

Juncheng (Billy) Li



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ABOUT ME

"With multi-disciplinary knowledge background and a clear focus on robust deep learning in multi-modal machine learning, I have prepared myself to delve into more challenging research problems, solve them and create something of value to the real-world!"

RESEARCH INTEREST

Robust Deep Learning
Multimodal Machine Learning
Natural language Processing
Audio / Speech Processing

Reviewer

ICML 20/21/22, NeurIPS 20/21,
ICLR 2022, AAAI 20/21,
CVPR 20/21/22, ACL 21/22
IEEE TALLIP, IEEE TNNLS

Teaching

11-751 Speech Recognition;
15-640 Distributed System;
Mentoring Undergrads.

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WORK EXPERIENCE

- ◆ **Quantative Research Consultant**
Two Sigma Investment LLC
May 2022 - Present | New York, NY
- Curate evaluations and/or scoring of audio/video/imagery data, particularly those with economic meaning
- ◆ **Deep Learning Research Engineer**
Bosch Center for Artificial Intelligence
Jul 2018 - Sept 2019 | Pittsburgh, PA
- Applied robust machine learning algorithms to Bosch Autonomous driving project, improved system robustness by 50% in bad weather condition.
- Explored mulimodality embeddings to make use of multi-sensor input, transferred the technology to Bosch business team.
- Developed occupancy detection solution using RGB-D sensor, and facilitated the transfer of technology to business unit.
- Applied representation learning to Bosch drier, improved energy efficiency by 5%.
- Generated 2 patents and top-tier AI conference publications.
- Mentored 2 interns and hired 5 members for the new team.
- ◆ **Research Engineer**
Bosch Research and Technology Center
Apr 2015 - June 2018 | Pittsburgh, PA
- Designed, Developed, and tested a 3D visualization platform based on BIM (Building Information Model) for Smart Campus sensor network (MQTT protocol) using Java at backend and Javascript at frontend.
- Collaborated closely with Bosch Next App development team, developed VR indoor navigation solution, and deployed the Bosch Next APP on App Store.
- Applied sound recognition to manufacturing production line to detect potential anomaly thus reducing the overall downtime by 10%.
- Applied sound recognition to detect leak in water pipelines, generated 1 patent.

EDUCATION

- ◆ **PHD Candidate (Language Technology Institute)**
School of Computer Science, Carnegie Mellon University
2017 - Present (expected Dec 2022) | Pittsburgh, PA
- ◆ **Dual Degree Master of Science (Advanced Infrastructure System + Engineering Technology Innovation & Management)**
Carnegie Mellon University
2012 - 2015 | Pittsburgh, PA
- ◆ **Bachelor of Science in Structural Engineering**
Tongji University
2008 - 2012 | Shanghai, China
- ◆ **Exchange Student in Civil Engineering**
National Chengkung University
2012 | Tainan, Taiwan

COURSE WORK

NLP & Deep Learning

- # Neural Networks for NLP
- # Neural Machine Translation
- # Deep Reinforcement Learning
- # Speech Recognition
- # Algorithm for NLP
- # Large Scale MultiMedia Analysis
- # Machine Learning
- # Statistical Machine Learning
- # Convex Optimization

Programming

- # Distributed System
- # Software Engineering
- # Algorithm Design and Analysis
- # Computer Networks
- # Parallel and Sequential Data Structures and Algorithms
- # Introductory to Computer System(C) # Machine Learning
- # Principles of O-O Programming
- # Data Mining
- # Rapid Prototyping(JAVA)
- # Numerical Methods
- # Data acquisition
- # Data Management.

