



NervousNet@School

Participatory & collective social sensing

Dr. Evangelos Pournaras

Science is cool!

Build and use instruments, measurement devices!

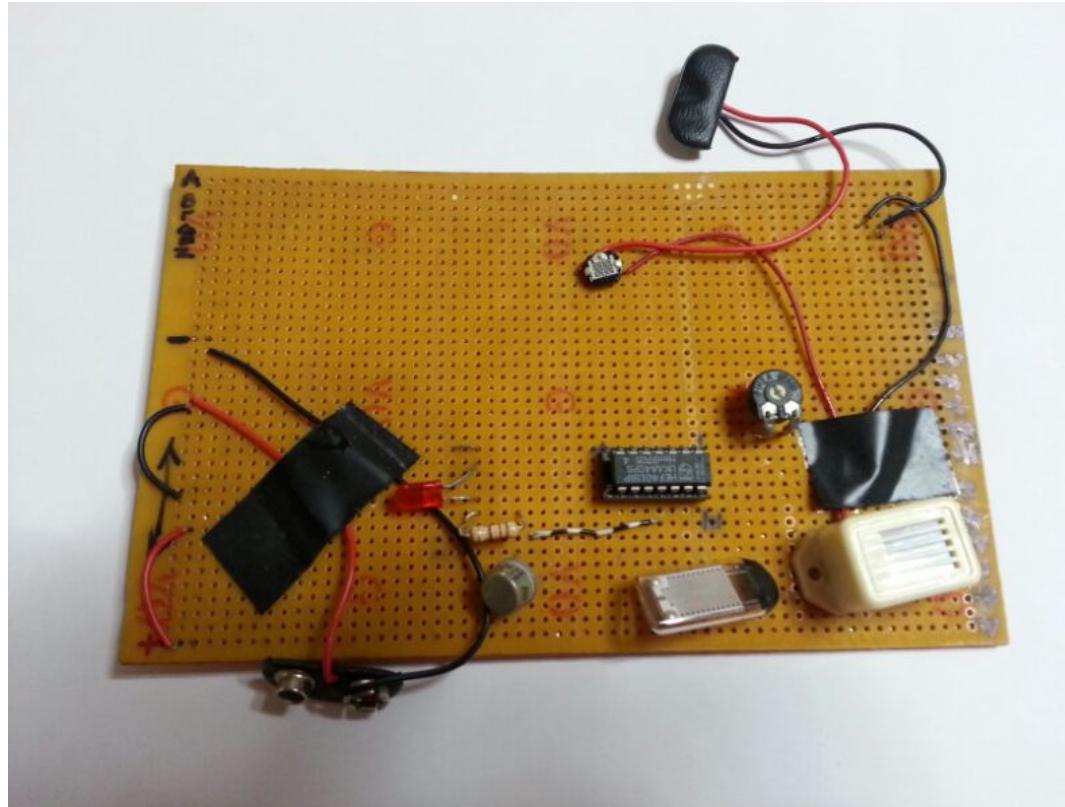


Exploring science at school (and beyond)



Information technology has brought a new era of instruments!

Exploring Science 16 years ago



Device: Light sensor
Application: Alarming system

Exploring Science Nowadays



It is all in your pocket!

Device: Mobile phone
Application: Social sensing

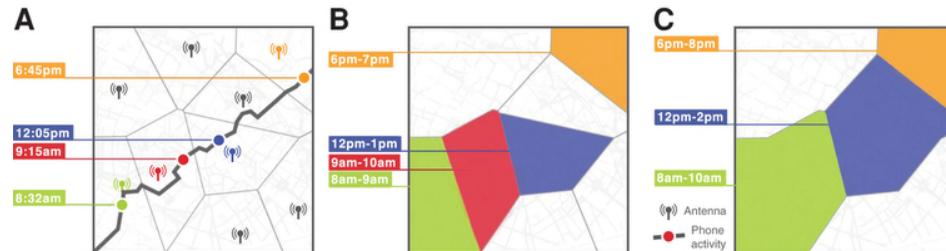
Applications of Social Sensing



Environmental noise monitoring



Mobility sensing



Platzhalter Logo/Schriftzug
(Anpassung im Folienmaster: Menü «Ansicht» → «Folienmaster»)

Earthquake detection



Centralized Social Sensing



segregation

Harvard Business Review

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HBR Blog Network

Big Data's Dangerous New Era of Discrimination
by Michael Schrage | 8:00 AM January 29, 2014

Comments (30)

Congratulations. You bought into Big Data and it's paying off Big Time. You slice, dice, parse and

privacy-intrusion

unscalable

Existing **social measurements** (Big Data)
threaten **social cohesion**



“surveillance has become increasingly privatized and commercialized”, Julie E. Cohen

First Degree Price Discrimination Using Big Data

Benjamin Reed Shiller, Economics Department, Brandeis University

unreliable
discrimination

ZDNet

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US Edition Internet of Things Mobility Research Windows Enterprise Software

ARE YOUR HR & FINANCE SYSTEMS BASED ON TECH OLDER THAN YOU ARE?

