Smart Cities - Location, The Citizen and New Data

Andrew Hudson-Smith
Director of The Centre for Advanced Spatial Analysis
University College London

Twitter - @digitalurban

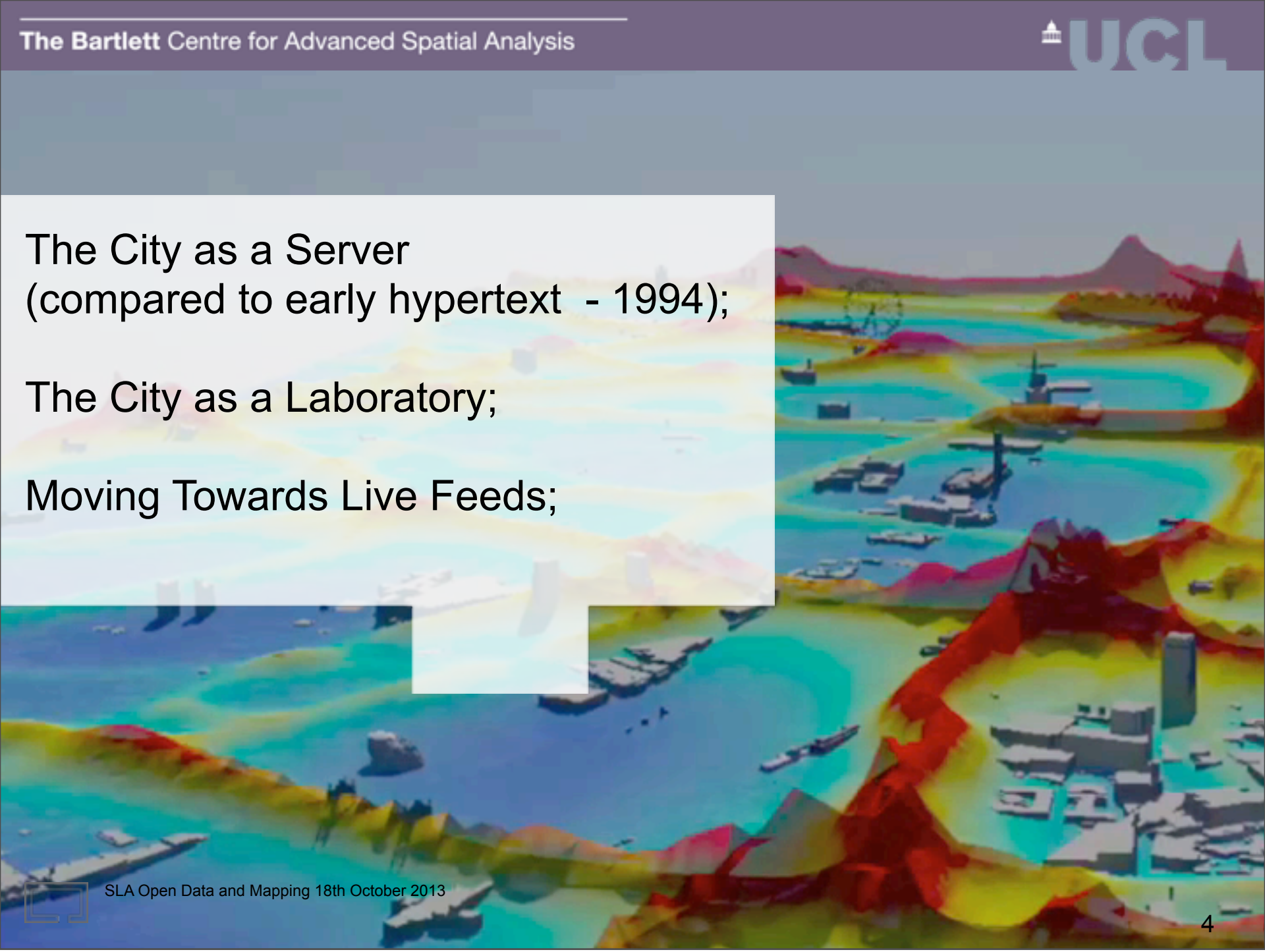
On the edge of a shift in our understanding the Built Environment;

Combined with a need for new methods in Visualization and Data Collection;

Moving Towards the Realtime City

Big Data

- 90 % of the data in the world created in the last two years alone;
- Data comes from ‘everywhere’ - sensors, mobile devices, government, the crowd to name a few;
- Increasingly geo-located;
- Smart homes, smart retail(?)



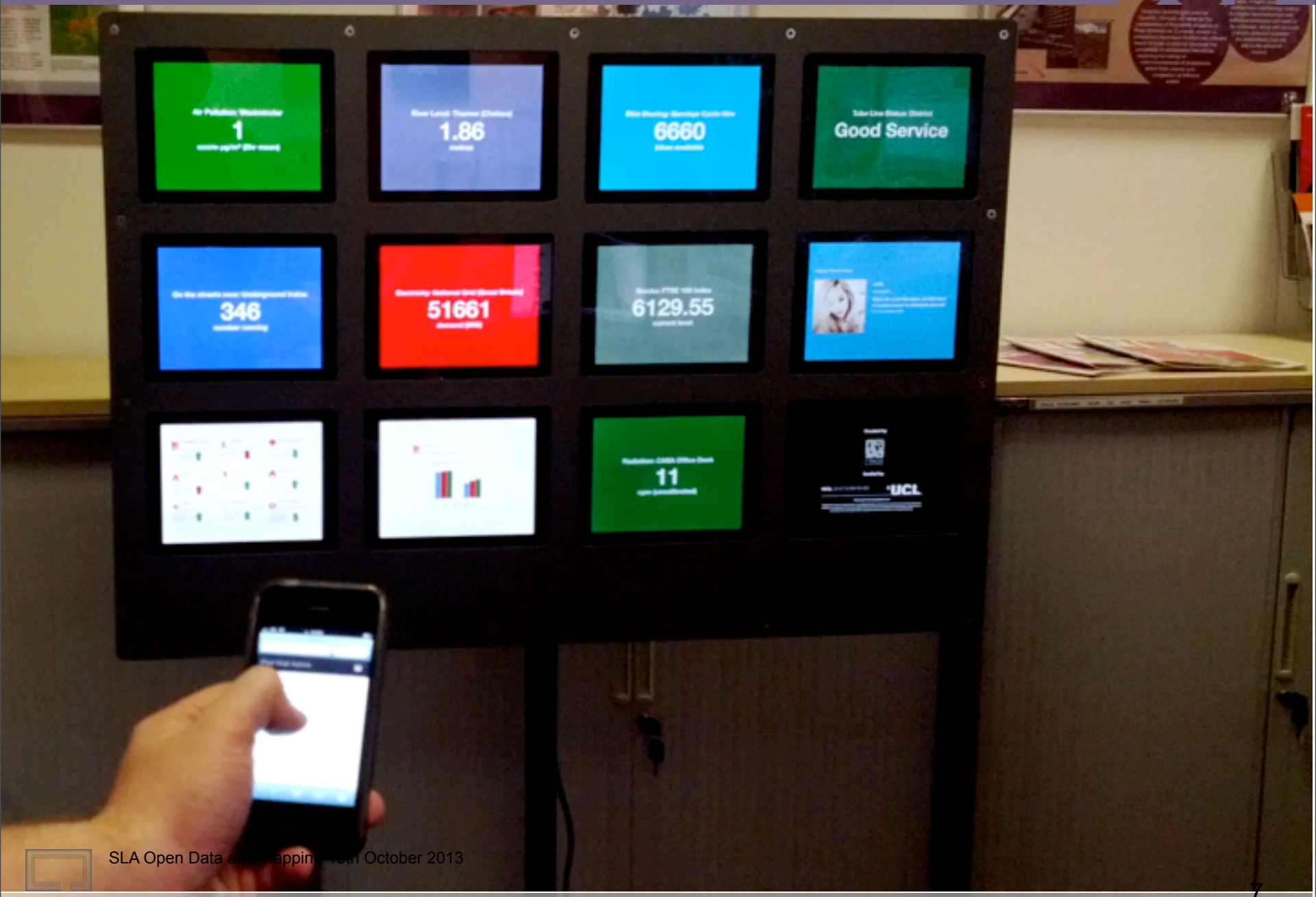
The City as a Server
(compared to early hypertext - 1994);

The City as a Laboratory;

