

Uncovering the presence and movements of tourist from user-generated content

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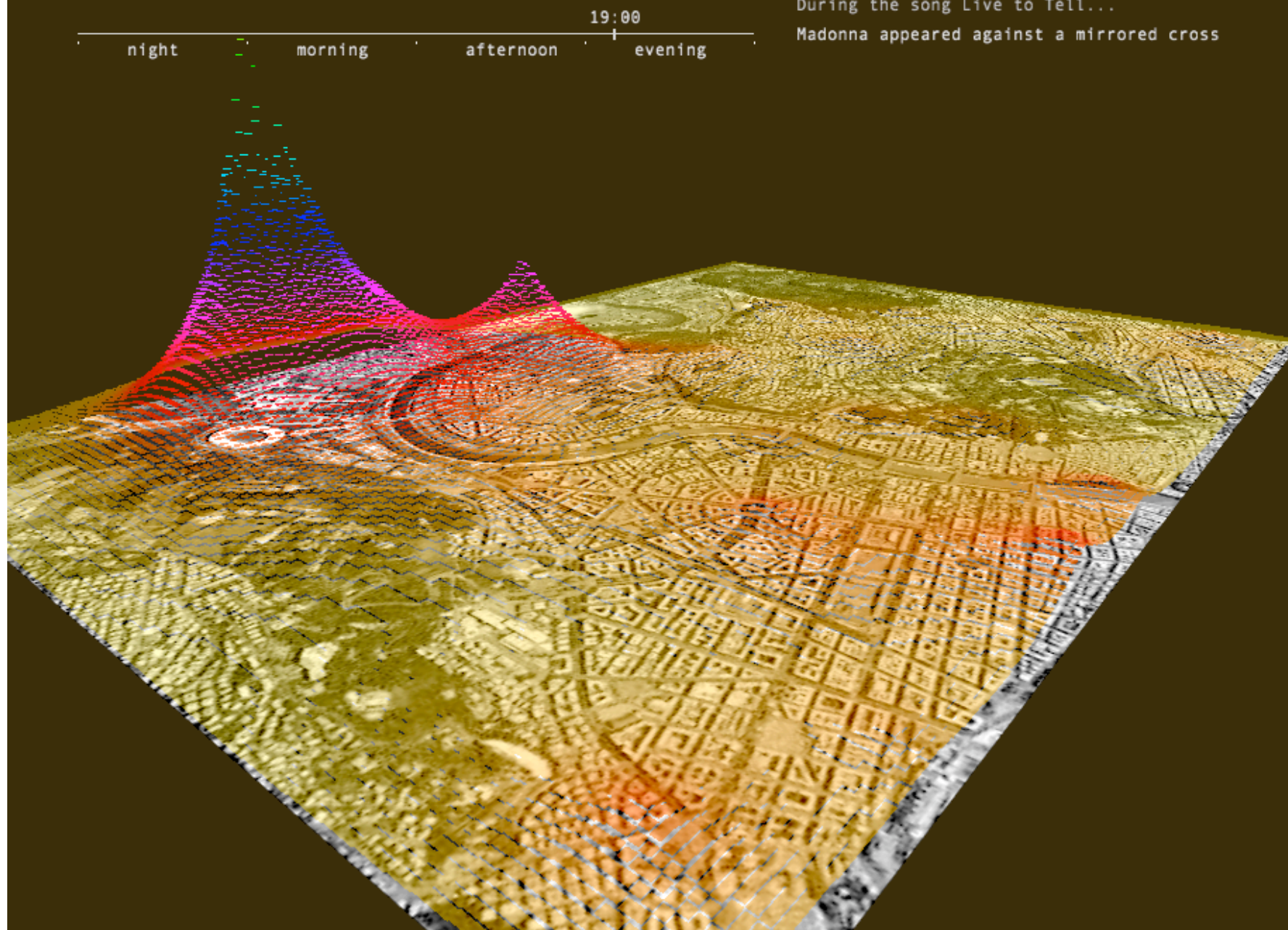
9th International Forum on Tourism Statistics, Paris, November 20, 2008

Digital shadows

- Records of implicit interactions with these new urban actors in the physical space with digital means
- Examples: RFID card (bike sharing, metro), tangible sensors, wireless networks (GSM, Wi-Fi), fidelity cards, credit cards, etc

