

Nathan Eagle's African Adventure

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What's a nice young American from the Massachusetts Institute of Technology doing in Nairobi, Kenya? Forum Nokia Champion Nathan Eagle is helping to spread the good word about mobile phones.

In the U.S., Eagle is a research scientist at the MIT Design Laboratory; he created Reality Mining, an initiative that is applying artificial-intelligence techniques to data collected from S60 devices; and he co-founded MetroSpark, a mobile matchmaking service. But since early in 2006, he has been conducting research for and working to establish a mobile-programming curriculum at the University of Nairobi.

Why Kenya? "If you're interested in mobile phones, now is a fantastic time to be in Kenya," Eagle says. "It really is just crazy what's going on now."

What's going on is that Kenya has become one of the world's fastest-growing markets for mobile devices. As of mid-2006, the number of mobile subscribers in Kenya had rocketed to nearly 6.5 million, from a mere 15,000 in 1999, according to the country's Communications Commission. Peter Waiganjo Wagacha, a University of Nairobi lecturer who is working with Eagle, explains: "You can get a really good phone here for about 2,000 Kenyan shillings [roughly \$28 USD], and most people use prepaid [service plans]. So even someone who survives on less than \$1 a day can buy a phone and communicate."

Because fixed-line telephones and PCs are relatively rare in Kenya, mobile phone usage there is also dramatically different from what developers in more-affluent countries are used to seeing. "I can pay for a taxi, buy milk, and transfer funds using my mobile phone," Eagle says. "The phone is basically a surrogate for the computer and the credit card. This one ubiquitous piece of technology can be repurposed for all sorts of interesting activities."

These dynamics have led Eagle to launch a program known as EPROM, short for Entrepreneurial Programming and Research on Mobiles. The Kenya-based program, administered by MIT and the University

of Nairobi, is sponsored by Nokia, which is supplying the project with approximately 70 S60 phones. EPROM's mission is to foster mobile technology education, research, and entrepreneurship in Kenya.

For education, Eagle and Wagacha are developing a course on mobile programming that they hope will attract business and computing students alike. For entrepreneurship, they are encouraging students to look for market opportunities, try out their ideas with local mobile operators, and explore possible sources of startup funding. And for research, Eagle is working with students to explore how Kenyans use their mobile phones. This effort is based on research he did in the U.S. as part of his Reality Mining project.

It Knows Where You Are

According to the Reality Mining Web site, the project “involves the collection of machine-sensed environmental data pertaining to human social behavior.” Specifically, Eagle and his colleagues at MIT put an application on 100 Nokia-supplied phones that logged all voice calls and text messages from the phones, the users' locations, and — thanks to Bluetooth scanning — data on other mobile users who were physically near the users of the test phones. “[The application] knows where you are, it knows what time of day it is, and it knows who is in your social circle,” Eagle explains. “My thesis was that by building separate probabilistic models, you can start predicting human behavior. Given that the phone has been watching you for the last two months, can it predict when you're going to go to work, when you're going to lunch, and who you're going to have lunch with?”

To get answers, Eagle and his colleagues collected Reality Mining data over the nine months of the 2004–05 academic term. The result: roughly 500,000 hours of data on continuous human behavior. “It's the largest data set of its kind,” Eagle says. Next, Eagle will use the Reality Mining data as the basis of an academic paper that, he says, will show how the team's models identified friendships with 95 percent accuracy.

Eagle has also worked in the business world, co-founding MetroSpark in 2004. The New York-based company, which offers mobile matchmaking services, uses data from Serendipity, a research project on which Eagle had worked on previously. MetroSpark uses Bluetooth and general packet radio service (GPRS) technologies to let mobile users meet other people who are nearby and who have similar interests. “Like [the online community] LinkedIn or Friendster, we use profiles with information about you and about people you want to meet,” Eagle explains. “We're trying to get that off the desktop computer and into real life — bars, airports, cafes. That way, people can use that type of information in social settings, rather than in front of a computer in the office.”

Other aspects of Eagle's busy life are publishing and speaking. He has published academic papers such as “Human Dynamic: Computation for Organizations” and “Mobile Matchmaking: Proximity Sensing and Cuing,” and he has written articles for nonacademic publications, including *Wired*, *The New York Times*, *New Scientist*, and *The Times* of London. A speaker on technology at conferences and other events, in the past year he has given talks on topics including word-of-mouth marketing and mobile services in places such as Spain and Ethiopia.

What's next? Eagle is working to expand the EPROM initiative to other universities across Africa and on academic publications that focus on large-scale network dynamics. And, he says, “I'm having an absolute ball.”

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