Yubo Luo

⬤ Homepage

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⬤ Google Scholar

Education

Aug 2017 - May 2023 (expected)	**University of North Carolina**, Chapel Hill, NC - Ph.D. in Computer Science - Advisor: Shahriar Nirjon - Research Area: **On-device ML, Edge Computing, Embedded Systems, IoT**
Sept 2014 - July 2017	**Tsinghua University**, Beijing, China - M.S in Electronic and Communications Engineering - Advisor: Yongfeng Huang
Sept 2010 - July 2014	**Central South University**, Changsha, China - B.S in Communications Engineering - **Course Ranking 1st/151**

Research Experience

Jan 2021 - present	**Efficient Multi-task Learning on Resource-constrained Systems** ○ Exploited task affinity to build a compact execution graph for vision and audio based tasks ○ Leveraged task dependencies to decrease model context switching and inference overhead ○ Built dedicated hardware systems to facilitate multi-task context switch
Dec 2018 - Dec 2020	**Use Reinforcement Learning to Improve Energy Efficiency** ○ Leveraged reinforcement learning to optimize energy consumption on batteryless systems ○ Built an energy harvesting system to do on-device learning and online adaptation
Dec 2018 - Dec 2020	**Enable Machine Learning on Intermittent Systems** ○ Implemented on-device training of ML algorithms on intermittent systems ○ Leveraged early termination of DNNs to schedule time-sensitive tasks on intermittent systems
May 2018 - present	**Hardware/Software Co-design and On-device ML** ○ Six years of hands-on experience with HW/SW co-design on embedded sensor systems ○ Developed a automated Python-to-C tool for fast ML models deployment on 16-bit MCU ○ Built customized hardware to tackle various system constraints, e.g, energy or memory

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Professional Experience

May 2022 - Aug 2022	**Meta**, Marketplace, Machine Learning Engineer Intern ○ Leveraged data downsampling strategies to decrease necessary training data by 20% ○ Leveraged Scaling User Models to improve model evaluation metrics by 1% - 2% ○ Implemented multiple data ingestion pipelines to automate data extraction and delivery
May 2020 - Aug 2020	**Amazon**, Alexa, Applied Scientist Intern ○ Studied active learning approaches for acoustic event classification ○ Proposed and implemented reinforcement learning based active learning approaches ○ Re-implemented and compared with a state-of-the-art clustering based active learning approach
June 2019 - Aug 2019	**Nokia Bell Labs**, Research Intern ○ Conducted control analysis of virtual network functions

Selected Publication

Conference and Journal

SenSys 2023
(in submission)
Exploiting Task Affinity for Efficient Multitask Learning on Low-Resource Systems
Yubo Luo, Le Zhang, Zhenyu Wang, and Shahriar Nirjon
Proceedings of the 21th Conference on Embedded Networked Sensor Systems

MobiSys 2023
(under review)
Seconds-Long Audio Event Recognition on Intermittently-Powered Systems
Mahathir Monjur, Yubo Luo, Zhenyu Wang, and Shahriar Nirjon
The 21st ACM International Conference on Mobile Systems, Applications, and Services

IoTDI 2023
Amalgamated Intermittent Computing Systems
Bashima Islam, Yubo Luo, and Shahriar Nirjon [paper]
The 8th ACM/IEEE Conference on Internet of Things Design and Implementation

DCOSS 2021
SmartON: Just-in-Time Active Event Detection on Energy Harvesting Systems
Yubo Luo, and Shahriar Nirjon [paper] [code]
The 17th Annual International Conference on Distributed Computing in Sensor Systems

Ubicomp 2020
Intermittent Learning: Machine Learning on Intermittent System
Seulki Lee, Bashima Islam, Yubo Luo, and Shahriar Nirjon [paper]
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies

RTAS 2019
(WIP)
Just-in-Time Active Event Detection on Energy Autonomous Sensing Systems
Yubo Luo, and Shahriar Nirjon [paper] [code]
25th IEEE Real-time and Embedded Technology and Applications Symposium

IHMMSEC 2017
Text Steganography with High Embedding Rate: Using Neural Networks to Generate Chinese Classic Poetry
Yubo Luo, and Yongfeng Huang [paper]
The 5th ACM Workshop on Information Hiding and Multimedia Security

2016
Text Steganography Based on Ci-poetry Generation Using Markov Chain Model
Yubo Luo, Yongfeng Huang, Fufang Li, and Chinchen Chang [paper]
KSII Transactions on Internet and Information Systems

Demo and Poster

IPSN 2022
(Demo) Capuchin: A Neural Network Model Generator for 16-bit Microcontrollers
Le Zhang, Yubo Luo, and Shahriar Nirjon [paper] [code]
The 21th ACM/IEEE International Conference on Information Processing in Sensor Networks

IPSN 2019
(Poster) On-Device Training from Sensor Data on Batteryless Platforms
Bashima Islam, Yubo Luo, Seulki Lee, and Shahriar Nirjon [paper]
The 18th ACM/IEEE International Conference on Information Processing in Sensor Networks

Awards

Ubicomp 2020	Best Presentation, Judge's Award
2016	The Huawei Scholarship (**top 5%**)
2014	The Honor of Excellent Graduate in Hunan Province (**top 2%**)
2014	Central South University Outstanding Award (**top 1%**)
2013	**1st** Prize in American International Mathematical Contest in Modeling
2012	**2st** Prize in China Undergraduate Mathematical Contest in Modeling
2012	The National Scholarship (**top 1%**)

Professional Services

Journal Review | IOTJ: IEEE Internet of Things Journal
CSSE: Computer Systems Science and Engineering
IASC: Intelligent Automation & Soft Computing
CMC: Computers, Materials & Continua

Teaching Assistantship

Spring 2023 | COMP380: Introduction to Digital Culture
Spring 2018 | COMP455: Models of Languages and Computation
Fall 2017 | COMP411: Computer Organization

Skills

Programming | Python, C/C++, Matlab, SQL
ML Framework | TensorFlow

List of References

PhD Advisor | **Dr. Shahriar Nirjon**
Associate Professor at UNC Chapel Hill
Email: nirjon@cs.unc.edu

Intern Manager | **Dr. Yin Zhang**
Research Scientist at Meta
Email: tonyzhang1231@meta.com

Intern Peer | **Dr. Nan Du**
Research Scientist at Meta
Email: dunan@meta.com