Mobile Phones in Africa: Education, Entrepreneurship, and Research

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http://eprom.mit.edu
Who Uses Mobile Phones?

- 41% Developed World
- 59% Developing World
Why Africa?

• Africa: fastest growing mobile phone market in the world.

• Underserved mobile software market.

• 10,000’s of computer scientists graduating every year…
EPROM: Entrepreneurial Programming and Research on Mobiles

- Education
- Research
- Entrepreneurship

http://eprom.mit.edu
EPROM: Education
Developing the Curriculum...

- Python for Rapid Prototyping
- SMS Bootcamp
- Mobile Phone Programming for Entrepreneurs
- Java: MIDP Development
- Mobile Web Apps
EPROM: Education
Expanding the Curriculum

• 10 countries:
  Mozambique, Kenya, Ethiopia, Uganda, Senegal, Ghana, South Africa, Tanzania, Rwanda, Nigeria

• Under the direction of 15 local computer science professors and lecturers
EPROM: Research

- mDSS - Mobile Medicine
- Sim-Based App Dev
- Realty Mining Africa
- SMS Bloodbank
- BoonaNet
EPROM: *Entrepreneurship*

*Mobile Application Development*

- SMS Gateway
- Air Time Regulator
- Stolen Car Alerts
- Business Directories
- Pre-Paid Electricity
- Weather Forecasts
- MoSoko (Craig’s List)
- Crush Lists...
Idle Times in Africa…

Kenya
- English Speaking
- >75% Literacy Rates
- 12M mobile phone subscribers

Yet almost half the country is unemployed.
There are over 1 billion literate, mobile phone subscribers in the developing world, many living on less than $5 a day.
Corporations are inundated with small tasks that need to be done.
Cellular Networks

How to increase ARPU?
How to monetize underutilized capacity?
The Opportunity

We can now enable these tasks to be distributed and completed via a mobile phone anywhere in the world.
Oct’08 Deployment

Kenya

The Dominican Republic
Citizen Journalism

Compensate subscribers for reporting news as it happens.
Rural Banking

Accumulate enough txteagle credit, and have a bank account opened in your name.
Village Phone Operators

Grameen VPOs have downtime too…

Multiple accounts can be set up for users of a single phone.
Beyond txt

The Voice Channel...

Targeted Radio Ads?

Market Research?
Network Data Mining: Behavioral Inference of Complex Social Networks in the Developing World
Network Data Mining

UK
- 1 month (Aug 05)
- 12B calls
- 250M unique numbers

Rwanda
- 3.5 years (2005 - present)
- 1M subscribers
- Course Tower Data

Coming soon:
- Kenya, Bolivia
External Connections

International Calls to and from Rwanda
Diffusion over the Network

- Computational Epidemiology
- "Pathogens" in Social Networks
- "Infecting" the Right People
- Quantifying Influence
Large-Scale Behavior

What is Driving Behavior of the Aggregate?
Diversity & Deprivation

Example Projects

Targeted Resource Allocation
Movement Dynamics
Housing Management
Economic Status vs. Calling Diversity
Importance of Triangles
Urban Planning
Reaction to Outlier Events
Financial Networks
Comparisons across continents…

Images from the SENSEable City Laboratory: http://senseable.mit.edu/
Get Involved.

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Got tasks?

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Thanks.
EPROM: Education

Python for Rapid Prototyping...

- Cross Platform
- Open Source
- Successful (Google, NASA, etc)
- Scripting Language
- Extending and embedding abilities
- Good standard library
- Reasonable memory footprint
- Access to full phone functionality…

import appuifw
appuifw.note(u’Hello World!’)

Image from: Michele Marchetti, “Python brings application ideas to life” NRC 2004
Cheap Phones

Decade-old Technology

Price of an unlocked GSM phone with sim-card and airtime in Nairobi: $15 (USD)
The Mechanical Turk

Artificial Artificial Intelligence

There are over 1 billion literate, mobile phone subscribers in the developing world, many living on less than $3 a day.
Deployment

txteagle prototypes:

Bolivia

Rwanda

Uganda

The Dominican Republic