

Social Fabric

Sune Lehmann

- Associate Professor, DTU Compute.
- Technical University of Denmark.

David Dreyer Lassen

- Professor, Department of Economics
- University of Copenhagen



Potential

Around 2010, we noticed a highly interesting technological development

Steve Mann's "wearable computer" and "reality mediator" inventions of the 1970s have evolved into what looks like ordinary eyeglasses



(a)
1980



(b)
Mid 1980s



(c)
Early 1990s



(d)
Mid 1990s



(e)
Late 1990s



(UCPH 2016 Funding)





05:00



Breadth

We were blown away by the potential

Actively working with scientists from:

- Anthropology
- Applied Math
- Economics
- Computer Science
- Physics (Complex Systems)
- Philosophy (Ethics)
- Psychology (Personality)
- Public Health (Epidemiology, Social Contagion)
- Sociology

And interest from many more

Results

We have too many findings to share here, but ...

Result 1: Education & Teaching

SCIENTIFIC
REPORTS



OPEN

SUBJECT AREAS:

APPLIED PHYSICS
COMPUTATIONAL SCIENCE
APPLIED MATHEMATICS

Received
28 March 2014

Accepted
14 May 2014

Published
20 June 2014

Correspondence and
requests for materials
should be addressed to

The Strength of the Strongest Ties in Collaborative Problem Solving

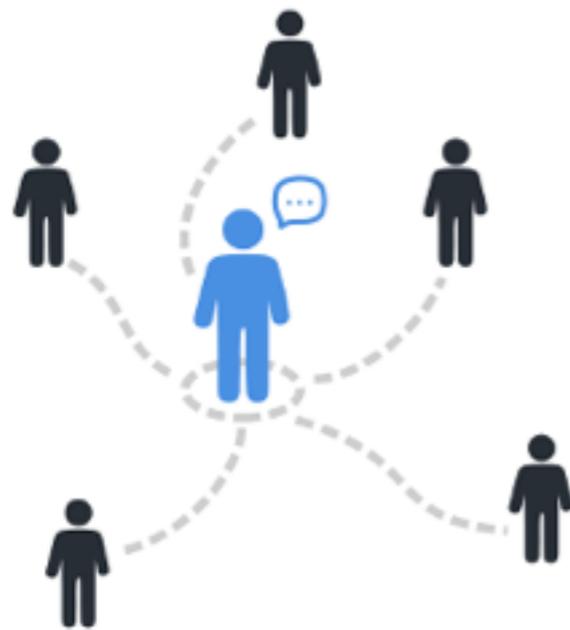
Yves-Alexandre de Montjoye¹, Arkadiusz Stopczynski^{1,2}, Erez Shmueli¹, Alex Pentland¹ & Sune Lehmann^{2,3}

¹Media Lab, Massachusetts Institute of Technology, ²Department of Applied Mathematics and Computer Science, Technical University of Denmark, ³Niels Bohr Institute, University of Copenhagen.

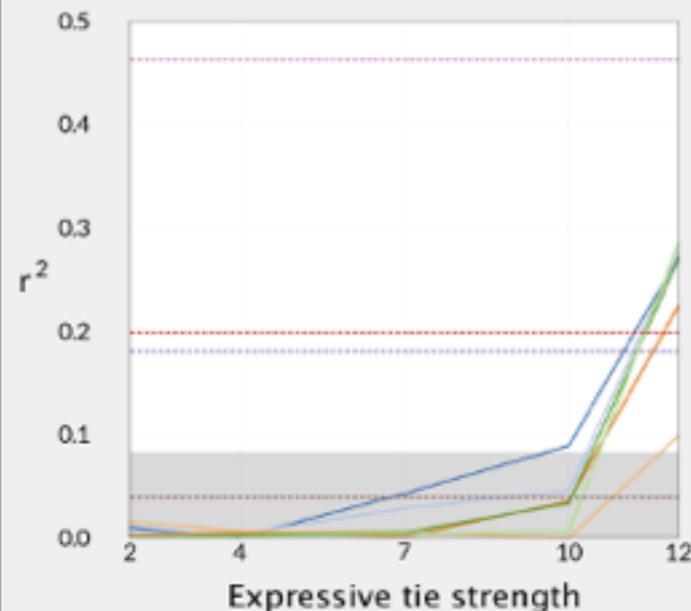
Complex problem solving in science, engineering, and business has become a highly collaborative endeavor. Teams of scientists or engineers collaborate on projects using their social networks to gather new ideas and feedback. Here we bridge the literature on team performance and information networks by studying teams' problem solving abilities as a function of both their within-team networks and their members' extended networks. We show that, while an assigned team's performance is strongly correlated with its networks of expressive and instrumental ties, only the strongest ties in both networks have an effect on performance. Both networks of strong ties explain more of the variance than other factors, such as measured or self-evaluated technical competencies, or the personalities of the team members. In fact, the inclusion of the network of strong ties renders these factors non-significant in the statistical analysis. Our results have consequences for the organization of teams of scientists, engineers, and other knowledge workers tackling today's most complex problems.