MUST READ [Hackers jump on the Shellshock Bash bandwagon](#)

Topic: [Big Data](#) Follow via:

Why big data evangelists should be sent to re-education camps

Summary: Big data is a dangerous, faith-based ideology. It's fuelled by hubris, it's ignorant of history, and it's trashing decades of progress in social justice.

By Stilgherrian for The Full Tilt | September 19, 2014 -- 07:13 GMT (00:13 PDT)

Follow @stilgherrian Get the ZDNet Big Data newsletter now

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The last time I wrote about big data, in July, I called it a big, distracting bubble. But it's worse than that. Big data is an ideology. A religion. One of its most important gospels is, of course, at Wired.

In 2008 Chris Anderson talked on a thin called The Datafuge

An Alternative Approach?

Open, transparent approach

Scalable & reliable

Participation of citizens

A Planetary Nervous System



A distributed participatory platform for social sensing



Open source development environment for evolving an application ecosystem!
Built by citizens for citizens as public good!

Functionality



nervousnet

Accelerometer	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Battery	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
BLEBeacon	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Connectivity	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Gyroscope	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Humidity	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Light	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Magnetic	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Noise	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Pressure	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Proximity	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share
Temperature	<input checked="" type="checkbox"/> Log	<input checked="" type="checkbox"/> Share

Developed for Android and iOS



Supporting several **physical** and **virtual** sensors

Two privacy control levels!

