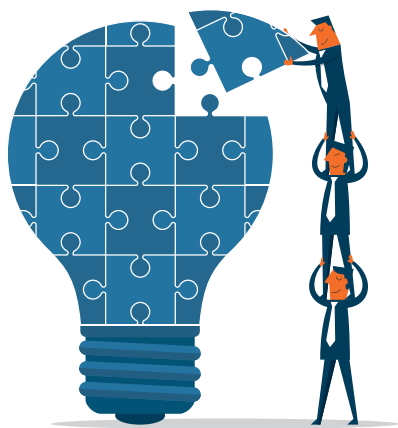


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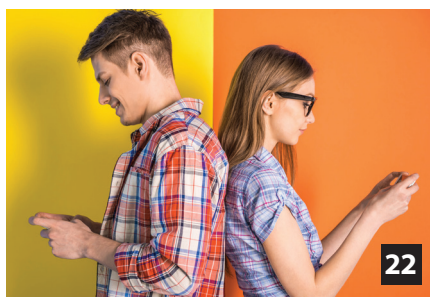
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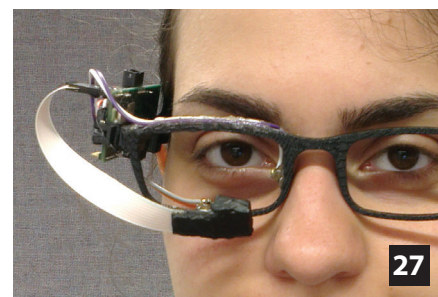
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MESSAGE FROM THE EDITOR-IN-CHIEF

CONTRIBUTORS

EDITOR-IN-CHIEF

Eyal de Lara, University of Toronto

MANAGING EDITOR Donna Paris

DESIGNER JoAnn McHardy

SENIOR ADVISORS (Past Editors-in-Chief)

Paramvir Bahl, Microsoft Research

Suman Banerjee, University of Wisconsin, Madison

Srikanth Krishnamurthy, University of California, Riverside

Jason Redi, BBN Technologies

Mani Srivastava, University of California, Los Angeles

Nitin Vaidya, University of Illinois, Urbana-Champaign

SECTION EDITORS

Sharad Agarwal, Microsoft Research

Nilanjan Banerjee, University of Maryland, Baltimore County

Geoffrey Challen, University at Buffalo

Prabal Dutta, University of Michigan

Carla S. Ellis, Duke University

Michelle X. Gong, Google

Marco Gruteser, Rutgers University

Robin H. Kravets, University of Illinois, Urbana-Champaign

Nic Lane, Bell Labs and University College, London

Iqbal Mohamed, Samsung Research America

Matthai Philipose, Microsoft Research

Sami Rollins, University of San Francisco

Jacob Sorber, Clemson University

Khai N. Truong, University of North Carolina, Charlotte

Lin Zhong, Rice University

ACM STAFF

Julie Goetz, Administrator – Publications Production

Adrienne Griscti, Program Coordinator – SIG Publications

Fran Spinola, Program Coordinator – SIG Activities

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Marco Gruteser, Rutgers University, *Treasurer*

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Eyal de Lara

IN THIS ISSUE, we highlight four papers from ACM MobiCom 2015. While these papers cover a broad range of topics including eye tracking, video streaming, context awareness, and web browsing, they all share a common underlying theme: adaptation. The mobile environment is intrinsically dynamic, and its constantly changing nature impacts all levels of the hardware and software stack.

The papers highlighted in this issue leverage adaptation to reduce energy consumption, improve user experience, and adjust application behavior to match the user's changing context.

"The 'I' in The Eye," by Addison Mayberry, Yamin Tun, Pan Hu, Duncan Smith-Freedman, Deepak Ganesan, Benjamin M. Marlin, and Christopher Salthouse describes iShadow, a wearable eye-tracking device that achieves long battery life on a small form factor. iShadow optimizes pixel acquisition, the critical bottleneck of eye-tracking systems, by using a low-resolution grayscale camera that supports individual pixel access and a multistage tracking algorithm that in most instances requires only pixels from a single row and column from the camera imager; reading the full image only occasionally. The authors argue that eye tracking could be used to infer a person's cognitive functions, and use this knowledge to provide them with useful information, or even redirecting their attention elsewhere, e.g., remind a distracted driver to look at the road. Other uses include early diagnosis of vision-related illnesses, such as lazy eye and glaucoma, as well as other mental conditions, such as fatigue, ADHD, autism, and even Alzheimer's disease.

In "piStream: Physical Layer Informed Adaptive Video Streaming Over LTE," Xiufeng Xie, Xinyu Zhang, Swarun Kumar, and Li Erran Li address the root cause of the frequent stalling behavior experienced by users streaming video over LTE. The authors argue

that the HTTP-based adaptive streaming protocols (DASH) used by many mainstream video content providers, such as YouTube and Netflix, is slow to reach to changing network conditions and, as a result, does not make optimal use of the network. piStream improves user-perceived quality of experience by exploiting physical layer information to enable accurate bandwidth estimation and agile video rate adaptation.

In “CAreDroid: Adaptation Framework for Android Context-Aware Applications,” Salma Elmalaki, Lucas Wanner, and Mani Srivastava take on the challenge of developing context-aware mobile applications. With CAreDroid, developers design context-aware applications by tagging methods with the contexts to which they are sensitive. The CAreDroid platform in turn monitors the context of the physical environment and calls upon the appropriate application methods as the context changes. The paper presents a Smart Camera case study that automatically adjusts the camera’s flash, focus, and scene mode to minimize blur when shooting pictures while on the move.

Lastly, in “Rethinking Energy-Performance Trade-Off in Mobile Web Page Loading,” Duc Hoang Bui, Yunxin Liu, Hyosu Kim, Insik Shin and Feng Zhao observe that mobile web browsers are optimized for fast rendering and not energy conservation. The authors present a modified version of the Chromium web browser for Android that achieves

significant energy savings with negligible impact on page loading time. This is achieved by adapting the content processing rate to match the available network bandwidth, minimizing screen repaints, and taking advantage of the ARM big.LITTLE architecture by increasing the use of the energy-efficient core.

The rest of the issue consists of four more columns: The Makers column features an article by Rohit Ramesh and Prabal Dutta that re-envision the design of embedded development tools with the goal of enabling programmers to automatically generate embedded hardware from application code.

In the Experimental Methods column, Khai Truong presents a primer on how to conduct controlled user studies of mobile and ubiquitous computing systems outside of the lab environment.

In the Mobile Platforms column, Tobias Grosse-Puppenthal, Andreas Braun and Xavier Dellangnol describe OpenCapSense, an open-source hardware and software platform that enables experimentation with capacitive sensing applications.

Finally, in the past→future column, Sylvia T. Kouyoumdjieva and Gunnar Karlsson discuss the ongoing effort to add device-to-device (D2D) communication support to LTE in the context of over a decade of research in opportunistic communications.

I hope you enjoy this issue, and I welcome your thoughts about GetMobile in general, and this issue in particular.

EDITORIAL CORRESPONDENCE

Address to: Prof. Eyal de Lara, 40 St. George Street, Suite 4283, Department of Computer Science, University of Toronto, Toronto, Ontario M5S2E4, Canada, Email: getmobile_editor@acm.org. For specific department email addresses, see the “Call for Contributions” on page 59.

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