for: IROS 2020