Songchun Fan

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I design and implement mechanisms that leverage the advances in mobile hardware (e.g., heterogeneous multiprocessors and accelerators) to improve the energy efficiency and user experience of compute- and sensing-intensive mobile applications. My research interest covers a broad spectrum of fields, including data-center energy efficiency, algorithmic game theory, and applied machine learning algorithms in mobile systems.

EDUCATION

2016	Ph.D. in COMPUTER SCIENCE, **Duke University**
	Mobile Energy Efficiency	Advisor: Benjamin C. LEE
2013	M.S. in COMPUTER SCIENCE, **Duke University**
	Mobile Sensing	Advisor: Romit ROY CHOUDHURY
2011	B.E. in SOFTWARE ENGINEERING, **Nanjing University**, China
	Sensor Networks	Advisor: Guihai CHEN
2010	Summer School, **Shanghai JiaoTong University**, China
	Sensor Networks	China 973 Project

WORK EXPERIENCE

09/2016 -	Software engineer at **Google Inc.**, CA
	Android Platform; Infrastructure
06-08/2014	Research Intern at **IBM T.J. Watson Research Center**, NY
	Networking and Cloud Computing Group, supervision of Dr. Theodoros Salonidis
06-08/2012	Research Intern at **Bell Labs, Alcatel-Lucent**, NJ
	Wireless Program Group, supervision Dr. Li Erran Li

RESEARCH EXPERIENCE

2013-2016	Research Assistant at **Duke University**
	Systems Architecture Integration Lab, supervision of Dr. Benjamin C. Lee
	PROJECT 1: Developed a set of mobile benchmarks and characterized their instruction-level as well as the architecture-level features. Conducted experiments on ARM big.LITTLE processor and gem5 simulator.
	PROJECT 2: Developed a game-theory based managing mechanism to let strategic processors decide whether to sprint based on application phases. Experimented on Apache Spark and its machine learning libraries.
2011-2013	Research Assistant at **Duke University**
	Systems and Network Research Group, supervision of Dr. Romit Roy Choudhury
	PROJECT 1: By inserting a smartphone into a soft-toy, we enabled toys to identify children's gestures by conducting mobile sensing, signal processing and unsupervised machine learning at real-time.
	PROJECT 2: Developed a mobile-sensing based automatic content rating system, which utilizes visual, audio and motion sensors to detect users' reactions and further estimate how much they liked the movie.
	PROJECT 3: Studied Linux driver for Wi-Fi scanning in mobile devices and discovered one source of inefficiency.
2009-2011	Research Assistant at **Nanjing University**
	Grip, P2P and Sensor Group, supervision of Dr. Guihai Chen
	Participated in the development of a network platform that connects wireless sensor networks, broadcast FM radio networks and the Internet, based on software defined radio networks (USRP).

Publications

Songchun Fan, Theodoros Salonidis, Benjamin C. Lee: Swarm Computing for Mobile Sensing, *ICDCS 2018.*

Songchun Fan*, Seyed Majid Zahedi*, Benjamin C. Lee: Distributed Strategies for Computational Sprints, *To Appear in Communications of the ACM, Research Highlight 2018.* (*Co-First Authors)

Seyed Majid Zahedi, Songchun Fan, Benjamin C. Lee: Managing Heterogeneous Datacenters with Tokens, *TACO 2018.*

Songchun Fan, Qiuyun Wang, Benjamin C. Lee: Predicting sensory data and extending battery life for wearable devices, *HotMobile 2017.*

Qiuyun Wang, Songchun Fan and Benjamin Lee: Cooper: Task Colocation on Shared Hardware with Cooperative Games, *HPCA 2017.*

Seyed Majid Zahedi, Songchun Fan, Matthew Faw, Elijah Cole, Benjamin C. Lee: Computational Sprinting: Architecture, Dynamics, and Strategies, *TOCS Vol. 34, No. 4*

Songchun Fan*, Seyed Majid Zahedi*, Benjamin Lee: The Computational Sprinting Game, *ASPLOS 2016.* (*Co-First Authors)

Songchun Fan, Theodoros Salonidis, Benjamin Lee: A Framework for Collaborative Sensing and Processing of Mobile Data Streams, *MobiCom 2016 Demo*

Songchun Fan and Benjamin Lee: Evaluating Asymmetric Multiprocessing for Mobile Applications, *ISPASS 2016.*

Songchun Fan, Hyojeong Shin and Romit Roy Choudhury: Injecting Life into Toys, *ACM HotMobile 2014.*

Xuan Bao, Songchun Fan, Alexander Varshavsky, Kevin Li and Romit Roy Choudhury: Your reactions suggest you liked the movie: automatic content rating via reaction sensing, *ACM UbiComp 2013*

Songchun Fan, Mahanth Gowda and Romit Roy Choudhury: Saving Power for Mobile Phones with Partial Wi-Fi Scans, *ACM MobiSys 2012 Poster*

Songchun Fan, Lubin Guan, Chao Dong, Lizhao You and Guihai Chen: Software Radio Implementation of Integrating Heterogeneous Wireless Networks, *IEEE Infocom 2011 Demo Poster*

Songchun Fan, Xin Fan, Cheng Tan and Jinyu Zhang: HeartPlayer: A Smart Music Player Involving Emotion Recognition, Expression and Recommendation, *Multimedia Modeling 2011 Demo Poster*

Patent Applications

Method and apparatus for content rating using reaction sensing, Kevin Ansia Li, Alex Varshavsky, Xuan Bao, Romit Roy Choudhury, Songchun Fan

Deployment and execution of sensing and computational tasks in a network of computing devices, Shahrokh Daijavad, Nirmit V. Desai, Songchun Fan, Martin G. Kienzle, Theodoros Salonidis, Rahul Urgaonkar, Dinesh C. Verma

Awards

2018	Communications of the ACM, Research Highlight
2017	IEEE Micro Top Picks Honorable Mention
2016	Best Paper Award, ASPLOS
2013	Best Paper Honorable Mention, ACM UbiComp
2011	Graduate Fellowship, Computer Science Department, Duke University
2011	Huawei Best Poster Award, IEEE Infocom Student Activities
2009	National First Prize, China Undergraduate Mathematical Contest in Modeling

SKILLS

Operating System:	Linux, Mac, Windows, Android
Embedded Platform:	Android, ARM Versatile Express, TelosB Sensors
Programming Languages:	Java, C, C++, Python
Scripting Language:	Bash, Perl
Data Analysis:	R, MATLAB
Simulators:	Gem5, Marssx86, QEMU
Big Data Processing:	Apache Spark, Hadoop
Version Control:	Git, SVN, CVS

GRADUATE COURSES

Specialized Computer Architecture	Data-Center Architecture	Computer Architecture
Privacy in Mobile Social World	Wireless Networking	Operating Systems
Algorithmic Paradigms	Probability and Statistics	Machine Learning

TEACHING EXPERIENCE

2013	Computer Networks/Distributed Systems
2012	Computer Network Architecture
2010	Personal Software Process (PSP)