PROGRAMMING SKILLS

| | |
|----------------|------|
| Java | ◆◆◆◆ |
| Python | ◆◆◆◆ |
| C / C++ | ◆◆◆◆ |
| JS/ HTML / CSS | ◆◆◆◆ |
| Swift | ◆◆◆◆ |
| MatLab | ◆◆◆◆ |

LANGUAGE SKILLS

| | |
|----------|------|
| Chinese | ◆◆◆◆ |
| English | ◆◆◆◆ |
| Japanese | ◆◆◆◆ |

PUBLICATIONS (citations: 975, h-index: 13)

- ◆ **Very Deep Convolutional Neural Networks for Raw Waveforms**
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2017, New Orleans, USA
Wei Dai, Chia Dai, Shuhui Qu, **Juncheng Billy Li**, Samarjit Das
- ◆ **A Comparison of Deep Learning Methods for Environmental Sound Detection**
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2017, New Orleans, USA
Juncheng Billy Li, Wei Dai, Florian Metze, Shuhui Qu, Samarjit Das
- ◆ **Real-Time Fine Grained Occupancy Estimation using Depth Sensors on ARM Embedded Platforms**
IEEE Real-Time and Embedded Technology and Applications Symposium 2017, Pittsburgh, USA
Sirajum Munir, Ripudaman Singh Arora, Craig Hesling, **Juncheng Billy Li**, Jonathan Francis, Charles Shelton, Christopher Martin, Anthony Rowe, Mario Berges
- ◆ **Learning Joint Embedding of Video and Text for Cross-Modal Retrieval**
International Conference on Multimedia Retrieval (**ICMR**) 2018, Yokohama, Japan (**BEST PAPER AWARD**)
Niluthpol Mithun, **Juncheng Li**, Amit Roy-Chowdhury, Florian Metze
- ◆ **Towards Zero-shot Learning for Automatic Phonemic Transcription**
AAAI Conference on Artificial Intelligence 2020 (acceptance rate: 20.6%) , New York
Xinjian Li, Siddharth Dalmia, David R Mortensen, **Juncheng Li**, Alan W Black, Florian Metze
- ◆ **A comparison of five multiple instance learning pooling functions for sound event detection with weak labeling**
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2019, Brighton, UK
Yun Wang, **Juncheng Li**, Florian Metze
- ◆ **Multiple Instance Deep Learning for Weakly Supervised Small-Footprint Audio Event Detection**
Annual Conference of the International Speech Communication Association 2018, India
Shaoyen Tseng, **Juncheng Billy Li**, Florian Metze, Joseph Szurley, Samarjit Das
- ◆ **Comparing The Max And Noisy-Or Pooling Functions in Multiple Instance Learning For Weakly Supervised Sequence Learning Tasks**
Annual Conference of the International Speech Communication Association 2018, India
Yun Wang, **Juncheng Li**, Florian Metze
- ◆ **On Adversarial Robustness of Large-scale Audio Visual Learning**
ICASSP 2022, Singapore (BEST STUDENT PAPER AWARD)
Juncheng B Li, Shuhui Qu, Xinjian Li, Poyao Huang, Florian Metze
- ◆ **Audio-visual event recognition through the lens of adversary**
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2021, Online
Juncheng Li, Kaixin Ma, Shuhui Qu, Po-Yao Huang, Florian Metze
- ◆ **A Light-weight Multimodal Framework For Improved Environmental Audio Tagging**
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2018, Calgary, Canada
Juncheng Li, Yun Wang, Joseph Szurley, Florian Metze, Samarjit Das
- ◆ **Adversarial camera stickers: A physical camera-based attack on deep learning systems**
International Conference on Machine Learning (**ICML**) 2019 (**acceptance rate 21.8%**), Long Beach, USA
Juncheng B Li, Frank R Schmidt, J Zico Kolter
- ◆ **Universal phone recognition with a multilingual allophone system**
IEEE International Conference on Acoustics, Speech and Signal Processing 2020, Online
Xinjian Li, Siddharth Dalmia, **Juncheng Li**, ..., Graham Neubig, Alan W Black, Florian Metze
- ◆ **Music Theory Inspired Policy Gradient Method for Piano Music Transcription**
Neural Information Process System 2018 Workshop on creativity AI, Montreal, Canada
Juncheng Li, Shuhui Qu, Yun Wang, Xinjian Li, Samarjit Das, Florian Metze
- ◆ **Adversarial Music: Real world Audio Adversary against Wake-word Detection System**
Neural Information Process System (**NeurIPS** 2019) , Vancouver, Canada (**SpotLight, top 2.4%**)
Juncheng Li, Shuhui Qu, Xinjian Li, Joseph Szurley, Zico Kolter, Florian Metze