GetMobile

MOBILE COMPUTING & COMMUNICATIONS REVIEW

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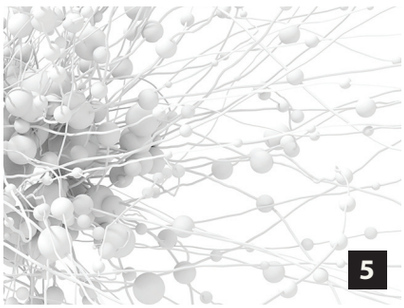

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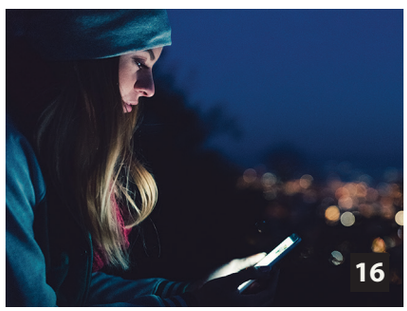

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Eyal de Lara

IN THIS ISSUE, we highlight three papers from ACM UbiComp 2017, as well as one paper that was published at the 2017 ACM International Symposium on Wearable Computers.

"TrailSense: Crowdsensing Risky Mountain Trail Segments," by Keunseo Kim, Hengameh Zabihi, Heeyoung Kim, and Uichin Lee describes a mobile crowdsensing system that uses smartphone sensing to automatically label mountain trail segments by analyzing walking patterns of individual hikers. TrailSense can be used to identify risky mountain trail segments to prevent accidents.

In "TouchPower: Interaction-based Power Transfer for Power-as-needed Devices," Tengxiang Zhang, Xin Yi, Chun Yu, Yuntao Wang, Nicholas Becker, and Yuanchun Shi describe a mechanism to power up electronic devices only during interaction by taking advantage of the natural contact or proximity between users and objects during interaction to transfer power. The paper describes a prototype that transfers on-body power to off-body power-as-needed devices through contact between electrodes on a glove worn by the user and the target device.

In "Predicting Symptom Trajectories of Schizophrenia Using Mobile Sensing," Rui Wang, Weichen Wang, Min Hane Aung, Dror Ben-Zeev, Rachel Brian, Andrew T. Campbell, Tanzeem Choudhury, Marta Hauser, John Kane, Emily A. Scherer, and Megan Walsh describe a system that can predict symptoms of schizophrenia for people living out in the community. Predictions are based on self-reported assessments and passive sensing of a range of features, including physical activity, sociability, mobility, sleep, and phone use.

Lastly, "The Dermal Abyss: Color-Changing Tattoos for Displaying Biodata," by Katia Vega, Nan Jiang, Xin Liu, Viirj Kan, Nick Barry, Pattie Maes, Ali K. Yetisan, and Joe Paradiso describes the use of tattoos to create an interactive display within the skin to reveal internal changes in the body. The technique replaces traditional tattoo inks with biosensors, in which colours or intensity

change in response to variations of biomarkers in the interstitial fluid. The paper describes tattoo biosensors that report on the concentration of sodium ions, glucose, and pH in the skin.

The rest of the issue consists of four additional columns:

The Arm's Length column features a paper by Nariman Farsad that discusses recent advances in the fields of bioengineering and nanotechnology, which have resulted in the emergence of tiny devices of sub-millimeter – and even micron or less – dimensions that can perform sensing and actuation. The article discusses how these nano devices can communicate with each other using a nature-inspired technique. Known as *molecular communication*, the technique uses chemical signals as carriers of information by encoding data into biological compounds, such as proteins or DNA molecules, or synthetic compounds, such as gold nanoparticles. This technology has many potential applications in a variety of fields, such as medicine, environmental remediation, manufacturing, and storage.

In the Experimental Methods column, authors Predrag Klasnja and Eric B. Hekler address the challenge of evaluating mobile health (mHealth) apps and wearables designed to promote healthy behavior changes, such as losing weight, increasing physical activity, or adhering to a medication regimen. The authors argue that the current approach is intended to establish whether the system as a whole is effective at changing target behaviors; unfortunately, this approach provides no insight about how specific aspects of the system contribute to its effectiveness and, as a result, the evidence it produces is of limited usefulness for informing future work. Instead, the authors describe an alternative strategy rooted in behavioral science research on intervention optimization that can assess causal effects of distinct intervention components and their interactions.

The Awards column penned by Margaret Martonosi recognizes Kyle Jamieson, the recipient of the 2018 ACM SIGMOBILE RockStar Award for his impactful and innovative early-career contributions, "bridging computer networking and signal processing to advance wireless communications and sensing."

Finally, the Standards column features an article by Michael Starsinic, Dale Seed, and Chonggang Wang describing the Network at the Service Capability Exposure Function (SCEF), a new API defined in the latest 3GPP release that provides IoT servers access to the capabilities and services of the 3GPP network, including APIs for monitoring user equipment events and status, service configuration, network coordination, and control plane data exchange.

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

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