Association for Computing Machinery

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NEWS RELEASE

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PERVASIVENESS AND POWER OF MOBILE COMPUTING ON VIEW AT 25th ANNUAL MOBICOM CONFERENCE

Top Venue for New Research on All Areas of Mobile Computing and Wireless Networking

New York, NY, October 9, 2019 — The Association for Computing Machinery's Special Interest Group on Mobility of Systems, Users, Data and Computing (SIGMOBILE) will hold its International Conference on Mobile Computing and Networking (MobiCom 2019) October 21-25 in Los Cabos, Mexico. In addition to celebrating its 25th anniversary, this is the first year the conference will be held in Mexico. MobiCom is a highly selective, premier international forum for addressing networks, systems, algorithms and applications that support the symbiosis of mobile computers and mobile and wireless networks. The conference covers all areas of mobile computing and mobile and wireless networking.

"Mobile computing has taken over our world," said MobiCom 2019 General Co-chair Sharad Agarwal of Microsoft. "It is an exciting time in this very young field, but there are also many unknowns and several challenges on the horizon. MobiCom has been the leading venue for the sharing of significant research and breakthroughs in the underlying technologies that have evolved the industry as a whole."

"We've planned some surprises for our 25th anniversary milestone," added General Co-chair Ben Greenstein of Google. "But the essence of MobiCom's appeal—the exciting research discoveries—will certainly be the cornerstone of our conference program. This year we've organized sessions on all the hottest innovations transforming our connected world— including computational health, machine learning for wireless networks, the impact of 5G technologies, and wireless sensing, among others."

In addition to the regular conference program featuring two keynote addresses and 55 leading-edge research papers, MobiCom 2019 will include a set of workshops, research demonstrations, and a poster session that includes the ACM Student Research Competition.

MobiCom 2019 HIGHLIGHTS

Keynotes

"Human-Machine and Human-Robot Interaction for Long-Term User Engagement and Behavior Change"
Maja Matarić, University of Southern California

The nexus of in-home intelligent assistants, activity tracking, and machine learning creates opportunities for personalized virtual and physical agents/robots that can positively impacts a user's health. And while these agents can serve as physical and mental health coaches and companions, sustaining user engagement and motivation with these "bots" over the long-term present complex challenges. Maja Matarić will present methods and results of modeling, learning, and personalizing user motivation, engagement, and coaching of healthy children and adults, stroke and Alzheimer's patients, and children with autism, in short- and long-term deployments. She will discuss research and commercial implications for technologies aimed at human daily use. Matarić is Chan Soon-Shiong Distinguished Professor of Computer Science, Neuroscience, and Pediatrics at the University of Southern California, founding director of the USC Robotics and Autonomous Systems Center, and Vice Dean for Research in the Viterbi School of Engineering.

"4 Systems Perspectives into Human-Centered Machine Learning"
Carlos Guestrin, Senior Director of Machine Learning and AI, Apple, and University of Washington
Machine learning (ML) has had a tremendous impact over the last decade – thanks to the humans in the loop responsible for defining tasks and metrics, developing and programming algorithms, collecting and labelling data, debugging and optimizing systems. Carlos Guestrin will discuss four human-centered perspectives in the machine learning development process, along with methods and systems, to empower humans to maximize the ultimate impact of their ML-based applications. Guestrin's address will cover: Developer tools that allow a wider range of people to create ML applications, Optimizing performance and power of ML models on a range of hardware and mobile devices, and Helping humans understand why ML models make each prediction, when these models will break, and how to improve them.

Research Papers (Partial List)
More than 50 research papers will be presented throughout nine different sessions.
Visit the MobiCom 2019 program page for the full list of papers.

"Living IoT: A Flying Wireless Platform on Live Insects"
Vikram Iyer, Rajalakshmi Nandakumar, Anran Wang, Sawyer B. Fuller, Shyamnath Gollakota, University of Washington
Sensor networks with devices capable of moving could enable applications ranging from precision irrigation to environmental sensing. Using mechanical drones to move sensors, however, severely limits operation time since light time is limited by the energy density of current battery technology. The authors explore an alternative, biology-based solution: integrate sensing, computing and communication functionalities onto live lying insects to create a mobile IoT platform.

"PDVocal: Towards Privacy-preserving Parkinson's Disease Early Detection using Passive Body Sounds in Daily Life"
Hanbin Zhang, Chen Song, Aosen Wang, Chenhan Xu, Wenyao Xu, State University of New York, Buffalo; Dongmei Li, University of Rochester Medical Center
Early detection of Parkinson's Disease (PD) plays an important role in symptom relief and improvement in performance of activities in daily life, which eventually reduces societal and economic burden. However, conventional PD detection methods are in-convenient in daily life (e.g., requiring users to wear sensors). To overcome this challenge, the authors propose and identify the non-speech body sounds as the new PD biomarker and utilize the data in smartphone usage to realize the passive PD detection in daily life without interrupting the user.

"Edge Assisted Real-time Object Detection for Mobile Augmented Reality"
Luyang Liu, Hongyu Li, Marco Gruteser, WINLAB, Rutgers University
Most existing Augmented Reality (AR) and Mixed Reality (MR) systems are able to understand the 3D geometry of the surroundings but lack the ability to detect and classify complex objects in the real world. Such capabilities can be enabled with deep Convolutional Neural Networks (CNN), but it remains difficult to execute large networks on mobile devices. Offloading object detection to the edge or cloud is also very challenging due to the stringent requirements on high detection accuracy and low end-to-end latency. The authors propose a system that employs low latency offloading techniques, decouples the rendering pipeline from the offloading pipeline, and uses a fast object tracking method to maintain detection accuracy. Their results show that their system can improve the detection accuracy by 20.2%-34.8% for the object detection and human keypoint detection tasks.