Why networking doesn't work?

Yves-Alexandre de Montjoye, Arkadiusz Stopczynski, Erez Shmueli, Alex "Sandy" Pentland, and Sune Lehmann



“**Networking**,” creating social ties in the workplace, generally increases **performance**. It is common career advice for executives, entrepreneurs, and academics. More companies are investing in common spaces and team building events to support networking.



But networking doesn't seem to improve **performance in competitive environments**. Our experiment at a large western university showed that when faced with a complex problem, the **weak ties of team members did not have any effect** on their performance. Frequency of interactions with the people we'd consider to be acquaintances, and even with those we'd would consider friends, did not help your performance.

Result 2: Overlapping data channels

RESEARCH ARTICLE

Tracking Human Mobility Using WiFi Signals

Piotr Sapiezynski^{1*}, Arkadiusz Stopczynski^{1,2}, Radu Gatej³, Sune Lehmann^{1,4}

1 Department of Applied Mathematics and Computer Science, Technical University of Denmark, Kongens Lyngby, Denmark, **2** Media Lab, Massachusetts Institute of Technology, Cambridge, MA, United States of America, **3** Department of Economics, University of Copenhagen, Copenhagen, Denmark, **4** Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark

* pisa@dtu.dk



CrossMark
click for updates

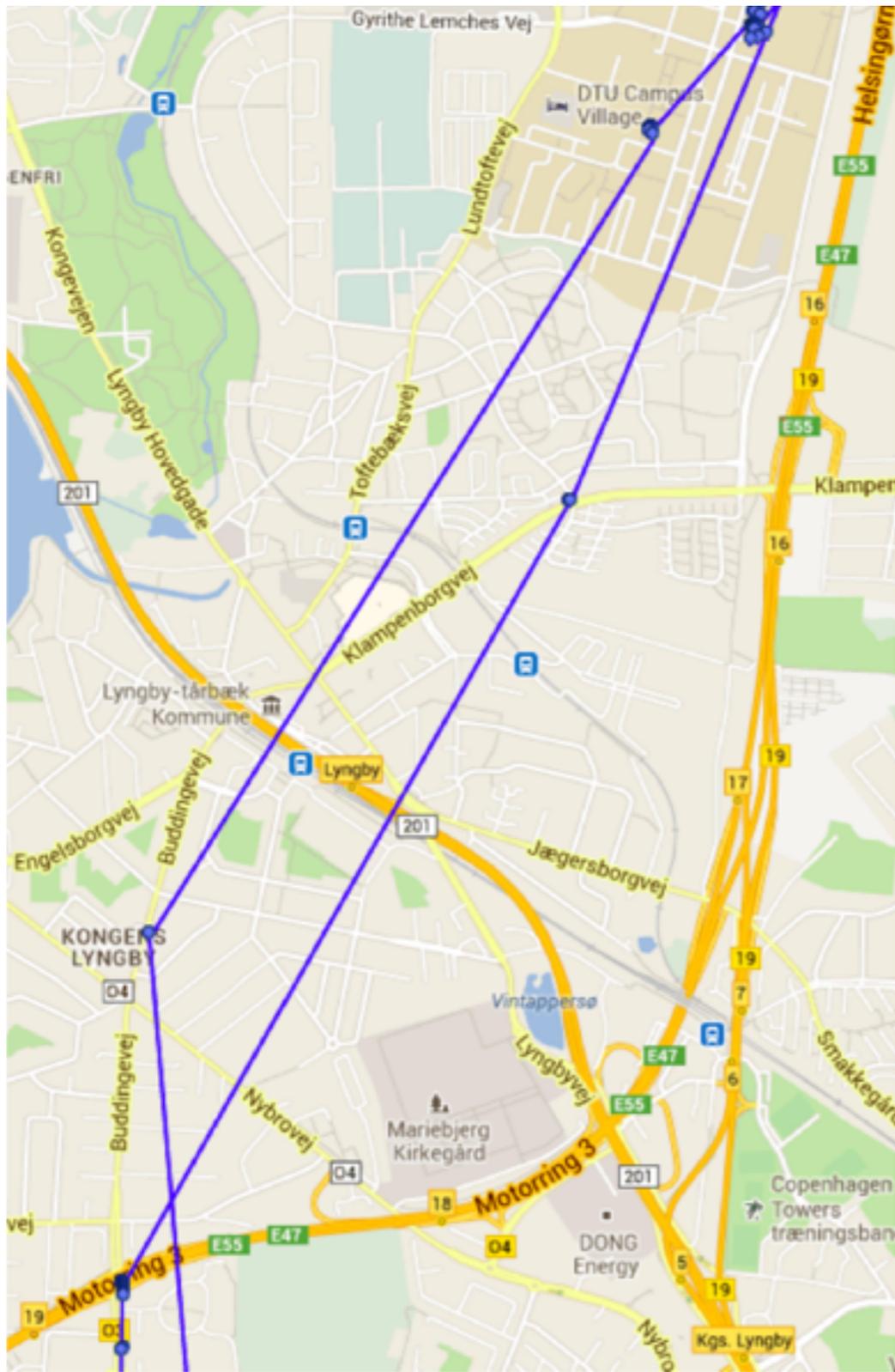
Abstract

We study six months of human mobility data, including WiFi and GPS traces recorded with high temporal resolution, and find that time series of WiFi scans contain a strong latent location signal. In fact, due to inherent stability and low entropy of human mobility, it is possible to assign location to WiFi access points based on a very small number of GPS samples and then use these access points as location beacons. Using just one GPS observation per day per person allows us to estimate the location of, and subsequently use, WiFi access points to account for 80% of mobility across a population. These results reveal a great opportunity for using ubiquitous WiFi routers for high-resolution outdoor positioning, but also significant privacy implications of such side-channel location tracking.