Moving Towards Live Feeds;

citydashboard.org/london/
London
51.51 N, 0.13 W
17:16:20
Go to Map - Go to Grid - Change City
Weather Stations
Station
Wind Speed
Wind Gusts
Direction
Temperature
Humidity
Rain Today
Pressure
Forecast
CASA Office: Bloomsbury W1
2.3 mph
3 mph
22.2 °C
69%
0.0 mm
1014.6 mbar
Sunny
Hampstead NW3
0 mph
0 mph
21.0 °C
78%
0.0 mm
1015.0 mbar
Dry Clear
Ben Cook: Bow E2
Data unavailable
Weather (METAR)
London City Airport
Mix at 3 mph
22 C
Forecast (Google)
Wed
Thu
Fri
Sat
26 C
27 C
20 C
22 C
Tube Line Status (TfL)
Bakerloo Good Service
Central Good Service
Circle Minor Delays
District Good Service
H & C Good Service
Jubilee Good Service
Metropolitan Good Service
Northern Good Service
Piccadilly Good Service
Victoria Good Service
W & C Good Service
Overground Good Service
DLR Good Service
Bike Sharing (TfL)
1.1 %
Stations Full
5.6 %
Stations Empty
5624
Bikes Available
614
Bikes or Docks Faulty
Available Bikes (last 24h)
Air Pollution (Defra)
1 = Low 10 = V High
Ozone
NO2
SO2
PM2.5
PM10
Bloomsbury
Marylebone Rd
N Kensington
Mood (LSE Mappiness)
A tiny bit unhappier
than the long term average for here
Quite a bit unhappier
than the whole country right now
Rads (CASA)
CASA Office Desk
6
cpm (uncalibrated)
River Level (PLA)
Thames (Tower Pier)
4.39
metres
Stocks (Yahoo)
FTSE 100 Index
5523.92
Twitter Trends for London
Gareth Bale
#AskNasri
Princess Die
Tower Bridge
Nora Ephron
Heather Watson
Paxman
LIBOR
Twitter: London News and Events
Tom Edwards: RT @wnettleford: I'm now producing @BBCLondonNews transport stories during the Olympics with @BBCTomEdwards < #ff Be gentle with him
Twitter: London Universities
CityUniversityLondon: Our School of Engineering and Mathematical Sciences postgraduate open evening is tomorrow. http://t.co/UvzKLP7g
Random Traffic Cameras (TfL)
A1 Archway Road Bakers Lane
A4 Bath Rd A30 Great South West Rd (Henleys Roundabout)
BBC London News
60% of 2012 Olympics tickets sold Protests over bus driver bonus Concerns continue at health trust Boy seriously hurt in hit-and-run British extremists 'main threat' Councils turn to green waste fees
OpenStreetMap Updates
Tweet 553
About
UCL
NeISS
JISC

Good Service
366
7,104
5
6409.67
247,000
504,611
UCL ENTERPRISE
UCL

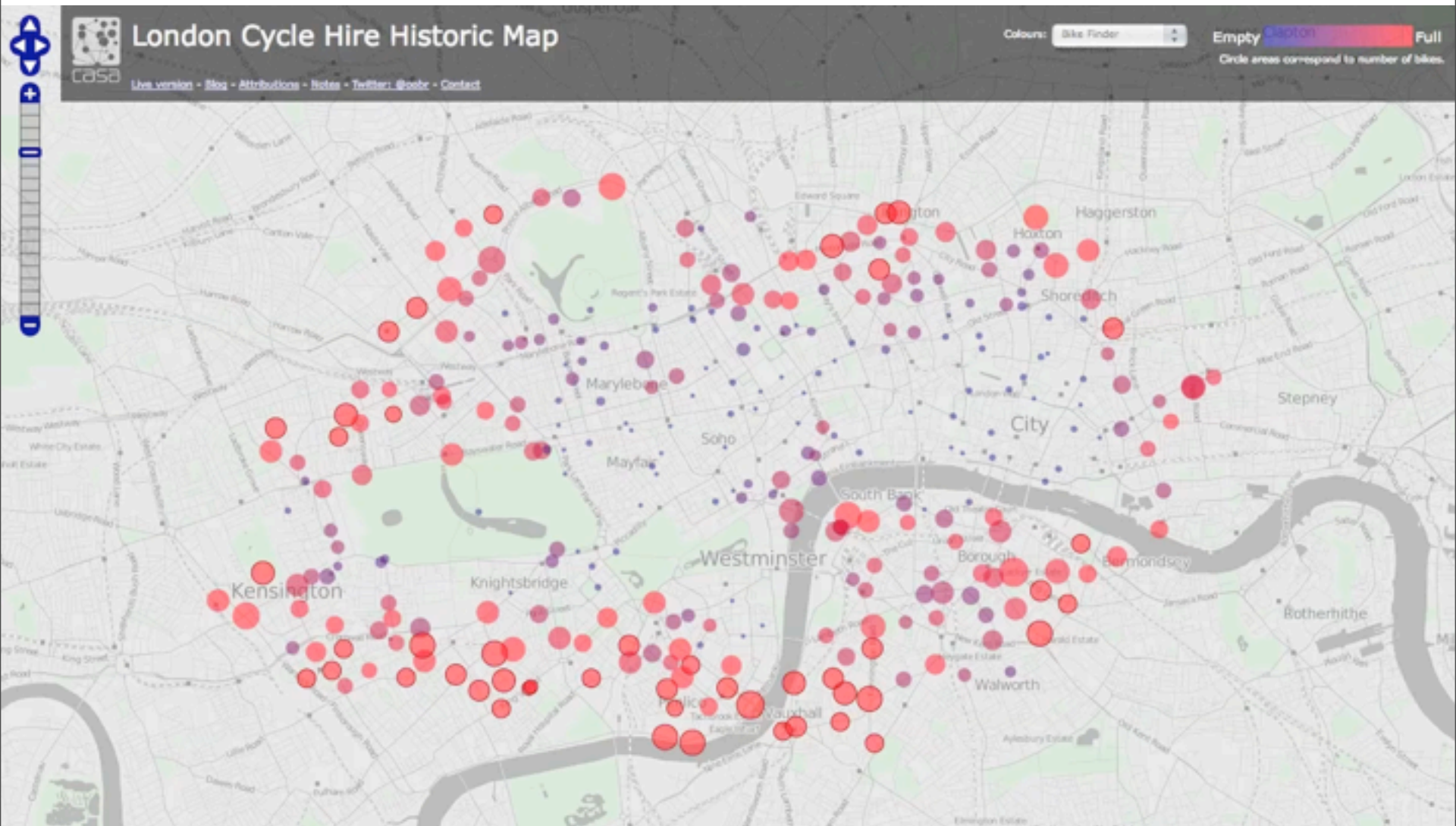

1
1.86
6660
Good Service
346
51661
6129.55
11
UCL

City Dashboard Now Archives -
over 1Billion Data Points;

Links into wider urban modelling;

Predicting the next 30 minutes of the city;

A new sciences of cities....


London Cycle Hire Historic Map
Live version - Blog - Attributions - Notes - Twitter: @oobr - Contact
Colours:
Bike Finder
Empty
Full
Circle areas correspond to number of bikes.
Haggerston
Hoxton
Shoreditch
Marylebone
Soho
Mayfair
City
Stepney
South Bank
Westminster
Borough
Bermondsey
Kensington
Knightsbridge
Rotherhithe
Walworth
Vauxhall

