WiFi 'napping' doubles phone battery life

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This is Justin Manweiler from Duke University. Credit: Justin Manweiler

A Duke University graduate student has found a way to double the battery life of mobile devices – such as smartphones or laptop computers – by making changes to WiFi technology.

WiFi is a popular wireless technology that helps users download information from the Internet. Such downloads, including pictures, music and video streaming, can be a major drain of battery.

The energy drain is especially severe in the presence of other WiFi devices in the neighborhood. In such cases, each device has to "stay awake" before it gets its turn to download a small piece of the desired information. This means that the battery drainage in downloading a

movie in Manhattan is far higher than downloading the same movie in a farmhouse in the Midwest, the researchers said.

The Duke-developed software eliminates this problem by allowing mobile devices to sleep while a neighboring device is downloading information. This not only saves energy for the sleeping device, but also for competing devices as well.

The new system has been termed SleepWell by Justin Manweiler, a graduate student in computer science under the direction of Romit Roy Choudhury, assistant professor of electrical and computer engineering at Duke's Pratt School of Engineering. The SleepWell system was presented at the ninth Association for Computing Machinery's International Conference on Mobile Systems, Applications and Services (MobiSys), being held in Washington, D.C.

Manweiler described the system by analogy: "Big cities face heavy rush hours as workers come and leave their jobs at similar times. If work schedules were more flexible, different companies could stagger their office hours to reduce the rush. With less of a rush, there would be more free time for all, and yet, the total number of working hours would remain the same."

"The same is true of mobile devices trying to access the Internet at the same time," Manweiler said. "The SleepWell-enabled WiFi access points can stagger their activity cycles to minimally overlap with others, ultimately resulting in promising energy gains with negligible loss of performance."

With cloud computing on the horizon, mobile devices will need to access the Internet more frequently -- however, such frequent access could be severely constrained by the energy toll that WiFi takes on the device's battery life, according to Roy Choudhury.

"Energy is certainly a key problem for the future of mobile devices, such as iPhones, iPads and Android smartphones," Roy Choudhury said. "The SleepWell system can certainly be an important upgrade to WiFi technology, especially in the light of increasing WiFi density."

Manweiler said that "the testing we conducted across a number of device types and situations gives us confidence that SleepWell is a viable approach for the near future."

Provided by Duke University