Mobile Programming Project Lifts Sub-Saharan Africa

The EPROM program in sub-Saharan Africa teaches computer science students to create mobile phone applications targeted specifically for the African market.

The mobile phone may be a boon to sub-Saharan Africa in more ways than originally thought. Yes, it is leapfrog technology that brings connectivity to rural African areas without the need to string land lines, and yes, it brings the miracle of voice communications to millions, resulting in a phenomenal growth of mobile phone usage over the past five years in the region. But MIT Research Scientist and Forum Nokia Champion Dr. Nathan Eagle has seen well beyond that. He views mobile phones as the dominant computing platform on the continent and believes Nokia handsets will soon play a transformative role, enabling rural African peoples to earn micropayments from a worldwide base of business in exchange for their time and labour. With that goal in mind, for the past three years, Eagle has been living in East Africa, where he established both Entrepreneurial Programming and Research on Mobiles (EPROM), a university programme for teaching mobile programming in sub-Saharan Africa, and a commercial venture called txteagle that is designed to monetize the services and skills available in rural areas through the mobile phone. The skills monetized by txteagle include transcription and language translation skills available among the local populations.

'Not only can people earn small amounts of money using their phone, but they can even use their phone to buy milk, transfer funds, and pay for a taxi.'
—Dr. Nathan Eagle, Research Scientist, MIT

EPROM

'EPROM, which is largely funded by Nokia, empowers African computer science students with the skills they need to develop mobile phone applications for their own communities', says Eagle. 'It started at the University of Nairobi in Kenya, then expanded out to Makerere University in Uganda, GSTIT [Graduate School of Telecommunications and Information Technology] in Ethiopia, Kenyatta University in Kenya, and the Kigali Institute of Science and Technology in Rwanda. We currently have universities in 12 countries involved in the programme.'

As a measure of success of the programme, Eagle points to the thousands of students who have gone through the EPROM curriculum. 'If they come in with very basic skills, then we start them off with the Python classes. If they know something of Java™, then we can expose them to that', he says. 'The Java for mobile devices courses are essentially those that are taught by Nokia elsewhere.'

Many of Eagle's students are interested in transforming their academic projects into for-profit companies, but a variety of other projects are focused on more-philanthropic pursuits. 'One of the applications that was developed

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"There are 60 different languages spoken in Kenya, and txteagle users can earn money by acting as resources to various localization projects," says Dr. Nathan Eagle, Research Scientist, MIT and Forum Nokia Champion. His commentary can be viewed at http://blogs.forum.nokia.com/blog/nathan-eagles-forum-nokia-blog.

Looking ahead

As EPROM is taking hold in sub-Saharan Africa, Eagle is already looking to broaden it to other areas. "We have 12 African countries now involved in the EPROM program, my goal is to raise enough funding by the end of 2009 to expand the EPROM curriculum to over 20 countries," says Eagle. "By then it is also my hope that txteagle will be playing a major role in the lives of the rural poor across the developing world. "

in Python was a medical information application that allowed for the efficient collection of data on malaria', says Eagle. 'Malaria is a big problem in the area where I was staying in the village of Kilifi in Kenya, and in the surrounding areas. This application allowed medical field workers to collect the information on an S60 device and send it back to a centralized server for analysis.' Another application allows local fishermen to check the local fish market prices on their phones to determine where to bring the day's catch. The Kenya Agricultural Commodity Exchange also now provides crop growers with up-to-date commodity information via text messages. Since many popular mobile applications are server-side short message service (SMS) text messaging services, the EPROM project also conducts an SMS Boot Camp at a variety of East African universities. It is aimed at enabling the students to launch and market their own SMS services to the millions of mobile phone users in Kenya.