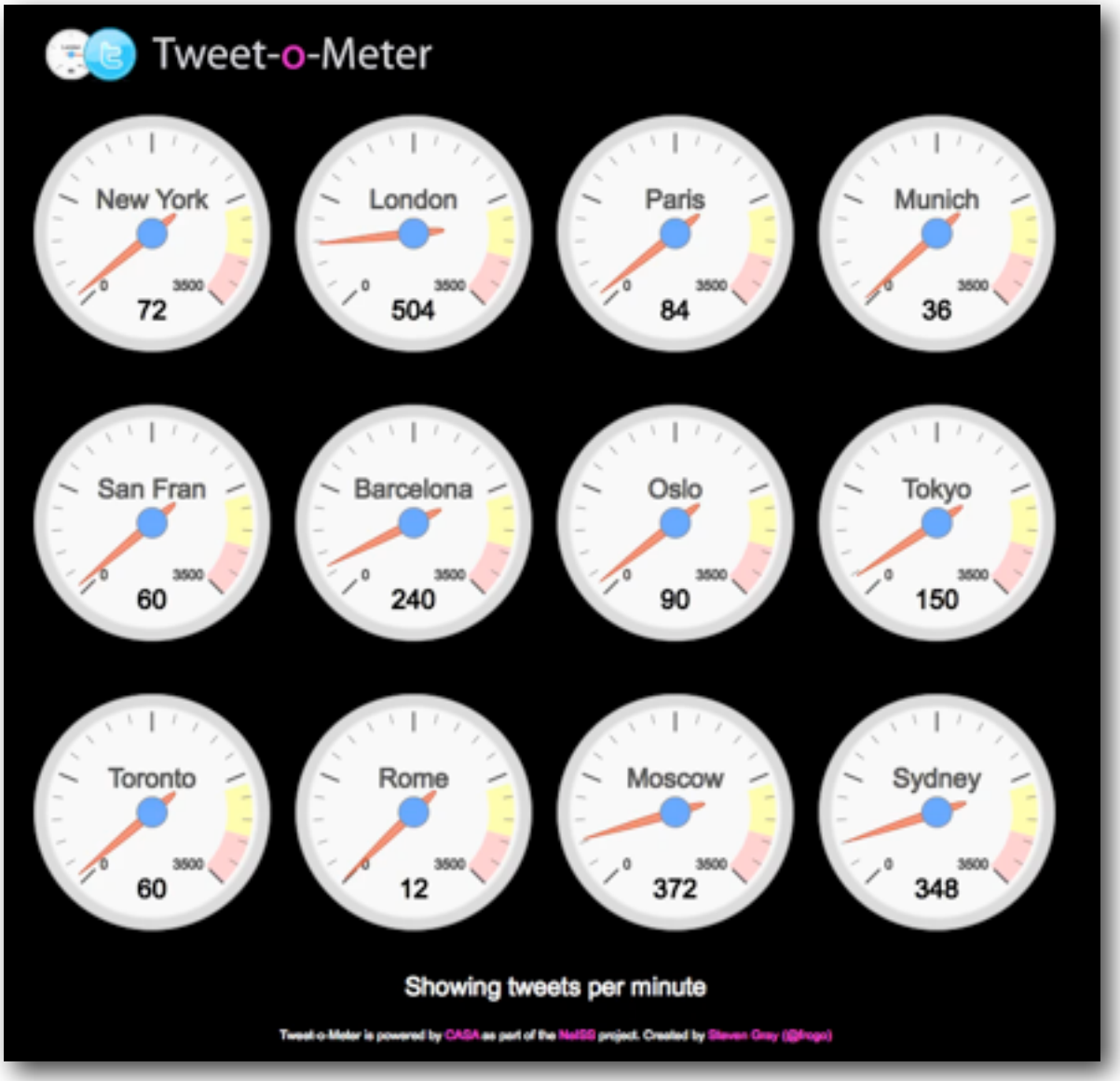
download.bigdatatoolkit.org

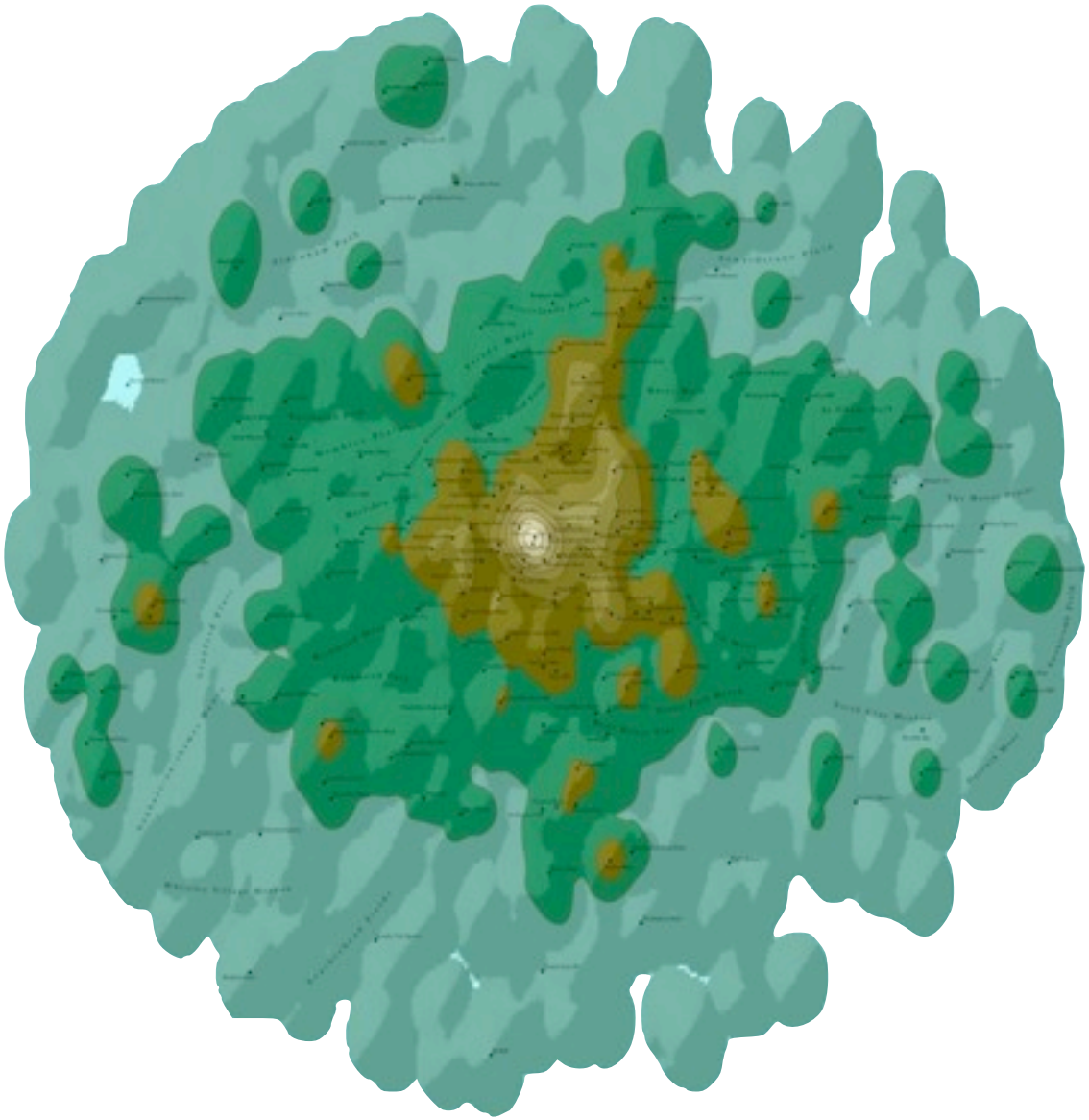
BigDataToolkit

Home Join the Beta Test Blog

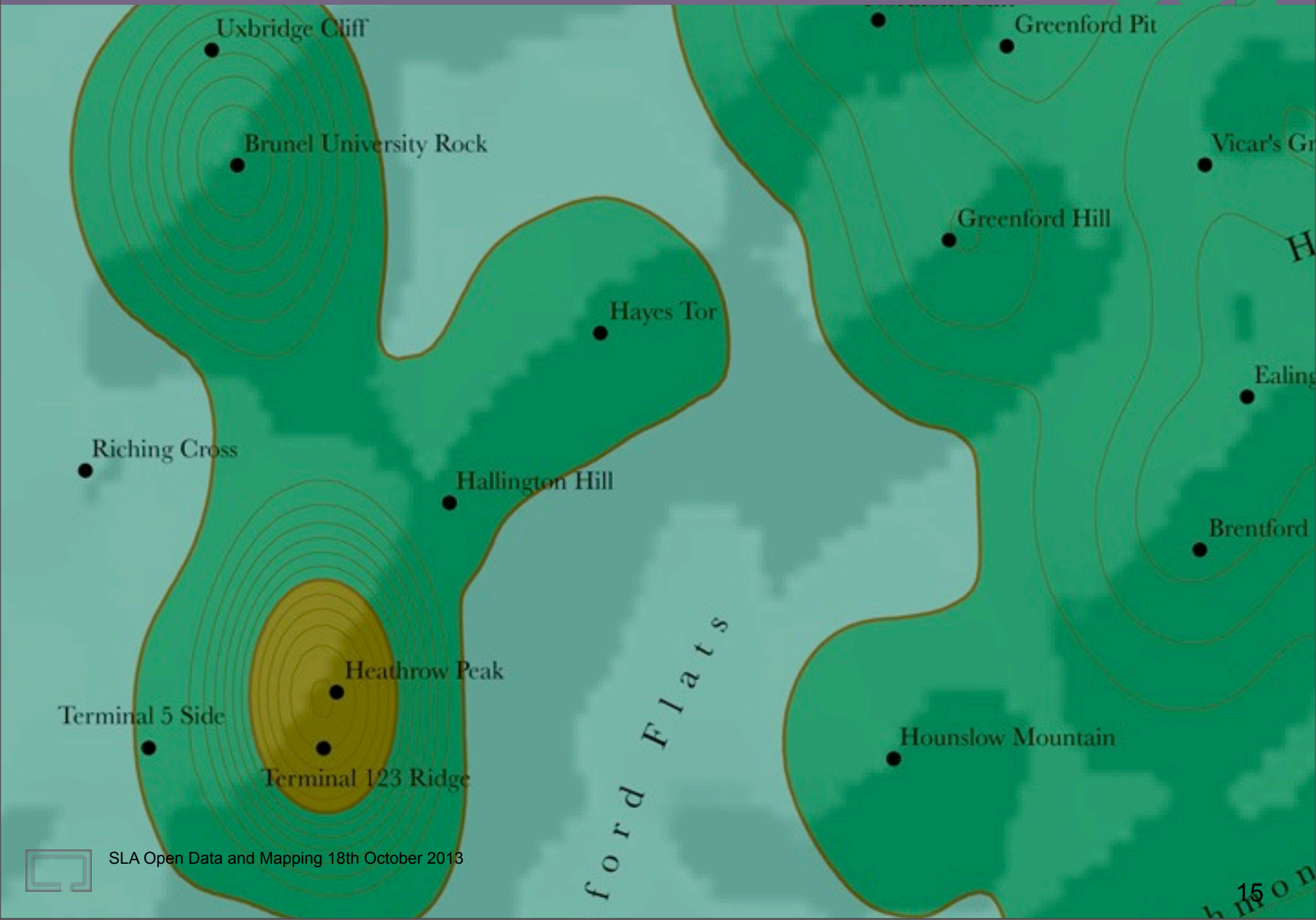
Collect Data from your own social networks