"An Active-Passive Measurement Study of TCP Performance over LTE on High-speed Rails"
Jing Wang, Yufan Zheng, Yunzhe Ni, Chenren Xu, Wangyang Li, Wantong Jiang, Yihua Cheng, Zhuo Cheng, Peking University, China; Feng Qian, University of Minnesota, Twin Cities; Yuanjie Li, Xiufeng Xie, Hewlett Packard Labs, USA; Yi Sun, University of Chinese Academy of Sciences; Zhongfeng Wang, China Academy of Railway Sciences
High-speed rail (HSR) systems potentially provide a more efficient way of door-to-door transportation than airplane. However, they also pose unprecedented challenges in delivering seamless Internet service for on-board passengers. In this paper, the authors conducted a large-scale active-passive measurement study of Transmission Control Protocol (TCP) performance over long-term evolution (LTE) on HSR. The authors also design a simple yet effective congestion control algorithm based on the Bottleneck Bandwidth and Round-trip propagation time (BBR) algorithm to further boost the throughput by up to 36.5%. Overall, their paper also highlights the need to develop dedicated protocol mechanisms that are friendly to extreme mobility.

"Keep Others from Peeking at Your Mobile Device Screen"
Chun-Yu (Daniel) Chen, Bo-Yao Lin, Junding Wang, and Kang G. Shin, University of Michigan, Ann Arbor
People use their mobile devices anywhere and anytime to run various apps, and the information shown on their device screens can be seen by nearby (unauthorized) parties, called "shoulder surfers." To mitigate this privacy threat, the authors have developed HideScreen by utilizing the human vision and optical system properties to hide the users' on-screen information from the shoulder surfers. Specifically, HideScreen discretizes the device screen into grid patterns to neutralize the low-frequency components so that the on-screen information will "blend into" the back-ground when viewed from the outside of the designed range. The authors extensive experimental evaluation of HideScreen demonstrates its high protection rates (>96% for texts and>99%for images) while providing a good user experience.

Workshops
Visit the MobiCom 2019 workshops page for full descriptions.

- 4th Internet-QoE Workshop: QoE-based Analysis and Management of Data Communication Networks
- Workshop on Hot Topics in Video Analytics and Intelligent Edges
- Wireless of the Students, by the Students, and for the Students (S3) Workshop
- 1st ACM Workshop on Emerging smart technologies and infrastructures for Smart Mobility and sustainability (SMAS)

- 13th International Workshop on Wireless Network Testbeds, Experimental evaluation & Characterization (WiNTECH)
- 3rd ACM Workshop on Millimeter-wave Networks and Sensing Systems (mmNets)
- 14th Workshop on Challenged Networks (CHANTS 2019)

Tutorials

Visit the MobiCom 2019 tutorials page for full descriptions.

- Computer architectures and hardware acceleration for deep learning
- COSMOS (Cloud-Enhanced Open Software Defined Mobile Wireless Testbed for City-Scale Deployment)
- Democratizing video analytics
- Building Embedded AI Systems - A Practical Approach

Additional Highlights

Test of Time Awards

"Design of Warp: a wireless open access research platform"

Patrick Murphy, Ashutosh Sabharwal, and Behnaam Aazhang, Rice University

"Sensing meets mobile social networks: the design, implementation and evaluation of the CenceMe application"

Emiliano Miluzzo, Nicholas D. Lane, Kristof Fodor, Ronald Peterson, Hong Lu, Mirco Musolesi, Xiao Zheng, and Andrew T. Campbell, Dartmouth College; Shane B. Eisenman, Columbia University

ACM Student Research Competition (SRC)

ACM MobiCom 2019 will host an ACM Student Research Competition (SRC) alongside the Posters Program. SRC offers graduate and undergraduate students an opportunity to present their original research, and rewards outstanding student research. It aims to give students an opportunity to meet with conference attendees and distinguished researchers to receive feedback on their research. The first, second, and third place winners from each category will be awarded $500, $300, and $200 respectively. Additionally, all participating students will receive up to $500 USD for their conference travel.

Student Career Evening

This event seeks to bring together top companies in the field with the best and brightest students and post-docs from the ACM SIGMOBILE community. MobiJob aims to assist with both open full-time positions, as well as fixed-duration internships.

N2Women Young Researcher Fellowship and Travel Grant Awards

These awards help broaden participation of female students from universities traditionally underrepresented at MobiCom by enabling these students to participate both in the N2Women dinner as well as in the general MobiCom program. They partially cover a young researcher's travel cost (up to $1,000) to a meeting where an N2Women event will be held. In exchange, the young researcher must help organize the N2Women meeting. The benefit of doing the organization, in addition to the travel funds, is for the young researcher to connect with the organizers of the conference who are, typically, leaders in the research field.

About SIGMOBILE

SIGMOBILE, the ACM Special Interest Group on Mobility of Systems, Users, Data and Computing, is the international professional organization for scientists, engineers, executives, educators, and students dedicated to all things mobile. SIGMOBILE members work in academia, industry, and government. They are students, teachers, practitioners, policymakers, and scientists.

About ACM

ACM, the Association for Computing Machinery, is the world's largest educational and scientific computing society, uniting educators, researchers and professionals to inspire dialogue, share resources and address the field's challenges. ACM strengthens the computing profession's collective voice through strong leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking.

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