

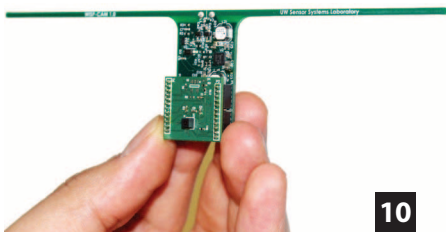
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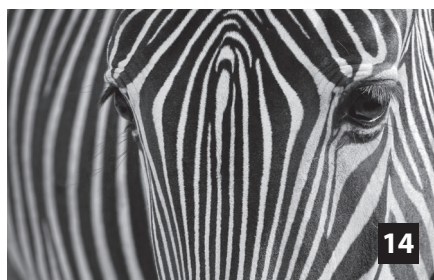
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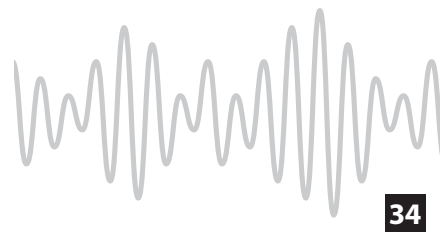
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# MESSAGE FROM THE EDITOR-IN-CHIEF

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**Eyal de Lara**

In this issue, we highlight three papers from ACM SenSys 2015 that address two of the hottest areas in mobile sensing today, augmented reality and continuous sensing. Mobile and wearable devices have benefited enormously from rapid advancements in computational power, storage capacity and network speeds. Simultaneously, the inclusion of ever more powerful sensors creates the opportunity to develop rich sensing

applications that are uniquely mobile. However, significant challenges still remain that prevent the wide adoption of next generation sensing applications. The papers in this issue address some of these challenges: limited compute and storage resources, the difficulty to estimate an application's effects on battery life, and sensor heterogeneity.

"GLIMPSE: Continuous, Real-Time Object Recognition on Mobile Devices," by Tiffany Yu-Han Chen, Hari Balakrishnan, Lenin Ravindranath, and Paramvir Bahl, describes a continuous, real-time object recognition system that locates and labels objects in full-motion video captured on a mobile or wearable device. This is a resource intensive task that is currently beyond the resources available on most mobile devices. A simple solution that offloads all processing to the Cloud, however, suffers from large network delays that reduce tracking accuracy. Glimpse takes an alternative approach that partitions the work between the mobile and Cloud. It offloads object recognition, which is computationally and memory intensive, to the Cloud, but performs object tracking on the mobile, which properly positions labels as they arrive from the server.

In "PowerForecaster: Predicting Power Impact of Mobile Sensing Applications at Pre-Installation Time," Chulhong Min, Chungkuk Yoo and June-hwa Song, Youngki Lee, Seungwoo Kang, and Inseok Hwang introduce a tool that provides users with an

estimate of the effect that installing a continuous sensing application will have on the battery life of their mobile device. This is a hard problem because accurate estimation depends not only on the application and the device, but also on the user's usage patterns. PowerForecaster produces personalized energy-usage forecasts by emulating the application execution using behavioral traces that capture the individual's usage patterns.

In "Activity Recognition on Smart Devices: Dealing with Diversity in the Wild," Henrik Blunck, Sourav Bhattacharya, Allan Stisen, Thor Siiger Prentow, Mikkel Baun Kjærgaard, Anind Dey, Mads Møller Jensen, and Tobias Sonne explore the effects of device heterogeneity on the performance of human activity recognition algorithms. The authors describe variations between sensor implementations (e.g., accelerometers from different manufactures), as well as due to differences in system software that affect how sensor readings get timestamp and the rate in which readings are provided to the sensing application. Not surprisingly, these variations reduced detection accuracy when training and testing is done using different devices.

The rest of the issue consists of four more columns: In the Education column, Dan Siewiorek and Asim Smailagic reflect on 25 years of experience with the User-Centered Interdisciplinary Concurrent System Design

Methodology (UICSM), in which teams composed of electrical engineers, mechanical engineers, computer scientists, industrial designers and human computer interaction students come together to work with an end-user to generate a complete prototype system during a four-month long course.

In the Arm's Length column, Saman Naderiparizi, Zerina Kapetanovic, and Joshua R. Smith describe their efforts developing battery-free machine vision applications using WISPCam, a passive wireless RFID tag enhanced with a VGA camera that leverages RF signals for power and communication.

In the Retrospectives column, Margaret Martonosi looks back at her groundbreaking research on mobile sensing and reflects on changes that the field has experienced and the new challenges it faces. The fetching zebra that graces the cover of this issue pays homage to her early work on ZebraNet.

Finally, in the Standards column, Ramachandran Ramjee, Sumit Roy, and Krishna Chintalapudi present an in-depth analysis of FCC's TV white space regulations. They argue that FCC's current white space regulations do not achieve the desired balance between effectively promoting unlicensed secondary access and providing adequate protection of the primary.

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

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**IN THIS ISSUE, WE HIGHLIGHT THREE PAPERS FROM ACM SENSYS 2015 THAT ADDRESS TWO OF THE HOTTEST AREAS IN MOBILE SENSING TODAY, AUGMENTED REALITY AND CONTINUOUS SENSING.**