Download the beta version very soon.


Tweet-o-Meter
New York
72
London
504
Paris
84
Munich
36
San Fran
60
Barcelona
240
Oslo
90
Tokyo
150
Toronto
60
Rome
12
Moscow
372
Sydney
348
0
3500
Showing tweets per minute



Camden Town Ridge
s Wood Hill
ket Point
Regents Park Valley
Clerkenwell Ridge
Liverpool Street Hill
Royal Oak Plain
West End
Smithfield Moor
Soho Mountain
Gherkin
Hydepark Steep
Holborn-Strand Head
Picadilly Rock
rpentine Cliff
South Bank
Palace Field
Waterloo Hang
rt Side
Westminster Rock
Victoria Point
Elephant and
Victoria Valley
Fulham Point
Oval Point
Burges Park


Uxbridge Cliff
Brunel University Rock
Greenford Pit
Vicar's Gr
Greenford Hill
Hayes Tor
Ealing
Riching Cross
Hallington Hill
Brentford
Heathrow Peak
Terminal 5 Side
Terminal 123 Ridge
Hounslow Mountain
ford Flats

UCL

BIM

GIS

IoT

Modelling

Data

Software

Analysis

Design

Government

Local Authorities

Industry

Citizens

Internet of Things

In 5 Years Everything will have an IP;

Hyper-Local Data and Tagging;

Realtime, Geo located, Everywhere;

iBeacon, low powered geoaware Bluetooth arguably the next ‘big thing’ (as in next month)...

54.7
Withings

No SIM
12:30
Users
Andy HudsonSmith (AND)
Configuration
150.2
150
146.7
144.1
144.3
143.0
141.5
140.5
140
Objectives
Weight
25.0%
23.4 %
21.9 %
21.1 %
21.4 %
20.2 %
19.9 %
19.4 %
19.5%
Fat
September 2011
November
January 2012
March
May
Weight
Blood pressure
2nd curve: Fat

http://www.talesofthings.com

RememberMe

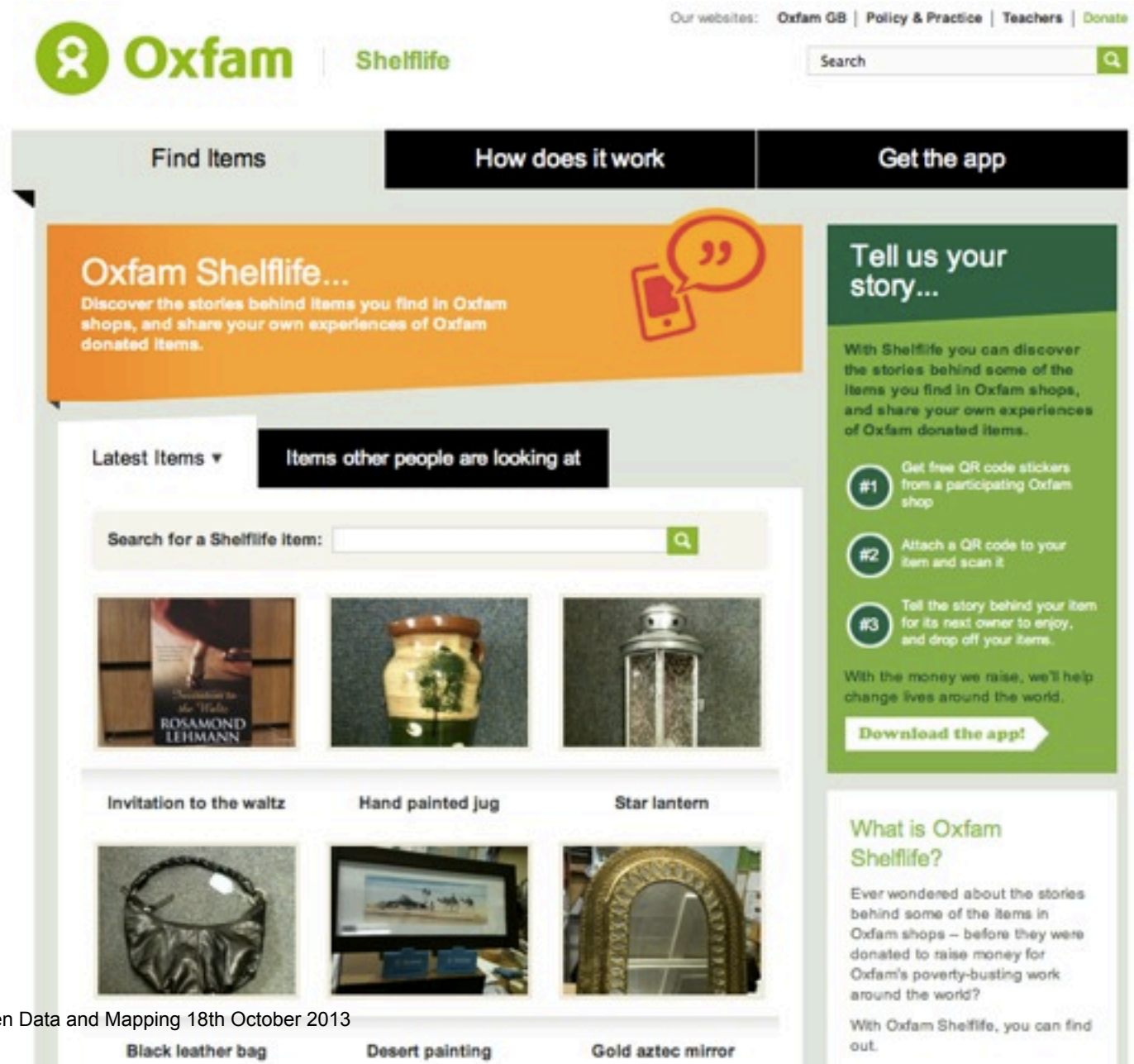
£95
Cashmere shawl
donated by Annie
Lennox

CURIOSITY
SHOP

fam

Oxfam

Our websites: Oxfam GB | Policy & Practice | Teachers | Donate
Oxfam
Shelflife
Search
Find Items
How does it work
Get the app
Get the Oxfam Shelflife app today
Discover the stories behind items in Oxfam shops, and share your own experiences of Oxfam donated items.
Start your story today...
With Oxfam's new app, Shelflife, you can discover the stories behind some of the items you find in Oxfam shops, and share your own experiences of Oxfam donated items.
#1 Get free QR code stickers from a participating Oxfam shop
#2 Attach a QR code to your item and scan it
#3 Tell the story behind your item for its next owner to enjoy, and drop off your items.
Available on the App Store
Download the iPhone app now
Oxfam Shelflife
Get started
Tap to scan


Our websites: Oxfam GB | Policy & Practice | Teachers | Donate
Oxfam
Shelflife
Search
Find Items
How does it work
Get the app
Oxfam Shelflife...
Discover the stories behind items you find in Oxfam shops, and share your own experiences of Oxfam donated items.
Tell us your story...
With Shelflife you can discover the stories behind some of the items you find in Oxfam shops, and share your own experiences of Oxfam donated items.
#1 Get free QR code stickers from a participating Oxfam shop
#2 Attach a QR code to your item and scan it
#3 Tell the story behind your item for its next owner to enjoy, and drop off your items.
With the money we raise, we'll help change lives around the world.
Download the app!
Latest Items
Items other people are looking at
Search for a Shelflife item:
Invitation to the waltz
Hand painted jug
Star lantern
Black leather bag
Desert painting
Gold aztec mirror
What is Oxfam Shelflife?
Ever wondered about the stories behind some of the items in Oxfam shops – before they were donated to raise money for Oxfam's poverty-busting work around the world?
With Oxfam Shelflife, you can find out.