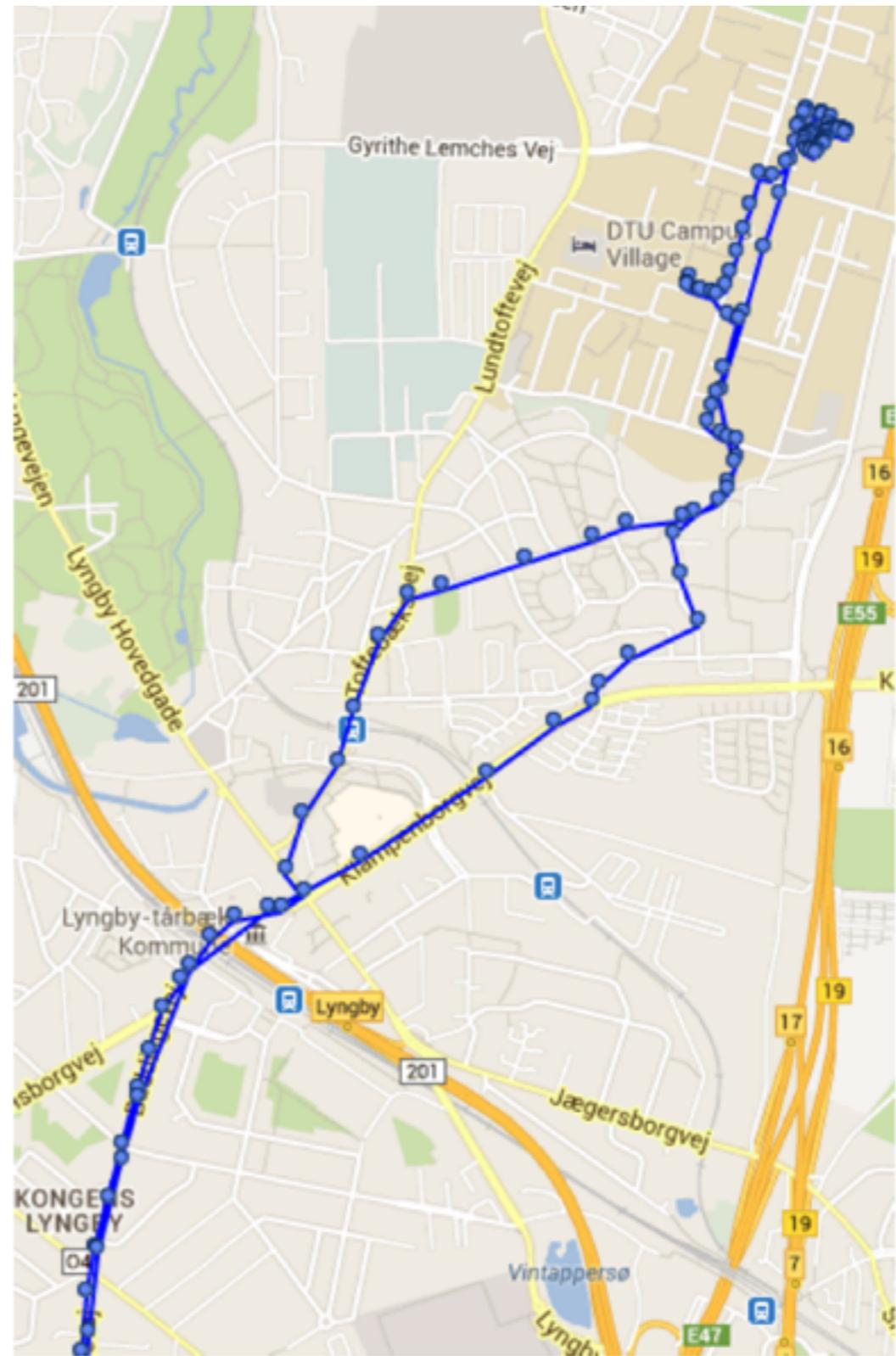
 OPEN ACCESS

Citation: Sapiezynski P, Stopczynski A, Gatej R, Lehmann S (2015) Tracking Human Mobility Using WiFi Signals. PLoS ONE 10(7): e0130824. doi:10.1371/journal.pone.0130824

Academic Editor: Ye Wu, Beijing University of Posts



(a)



(b)

From *The Atlantic*

CITYLAB

NAVIGATOR

CITYFIXER

MAPS

PHOTOS

COMMUTE

WORK

HOUSING

WEATHER

Apps Don't Need GPS Data to Know Where You Are

We're creatures of habit. And for some third-party apps, that means we're easy to find.

LAURA BLISS | [@mslaurabliss](#) | Jul 9, 2015 | 2 Comments

306
Shares

[Share on Facebook](#)

[Tweet](#)

[in](#)

[Email](#)

[Print](#)



Privacy

This type of research (and its applications) must be developed in a sustainable way

Data sharing: What's in it for me?

Public sector: The law - and trust

Google: email, services

Social Fabric: A phone,
Quantified Self info, helping
research - and control over
own data



Data sharing: What's in it for me?



Public sector: The law - and trust

Google: email, services

Social Fabric: A phone, Quantified Self info, helping research - and control over own data

More generally: standard public goods problem

'Researcher protection' / forskerbeskyttelsesordning
early warning sign

Scandals don't help



Who watches
the watchmen?

Who studies the
data scientists?

Social Fabric:
Embedded study of
researchers' use
and handling of data

social data science

@ UCPH

scraping, analyzing, visualizing
big data

AND ethics, privacy

combines social and data science

100+ students

The Future

Sustainable
computational governance
(SUSTAINGov)

SUSTAINGOV

Harness information flows from citizens to municipal government via smartphones

Based on what citizens *do*

Democratic: everyone (with a smartphone) counted

Practical: low cost, fast response

Comprehensive: many channels at once

SUSTAINABLE

Explicit strategy for personal info

not all data needs to be at person level

behavioral designs for participation

private sector knowledge for public sector solutions

Randomized trials

living labs to learn about trade-offs and trust

COMPUTATIONAL

Digital nervous system

Aggregate personal info from citizens' smart phones
in real time - combine with other data sources

service utilization, safety, health, education, ...

Available for citizens and firms

GOVERNANCE

From passive e-government to active e-governance and e-citizenship

Inclusive - high internet/smartphone penetration

Participatory government - data donations

Improved accountability - are problems handled?

Partners

UCPH/DTU/MIT

SiteCore / KL.7 / You Technology

Frederiksberg / Lyngby

Thank you

sljo@dtu.dk

ddl@econ.ku.dk

<http://socialfabric.ku.dk>