New app to detect anxiety and mood disorders in teens

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A phone rings in the middle of the night, an anxious teen seeking guidance from a friend. Is it adolescent angst or a serious mental health

problem? Sometimes, it can be hard to tell.

That's why Rutgers researchers have developed a smartphone app designed to monitor and evaluate moods and activities in real-time, allowing clinicians, school officials and parents to intervene should a child need help.

The app, piloted in a small study of middle school students, started as a joint project of Rutgers' Graduate School of Applied and Professional Psychology (GSAPP) and the university's Wireless Information Network Laboratory (WINLAB), a research center focused on wireless technology, and has expanded to include additional academic and industry partners.

"With teenagers tethered to their smartphones and digital devices, we wanted to reach adolescents where they could be reached," says Brian Chu, an associate professor at GSAPP and director of the school's Youth Anxiety and Depression Clinic.

"Everyone has fleeting moods up and down," he says. "We are looking to find the kids who are getting stuck. The app allows us to get a continuous view of how a teen is experiencing everyday life, to find out where the triggers are – and where their hot spots might be."

Mental health professionals are concerned about the rise in mood disorders and suicides among middle school and high school students. According to the National Institute of Mental Health, 8 percent of 13 to 18 year olds suffer from an anxiety disorder, and 11 percent meet the criteria for a major depression. Nearly one in six high school students have seriously considered suicide and one in 12 have attempted it.

Standard methods for assessing adolescent mental health have limitations, experts say. The most common screening tools include self-

report questionnaires, which offer only a snapshot at any given moment, and structured interviews, which require time and resources.

The new technology combines the best of the older approaches, Chu says. The app has several components: an electronic diary that prompts teens each day to complete an entry describing their state of mind as well stressful events and what triggered them, and two sensing devices, one that uses the smartphone microphone to assess social interaction and physical activity, and the other, tracks how often a teen texts or talks on the phone.

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Yanyong Zhang, an associate professor in the Department of Electrical and Computer Engineering who works with Chu, developed the social sensing application – called Crowd ++ – with her graduate students at the WINLAB research center.

"Our idea was to analyze audio data to detect behavior, such as physical activity, engagement, how many people are speaking in room." says Zhang, co-author of a journal article on mobile sensing published in 2013 by the Association for Computing Machinery (ACM).

She was still trying to figure out the best use for the app when a colleague, a father of a 13-year-old daughter, suggested the technology could be useful in tracking behavior – making sure teens were interacting with people and not isolating themselves. Zhang loved the idea: "'Wow, I thought, this technology can affect real lives,"' Zhang recalls.

Zhang approached Chu about collaborating on a suite of mobile clinical tools that could identify and track behavioral risk factors in adolescents.

Chu was intrigued, and together, starting in 2011, the researchers began building the apps.

Preliminary testing has found the electronic diary helpful in distinguishing anxious or depressed teens from those who cope in healthy ways, and the researchers hope to expand the study. The mobile sensing devices are currently being evaluated in teens for the first time.

More information: "Crowd++: Unsupervised Speaker Count with Smartphones." www.cs.dartmouth.edu/~campbell/crowd.pdf

Provided by Rutgers University