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UCL
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New Forms of Data
Emotions in Buildings and Cities

mappiness, the happiness mapping app
http://www.mappiness.org.uk/
mappiness .org.uk
Available on the App Store
Home News Meters Maps More info
mappiness maps happiness across space in the UK
mappiness is a free app for your iPhone
It's part of a research project at the London School of Economics
We'd love to have you on board!
how does it work?
You get mappiness from the App Store, open it, and sign up
We beep you once (or more) a day to ask how you're feeling, and a few basic things to control for: who you're with, where you are, what you're doing (if you're outdoors, you can also take a photo)
The data gets sent back -- anonymously and securely -- to our data store, along with your approximate location from the iPhone's GPS, and a noise-level measure
mappiness
Thank you for taking part
20
87%
Immediate
My happiness
Info & help
How do you feel?
what's in it for you?
Interesting information about your own happiness, which is charted inside the app -- including when, where and with whom you're happiest
The warm glow of helping increase the sum of human knowledge
what's in it for us?
We're particularly interested in how people's happiness is affected by their local environment -- air pollution, noise, green spaces, and so on -- which the data from mappiness will be absolutely great for investigating
We hope to have results published in academic journals and elsewhere -- whatever we produce will be linked from here
get the app
tell me more
feedback

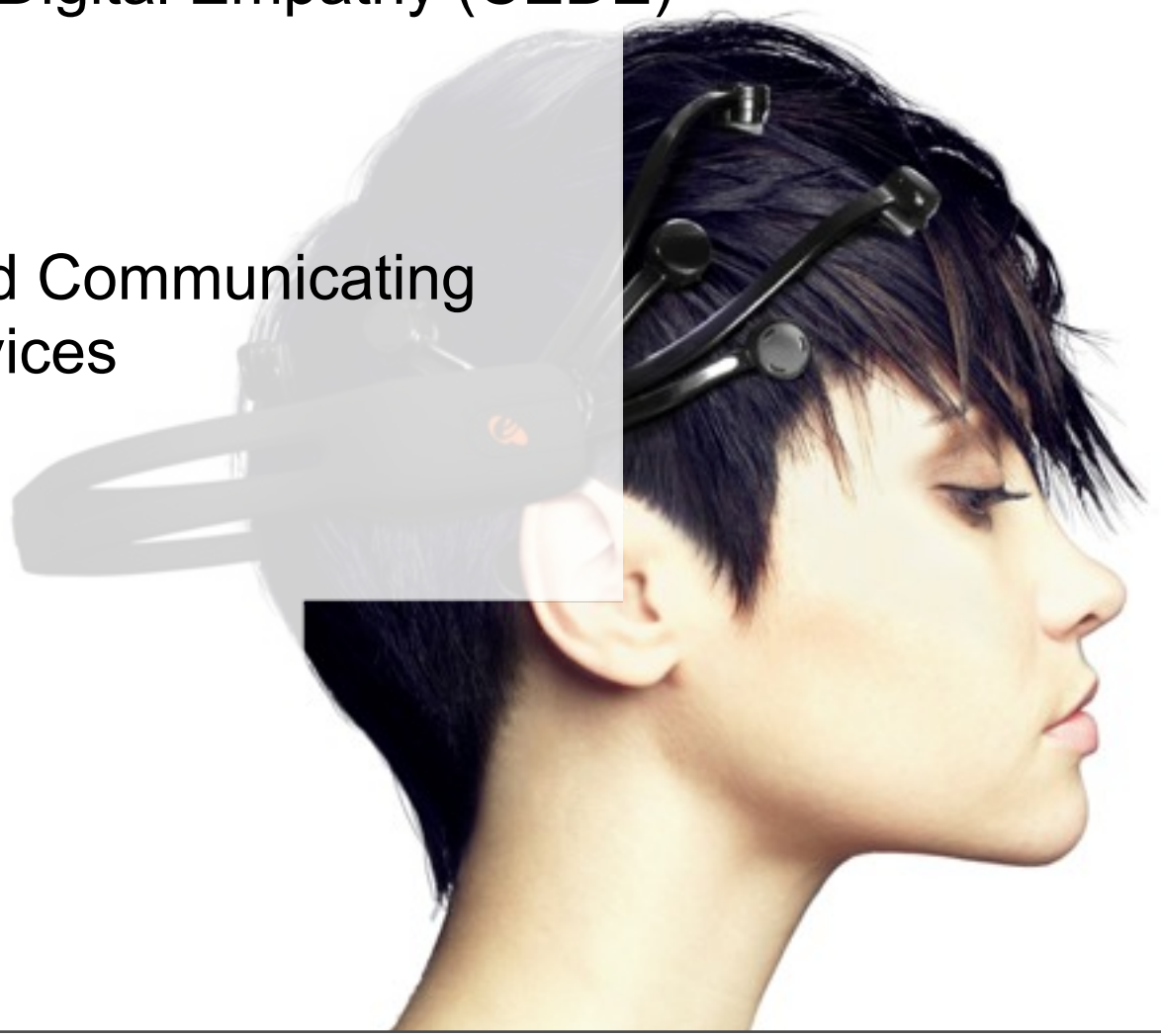
vodafone UK 3G 17:12
iPod
Wednesday
8
Calendar
Clock
Camera
mappiness
How do you feel? Please tell us as soon as you safely can
Close
View
HulloMail
Guardian
App Store
Settings
83
Phone
Messages
Mail
Safari

mappiness – hedonimeters
http://www.mappiness.org.uk/meters/
mappiness .org.uk
Available on the App Store
Home
News
Meters
Maps
More info
when are we happy?
The hedonimeters on the right display mappiness users' happiness in real-time, compared against the all-time average.
Below, happiness levels are charted hour by hour over the past week.
UK
London
Thu 02 Dec
Fri 03 Dec
Sat 04 Dec
Sun 05 Dec
Mon 06 Dec
Tue 07 Dec
Wed 08 Dec
2012/12/05 09:00 – UK: 2.85 – London: 2.9
Click and drag to zoom. Double-click to zoom back out.
feedback
hedoniwhat?
As imagined in 1881 by the economist Edgeworth,

Creating and Exploring Digital Empathy (CEDE)

