

Experimental phone network uses virtual sticky notes

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The rapid convergence of social networks, mobile phones and global positioning technology has given Duke University engineers the ability to create something they call "virtual sticky notes," site-specific messages that people can leave for others to pick up on their mobile phones.

"Every mobile phone can act as a telescope lens providing real-time information about its environment to any of the 3 billion mobile phones worldwide," said Romit Roy Choudhury, an assistant professor of electrical and computer engineering in Duke's Pratt School of Engineering.

A team led by Roy Choudhury has developed a new software system that enables users to obtain location-specific, real-time information – either passively or directly – from other mobile phone users across the world. It will be as if every participating mobile phone works together, allowing each individual to access information throughout that virtual network.

Interested in trying that new Mexican restaurant? Tap into the virtual sticky notes floating in the ether within the restaurant and find what other network users thought of it.

Heading to the airport and need to know where the traffic jams are? Sensors in the phones detect movement and can relay back to the network where traffic is the heaviest.

The potential of this new application, which has been dubbed micro-

blog, is practically limitless said Roy Choudhury.

"We can now think of mobile phones as a 'virtual lens' capable of focusing on the context surrounding it," Roy Choudhury said. "By combining the lenses from all the active phones in the world today, it may be feasible to build an internet-based 'virtual information telescope' that enables a high-resolution view of the world in real time."

The application combines the capabilities of distributed networks (like Wikipedia), social networks (Facebook), mobile phones, computer networks and geographic positioning capabilities, such as GPS or WiFi.

"Micro-blogs will provide unprecedented levels and amounts of information literally at your fingertips no matter where you are, through your mobile phone," Roy Choudhury said. "We have already deployed a prototype, and while some challenges remain to be addressed, the feedback we've received so far indicates that micro-blog represents a promising new model for mobile social communication."

Roy Choudhury presented the details of the micro-blog application at the MobiSYS 2008 6th International Conference on Mobile Systems, Applications and Services in Breckenridge, Colo.

Mobile phones are already more than just communications devices, Roy Choudhury points out. Increasingly they are coming equipped with cameras, GPS service, health monitors, and even accelerometers, devices which measure speed.

In simple terms, people who use the micro-blog application will enter information – photos, comments, videos – into their mobile phone, where it will be "tagged" by the user's location. Passive information, such as location or speed, can also be recorded. All this information is then sent to a central server, where it is available to all participants.

"So if you're planning a trip to the beach or a restaurant, you can query the micro-blog and get information or see images from people who have been or are currently there," Roy Choudhury said. Another application consists of individual, localized pockets of information.

"Say you are in a museum," Roy Choudhury said. "As you pass a particular painting, your phone could download comments from art experts providing relevant information about that painting."

The current prototype works with the Nokia N95 mobile phone, but Roy Choudhury said the application will eventually be written for any kind of programmable mobile phone. He also believes that these, and other as-yet-to-be imagined applications, will be commonplace within five years.

However, Roy Choudhury said there are three solvable issues that still need some work. The first is the trade-off between precise geographic location and battery power.

"GPS, while it can be accurate down to several meters, can also drain a mobile phone battery in seven hours," Roy Choudhury said. "On the other hand, WiFi and GSM technologies are widely available and don't use as much energy, but they aren't nearly as accurate. We believe that an approach blending these technologies will probably solve that problem." (GSM is an international cell phone standard that enables global roaming.)

Another issue is more societal than technological: What kinds of incentives would inspire users to enter information when queried by strangers, since that would involve their time and battery power.

Finally, location privacy needs to be addressed. Since mobile phones are transmitting data – including location – back to a central server, users must trust the administrator to keep this information private. Roy

Choudhury believes that these issues can be addressed by assigning different modes – private, social or public – much like social networks already do.

Source: Duke University

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