Pervasive computing and AI have always struck me as a match made in heaven. The notion that technology will fade into the background of our lives necessarily requires understanding and anticipating our needs, which requires some level of AI.

**BRINGING AI TO PERVERSIVE COMPUTING**

The maker community has recently rolled out kits to bring these two areas of computer science together. Two notable examples are the TJBot and the Zooids.

TJBot is a DIY kit for creating a cardboard robot with Watson inside. Inside TJBot is a Raspberry Pi with a camera, microphone, speaker, and LED light with easy connection to Watson services. The TJBot kit provides three starter recipes. The first is a sentiment analysis that changes the color of TJBot’s LED based on the emotional sentiment of a particular topic on Twitter. The second lets you use your voice to control TJBot. The third lets you have a conversation with TJBot. This open source project is available on GitHub. Directions for printing your very own TJBot, as well as the initial recipes and recipes contributed by the community, are available at https://ibmtjbot.github.io.

Zooids are small, ant-like robots with little wheels, a touch sensor, gyros, and an optical sensor on top to monitor instructions from a projector overhead. Zooids work cooperatively, in a swarm, to accomplish things like moving your phone closer to you or coming out of a mouse hole in the wall at night to tidy up while you sleep (I like this one the best but it’s still just a vision). Like TJBot, Zooids software is available on GitHub, and the authors invite interested community members to try them out. You can find the software at https://github.com/ShapeLab/SwarmUI.

Interestingly, both of these maker projects are exploring fundamental questions about human-computer interaction. TJBot is looking to understand how humans will (want to) interact with cognitive objects, especially using voice commands. Zooids are exploring how humans might exploit swarm-based user interfaces consisting of small, tangible robots working in concert with one another and a human. Both of these projects also leverage internal AI capabilities—either explicitly or implicitly. These kits highlight that our industry is on the cusp of fundamental changes in the way we will interact with technology.

**IN THIS ISSUE**

Drones, our theme for this issue, are another good example of technology that falls at the intersection of pervasive computing with AI. Many thanks to Albrecht Schmidt and Floyd Mueller for focusing our attention on drones. In this issue, we also introduce two new departments: IoT News and Human Augmentation.

Our first new department, IoT News, is led by Florian Michahelles from Siemens and presents news and research on the Internet of Things. The coverage will range from industrial use cases of IoT to social and business implications. Michahelles is looking for contributions from the community and outlines, in more detail, what he is looking for.
We’re looking for volunteers to join our editorial board as well as to join our new initiatives team. Members of the editorial board contribute, edit, or manage the magazine’s content. The open positions include department editors for three departments: Conferences, Education, and Wearable Computing. We’re also open to proposals for new departments. In addition, we’re creating a new organization within our team of volunteers, the initiatives team. Members of this team will help the magazine in other roles by contributing their knowledge, experience, and connections. The open positions for the initiatives team include the following: online presence and engagement, social network ambassador, constituency ambassador manager, constituency ambassador, awards, IEEE Computer Society project liaison, and member at-large.

Anyone interested in volunteering is asked to fill out the application found at: http://tinyurl.com/2gzwf5j.

Full consideration will be given to applications received by 1 February 2017.

tattoos particularly intriguing. The potential of this technology for use in physical therapy seems enormous! My physical therapist could see the potential in helping change people’s habits, especially when they sit in front of a keyboard.

We also have three feature articles this issue, starting with “A Survey of Diet Monitoring Technology,” by Haik Kalantarian, Nabil Alshurafa, and Majid Sarrafzadeh. This article provides a deep dive analysis of different technologies available for monitoring eating behaviors. These technologies range from manual tracking, to acoustic monitoring, to gesture recognition, to instrumented objects, to visual approaches, to sensors attached to the skin. The authors also performed a survey designed to measure user acceptance of these technologies. This article provides a thorough review of the many ways to do automated tracking of eating behaviors.

The next article is “Semi-Automated Tracking: A Balanced Approach for Self-Monitoring Applications,” by Eun Kyoung Choe, Saeed Abdullah, Mashfiqui Rabbi, Edison Thomaz, Daniel A. Epstein, Felicia Cordeiro, Matthew Kay, Gregory D. Abowd, Tanzeem Choudhury, James Fogarty, Bongshin Lee, Mark Matthews, and Julie A. Kientz. The authors make the case for semi-automated tracking of health behaviors. Semi-automated tracking balances the convenience of automated tracking with the awareness of manual tracking. The authors define semi-automated tracking and walk readers through its characteristics, contrasting the strengths and weaknesses with those of both manual and automated tracking. They then examine three important design considerations, and give examples of semi-automated tracking of food, mood, and sleep to demonstrate these ideas. Semi-automated tracking strikes me as a promising compromise between fully automated and fully manual tracking approaches.

Finally, in “Region Formation for Efficient Offline Location Prediction,” Ian Craig and Mark Whitty explore the use of regions to make predictions about users’ destinations. The authors recognize the importance of location predictions as well as the challenges faced in making such predictions on mobile devices, including power consumption, privacy, and data sparsity. To overcome these challenges, they propose dividing the geographic area into regions that uniquely differentiate users’ paths. This approach addresses the power consumption problem because updates are needed much less frequently. It addresses the privacy problem because the user’s exact location within the region is unimportant. It addresses the data sparsity problem by reducing the overall state space. Although this approach shows promise, more research is needed before it is applied in “the real world.”

The ability to bring AI together with pervasive computing will help us to create more compelling user experiences in the years to come. As we move forward, I anticipate these two fields coming together more and more, in applications from health, to drones, to smarter cities.

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