Crowdsourcing beyond the desktop
Experiences and challenges

Vassilis Kostakos

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# Community Imaging

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<tr>
<th>Who</th>
<th>What</th>
<th>How</th>
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| Vassilis Kostakos  
Prof. Computer Engineering in Ubiquitous Computing  
vassilis@ee.oulu.fi  
www.ee.oulu.fi/~vassilis | Social networks and crowdsourcing  
Sensing urban mobility  
Public interactive displays  
Security and privacy | Instrumenting mobile platforms  
Real-time city-sensing  
Human subjects studies  
Large scale deployments |
Ongoing research

Usage

[Images of historical computing equipment, modern smartphones, and an aerial view of a city]
Our approach: the CITY is the system
panOulu WiFi
Bluetooth network
3D Oulu
Reconstructing movement
Where is it busy now?
Find visitors & visitor locations
Our approach: the CITY is the system

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<th>Output</th>
<th>Input</th>
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<th>Cognition</th>
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Input

- Bandwidth
- Cognition
- Human-Computer Interaction
- Mobility analysis
- Crowdsourcing
It is still early days
It is still early days
Synthesizing the big picture from multiple perspectives
Information Propagation on Twitter

Spread of news regarding earthquake outside Japan on July 10, 2011

(Internal structure of a 3766 node story from CrisisTracker Prototype)
Information Propagation on Twitter
Spread of news regarding earthquake outside Japan on July 10, 2011
(internal structure of a 3766 node story from CrisisTrackerPrototype)
Workers at Japan's Fukushima nuclear power plant evacuated after earthquake - Reuters
Twitter realtime analysis

http://ufn.virtues.fi/crisistracker

Algorithms & humans working together

But will they do it for anyone?
The task

- Generated artificial images of infected blood cells

- Task
  - Count blood cells
  - Count parasites in double-dotted ring form

- Cover story
  - Big commercial pharmaceutical
  - World Health Organization

Varying cover story

- Working for charity = generally more accurate
- No effect on completion speed
Difficulty threshold

- Beyond some difficulty threshold, people gave up
Varying payment

- More money = faster results
- Size of effect varies (with level of income?)
- Non-significant effects on accuracy
A better way to tap into altruism?
(for free)
The cover story matters
Public Displays vs. MTurk
Going mobile
AWARE
Android Mobile Context Instrumentation Framework

http://AwareFramework.com

AWARE Client
Android 2.3+ phone or tablet

AWARE Server
PHP + MySQL server
**AWARE Client**

**DEVELOPER MODE**

**Debug**
Turn debug of AWARE framework

**Logcat**
The tag on logcat assigned to AWARE framework

**DEVICE**

**Device ID**
Assign a device ID for uniquely identify it

**SENSORS**

**Accelerometer**
Capture accelerometer readings

**Applications**
Foreground and background applications

**Battery**
Battery events

**Bluetooth**

**AWARE Addons**

**Cloud UX**

**Mode Of Transportation**

**Pedometer**

**PolarHRM**

**Screen Orientation**

**Social**
New Apps

New plugin

Plugin Appstore

Store locally
Store remotely

Remote commands → Crowdsourcing

AWARE
Android Mobile Context Instrumentation Framework
Closing thoughts
Closing thoughts

• How can we improve the way humans and algorithms work together?
• What is the potential of public displays in terms of crowdsourcing?
• Crowdsourcing / crowdsensing: what can we do with 100 million instrumented smartphones?
• In general, will crowdsourcing beyond the desktop catch up?

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