1. Local storage

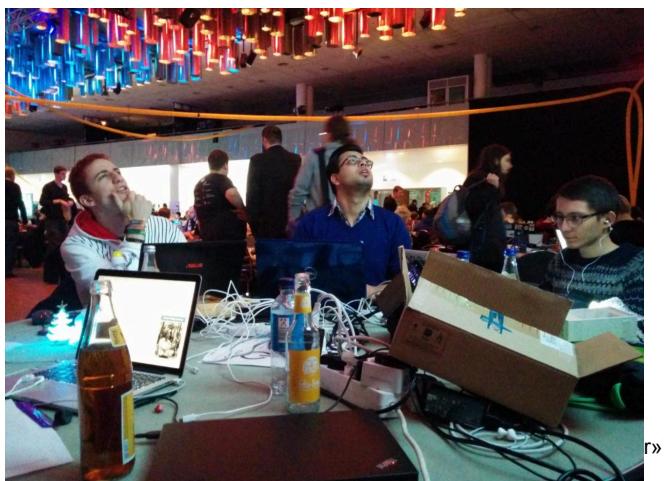
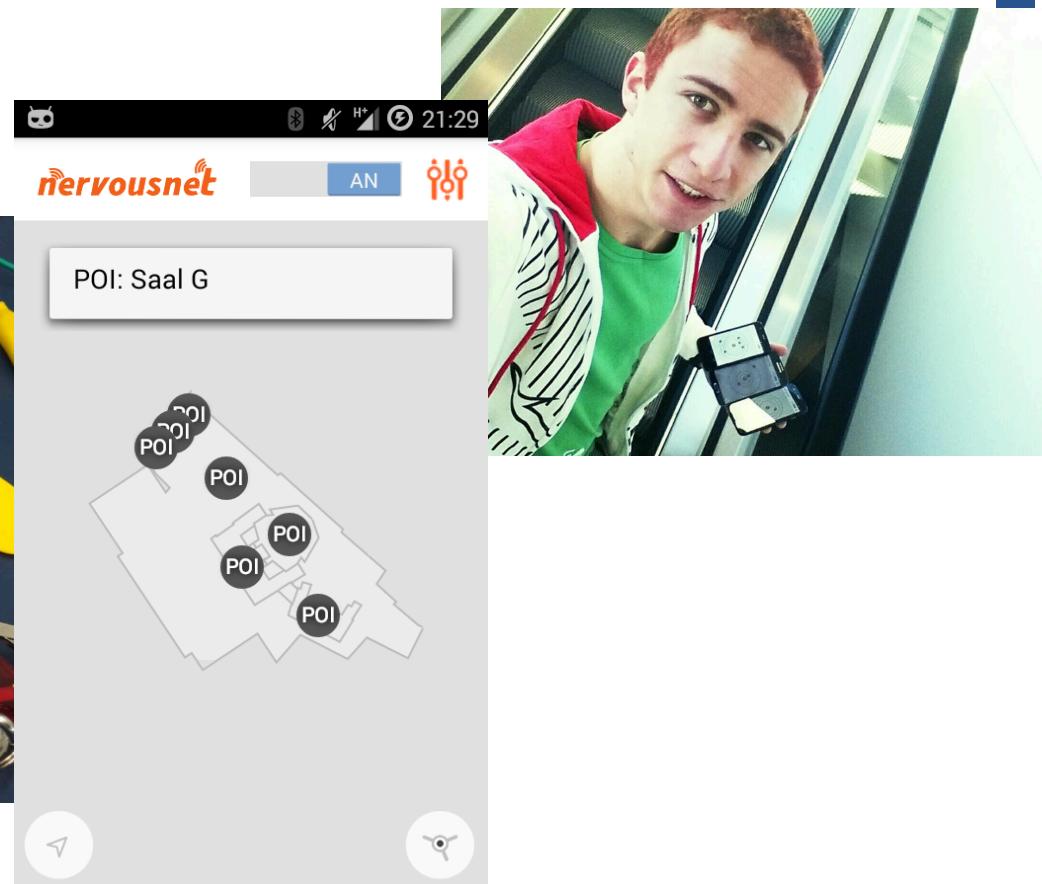
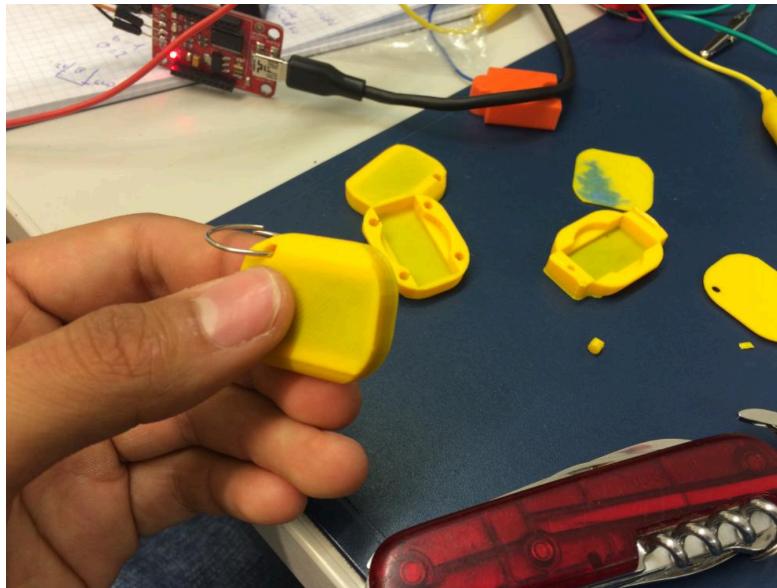
2. Sharing

Why to download the app?

Cool access to your sensor data – data-driven apps on top

Large-scale collective measurements among phones

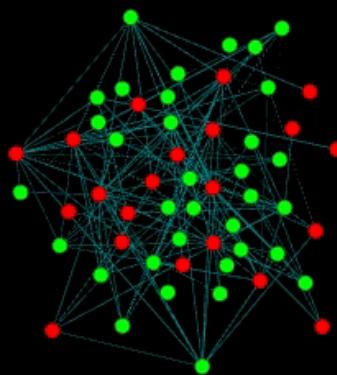
Demonstration



Privacy-preserving social networking and navigation

31c3 Chaos Communication Congress, Hamburg
27-30.12.14

Demonstration



The Grant Challenge

How to design such a complex sensing system to work in a decentralized way?

Fun Time!

Let's Play A Game!



Fun Time!

Centralized Big Data programmer

Vs.

Decentralized network programmer

Application: aggregation, e.g. calculate the average of distributed sensor values

Decentralized calculation: Summing two number and divide them by 2!

E.g. Person A: 5,
Person B: 2,
 $a=(5+2)/2=3.5$

Márk Jelasity, Alberto Montresor, and Ozalp Babaoglu. 2005. Gossip-based aggregation in large dynamic networks. *ACM Trans. Comput. Syst.* 23, 3 (August 2005), 219-252.
DOI=10.1145/1082469.1082470 <http://doi.acm.org/10.1145/1082469.1082470>

Message



Science is a kind of **heroism**. It needs **courage, persistence & discipline**.

Though it is a highly **rewarding, morally satisfactory & cool experience!**

Join our Vision!



<http://www.coss.ethz.ch>

<https://github.com/mosgap/nervous>

Questions?

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