projectcede.org

Emotions in the City and Communicating Empathy via Digital Devices



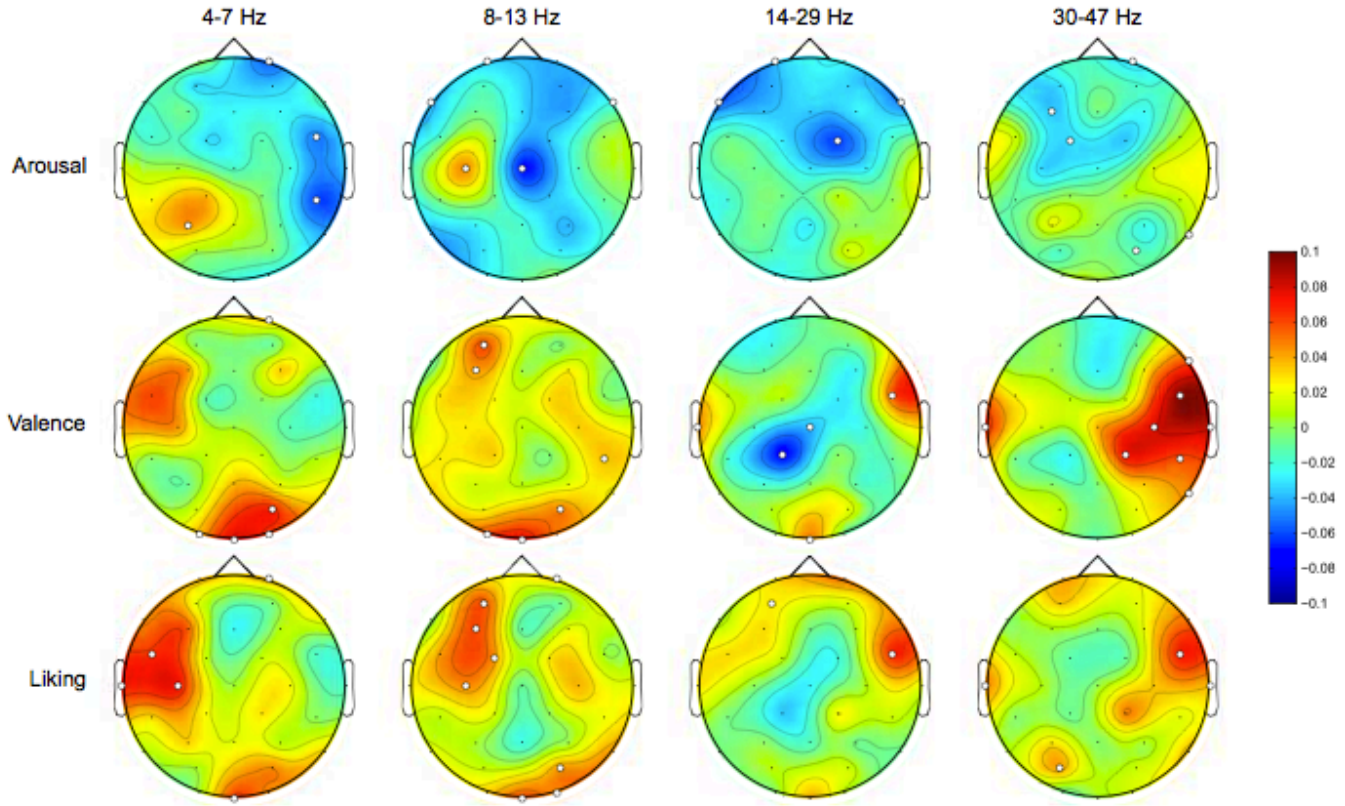
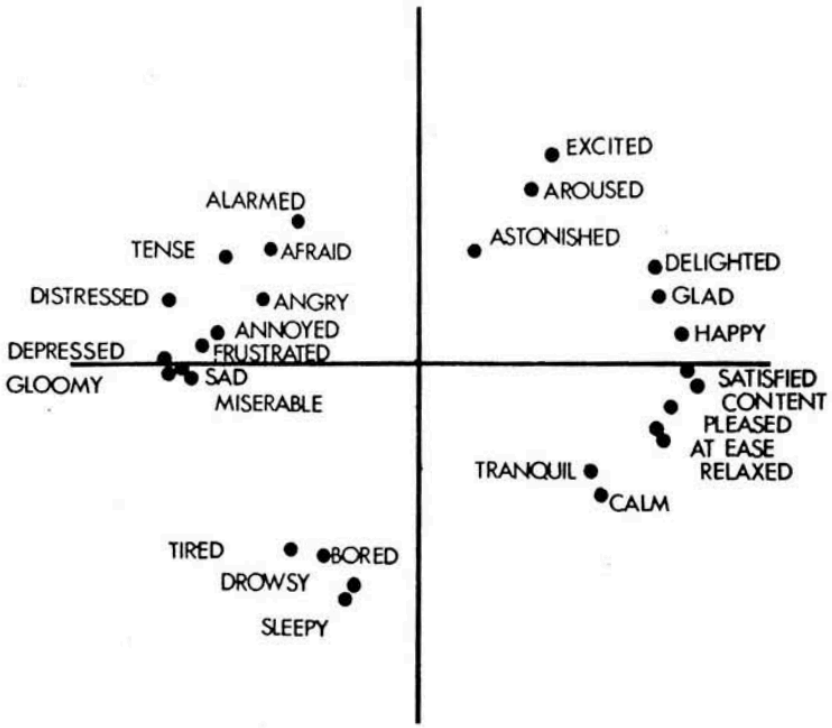
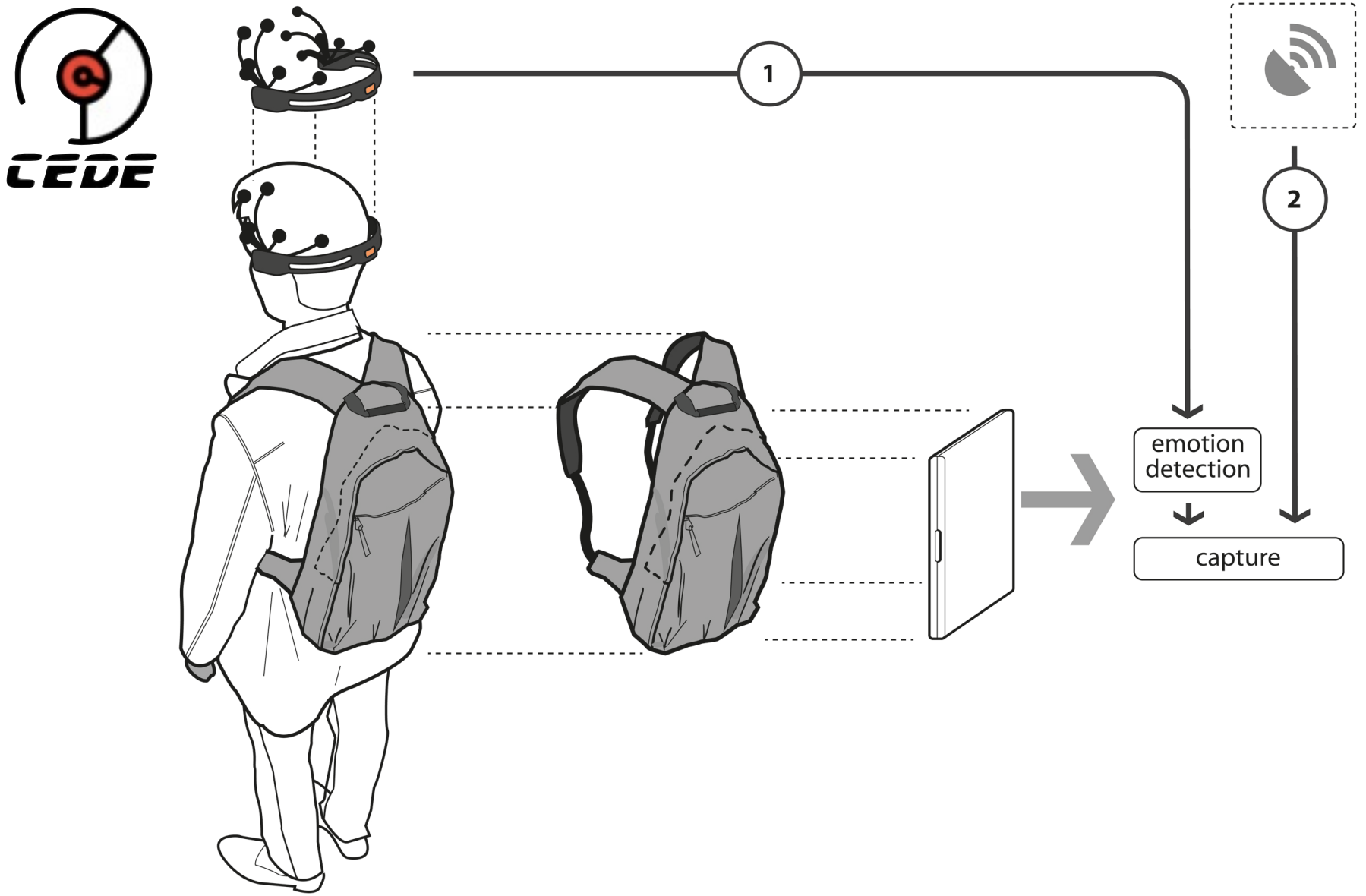