txteagle

Eagle also saw that mobile phones could be used as a tool to enable mobile phone subscribers to earn small amounts of money by completing simple tasks for companies who pay them in either airtime or M-PESA (mobile money). 'In Kenya, for example, there are many people who are fluent in English. There is also a $20 billion worldwide market for medical transcriptions in English. Much of that is now being done in India and in the Philippines. If we can tap just a fraction of a percent of that market using local people and mobile phones, it could have a phenomenal impact on the lives of millions of rural Kenyans.' To help the rural poor begin to monetize their idle time by completing simple tasks via the mobile phone, Eagle created txteagle. 'This is an artificial intelligence system that enables mobile phone subscribers in the developing world to earn small amounts of money by completing short SMS-based tasks,' says Eagle. 'It is deployed in Kenya through Safaricom and in the Dominican Republic via Viva. The phone can actually act as a credit card and bank in these areas. Not only can people earn small amounts of money using their phone, but they can even use their phone to buy milk, transfer funds, and pay for a taxi.'

'If we can tap just a fraction of a percent of the [transcription] market using local people and mobile phones, it could have a phenomenal impact on the lives of millions of rural Kenyans.'—Dr. Nathan Eagle

One way that people can earn money is through localization and translation services. 'There are 60 different languages spoken in Kenya, and txteagle users can earn money by acting as resources to various localization projects', says Eagle. 'For example, people receive a survey or questionnaire, and translate the words into their own languages. We keep issuing the same task to different people until we get enough of the same translated word responses to ensure a minimum 95 percent confidence interval that we have the correct translation of the word.'

Serendipity and Reality Mining

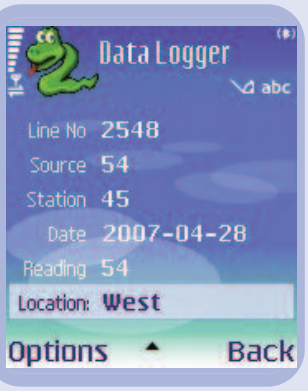
Eagle originally became known for his work launching the Reality Mining and Serendipity projects while he was still a doctoral candidate at the Media Lab of the Massachusetts Institute of Technology (MIT). Serendipity, an S60 application he designed and patented in 2004, initiates interactions between people who may not know each other, but perhaps should — because of a shared hobby or mutual interest. Relying on Bluetooth wireless technology, the application identifies other Serendipity users nearby. Should a user's system determine an introduction is in order, within about a minute, each person receives the other's name, a thumbnail photo, and an icebreaker about their mutual interests. Eagle's Ph.D. thesis on Reality Mining consisted of using the Context S60 application to quantify 100 subjects' behaviour over the course of nine months and designing machine learning algorithms to recognize behavioural patterns and infer what his subjects would be doing next. Last year this work was declared one of the '10 technologies most likely to change the way we live' by the MIT Technology Review magazine. Currently Eagle is working with data from a variety of mobile phone service providers to scale his algorithms to the behaviour of hundreds of millions of people from almost every continent on Earth.

Forum Nokia support

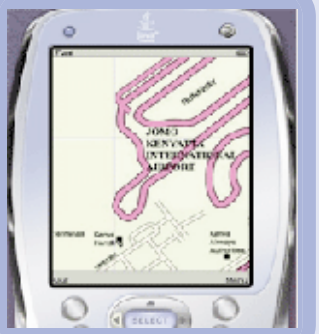
'Nokia has been instrumental in virtually every major research project of my career', says Eagle. 'EPROM received support from a wide range of people and departments within Nokia. Included in that was the technical help that we received from Forum Nokia experts and from the Nokia Research Center.'

For more information, go to:

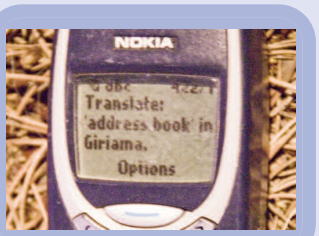
www.nokia.com/developer



By collecting the data through S60 devices and feeding it back to a server for analysis, medical researchers can get an up-to-date picture of where malaria is spreading and how it is being spread in the local areas.



Kenyans can now access street maps and points-of-interest data from their mobile devices through the EPROM server.



Through txteagle, local people can make money by translating words into their local languages, performing transcription by phone, and other services.