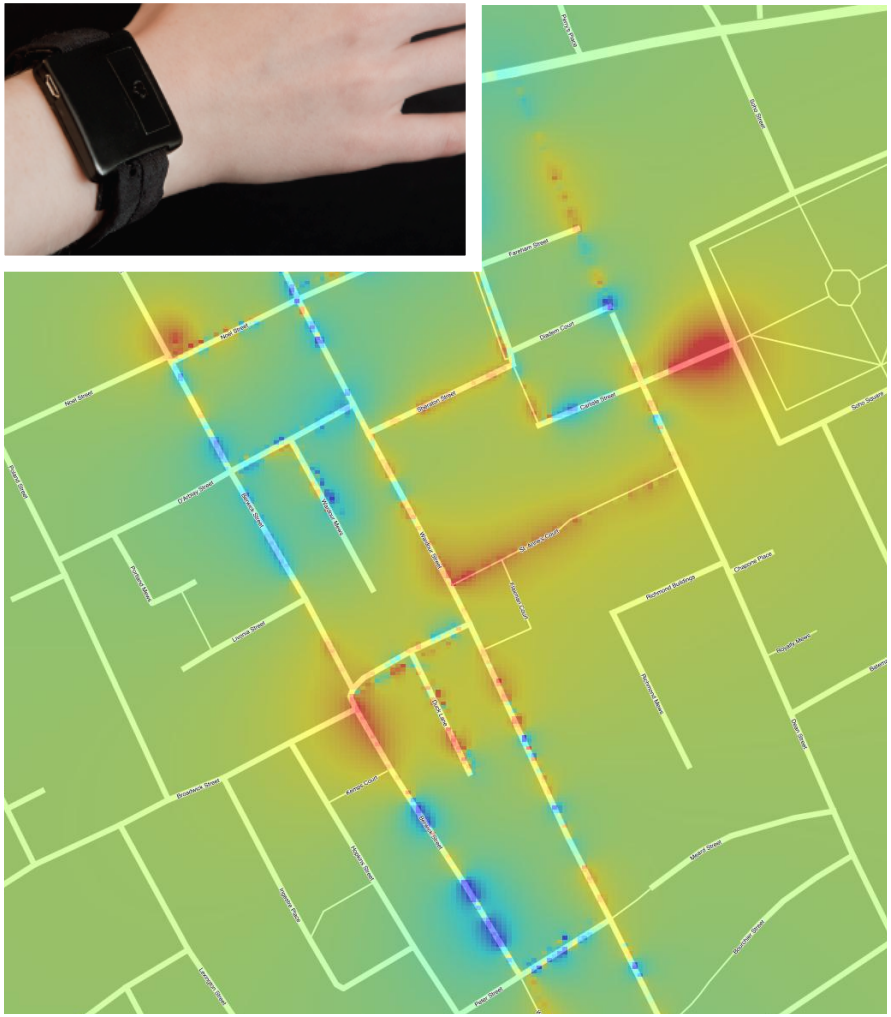
Fig. 8. The mean correlations (over all participants) of the valence, arousal, and general ratings with the power in the broad frequency bands of theta (4-7 Hz), alpha (8-13 Hz), beta (14-29 Hz) and gamma (30-47 Hz). The highlighted sensors correlate significantly ($p < .05$) with the ratings.

Koelstra *et al.*, (2012).Deap: A database for emotion analysis; using physiological signals, *Affective Computing*



James Russell, A circumplex model of affect, 1980


CEDE
1
2
emotion detection
capture



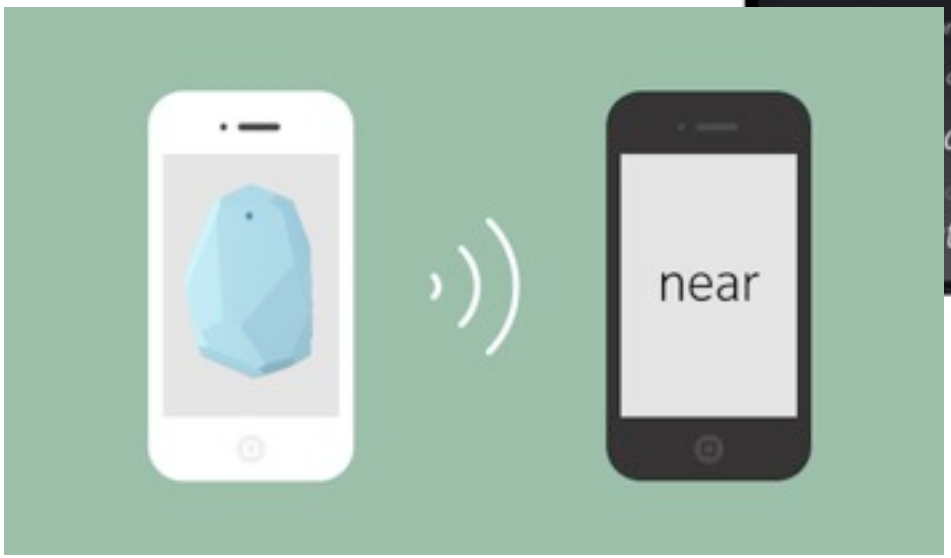
- Real-world training.
- Recording the arousal levels (GSR) to testing the interaction between emotional state (stress, arousal etc) and learning performance.
- Spatial analysis measures
- Understanding the role of emotion during
  - Learning
  - Task execution (stress, ease of recall, etc)

Inside iOS 7: iBeacons enhance apps' location awareness via Bluetooth LE

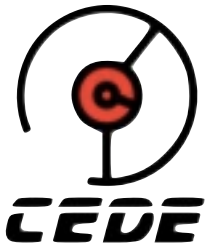
By Daniel Eran Dilger

Apple's new iBeacons feature for iOS 7 implements a Bluetooth Low Energy (BLE) profile for micro-location, enabling a series of new geofencing capabilities for app developers.

Future of Retail Report
EPSRC/TSB



PHILIPS
PHILIPS
PHILIPS



What is IFTTT? IFTTT is a service that lets you create powerful connections with one simple statement:

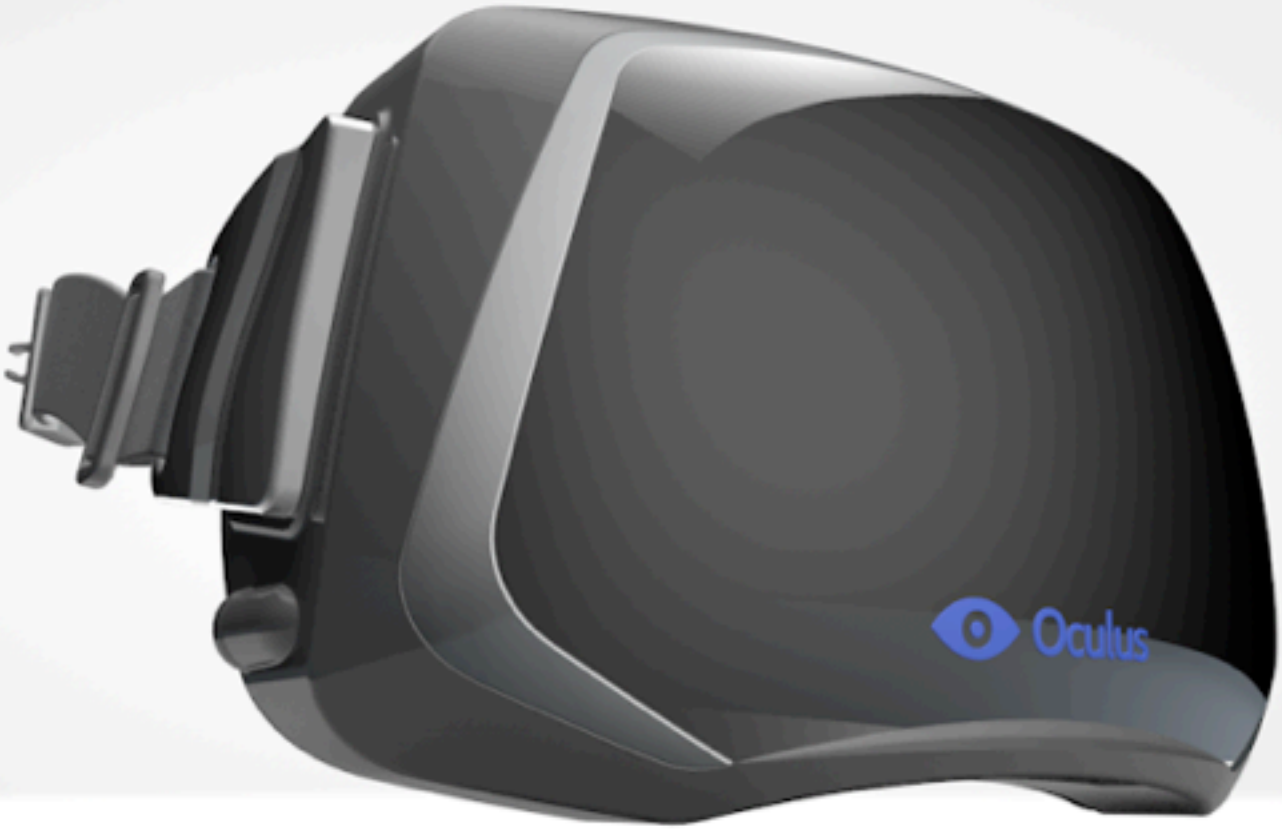
Recipe

if this then that

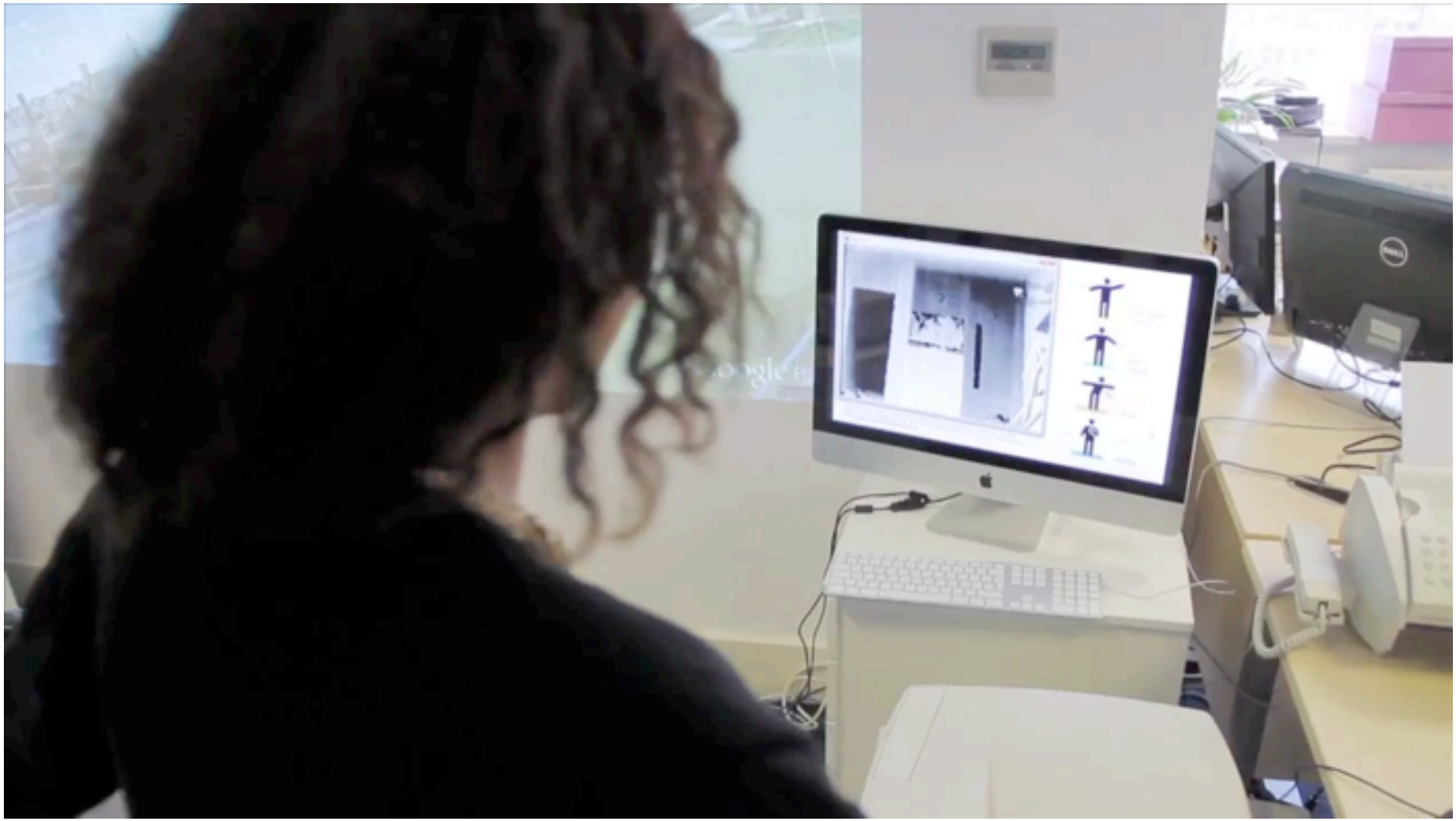
Trigger

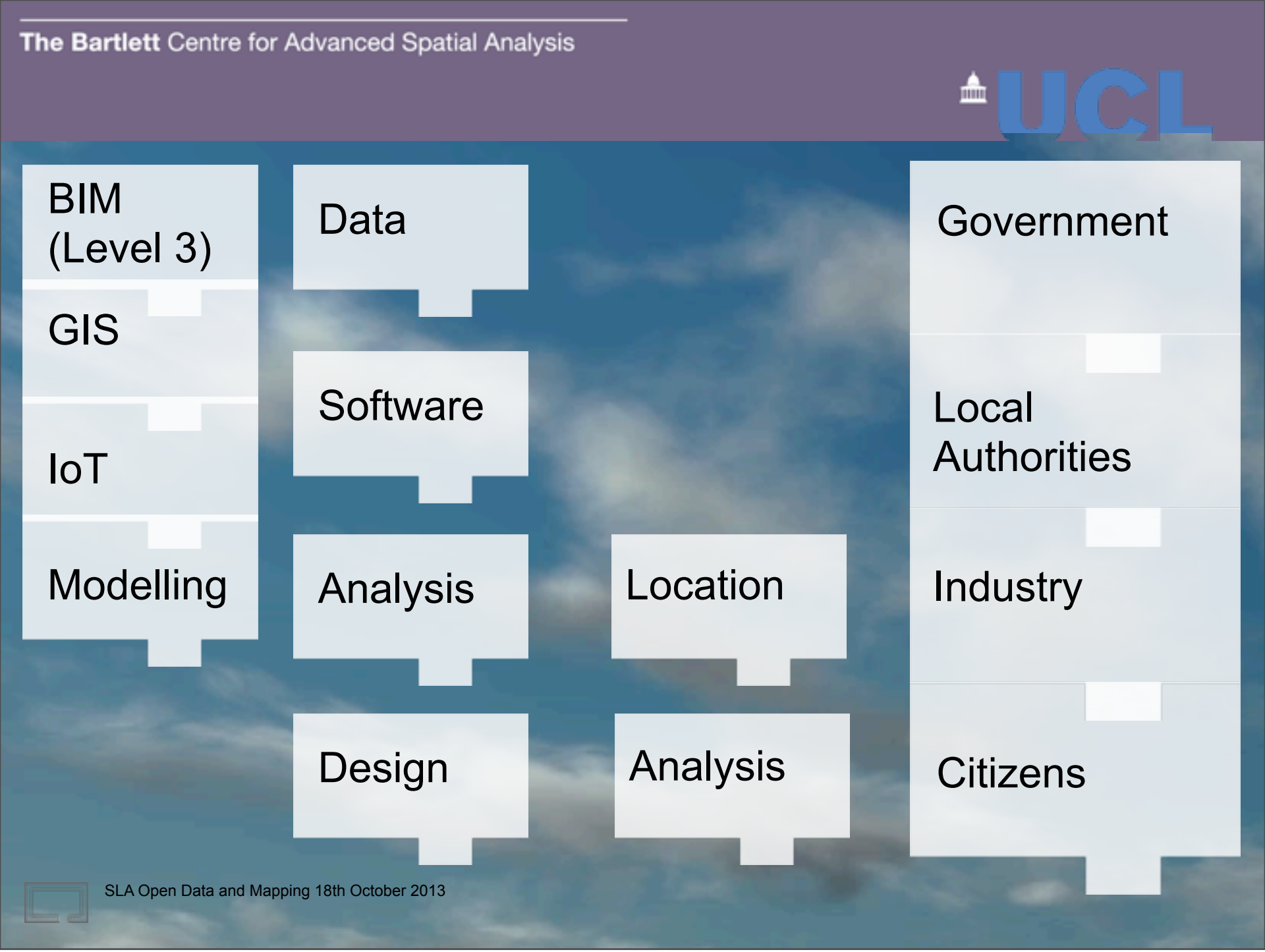
Action

IFTTT is pronounced like “gift” without the “g.”


Oculus

TSB Internet of Schools




BIM (Level 3)
GIS
IoT
Modelling
Data
Software
Analysis
Design
Location
Analysis
Government
Local Authorities
Industry
Citizens

UCL

Smart Cities - Location, The Citizen and Systems

Andrew Hudson-Smith
Director of The Centre for Advanced Spatial Analysis
University College London

Twitter - @digitalurban