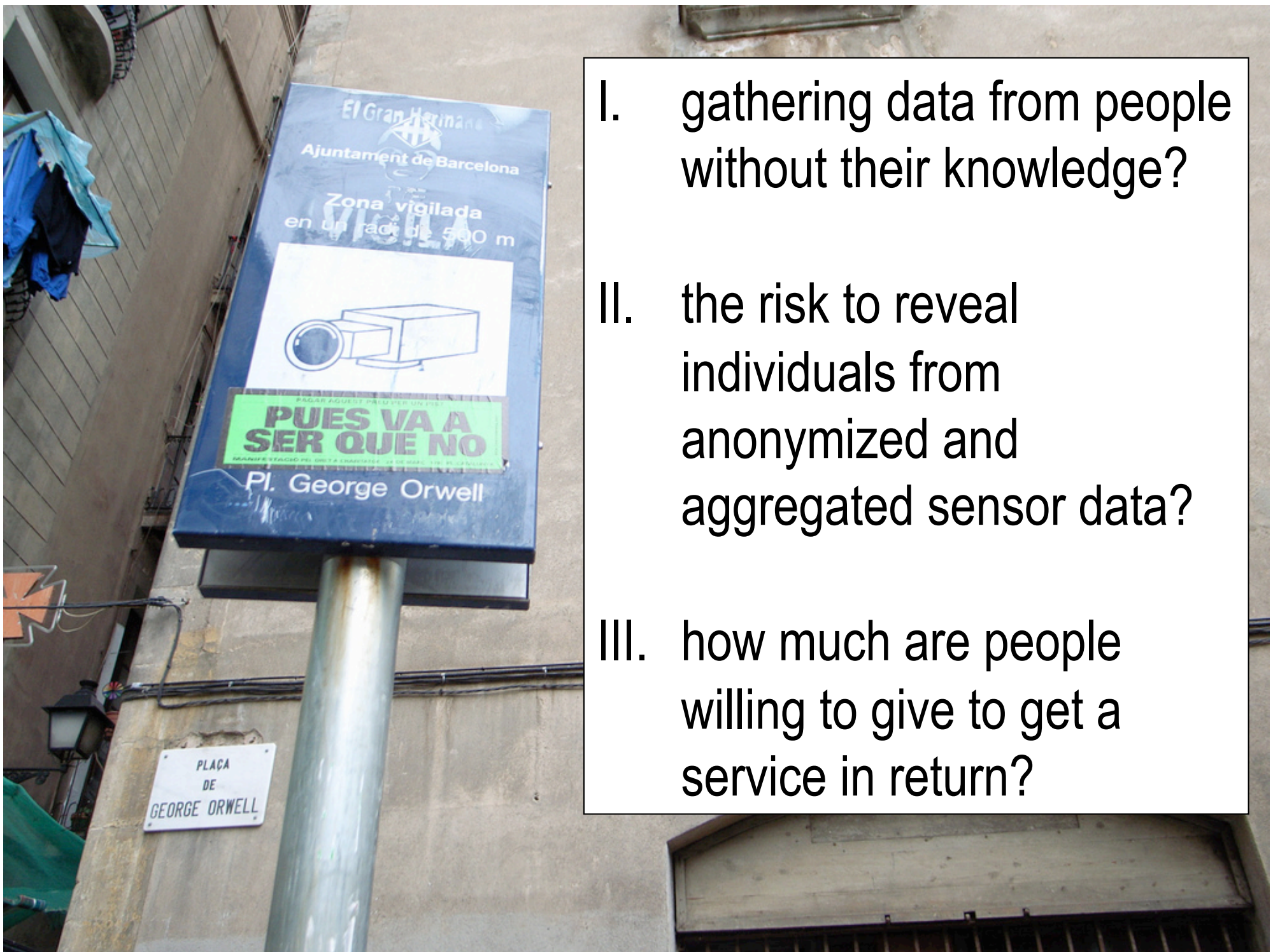
Madonna Concert
Cellphone activity in Stadio Olimpico Rome
2006-08-06

But receives rave reviews from 70,000 in attendance
At Rome's Olympic Stadium
Located about three kilometres from the Vatican
During the song Live to Tell...
Madonna appeared against a mirrored cross



Digital footprints

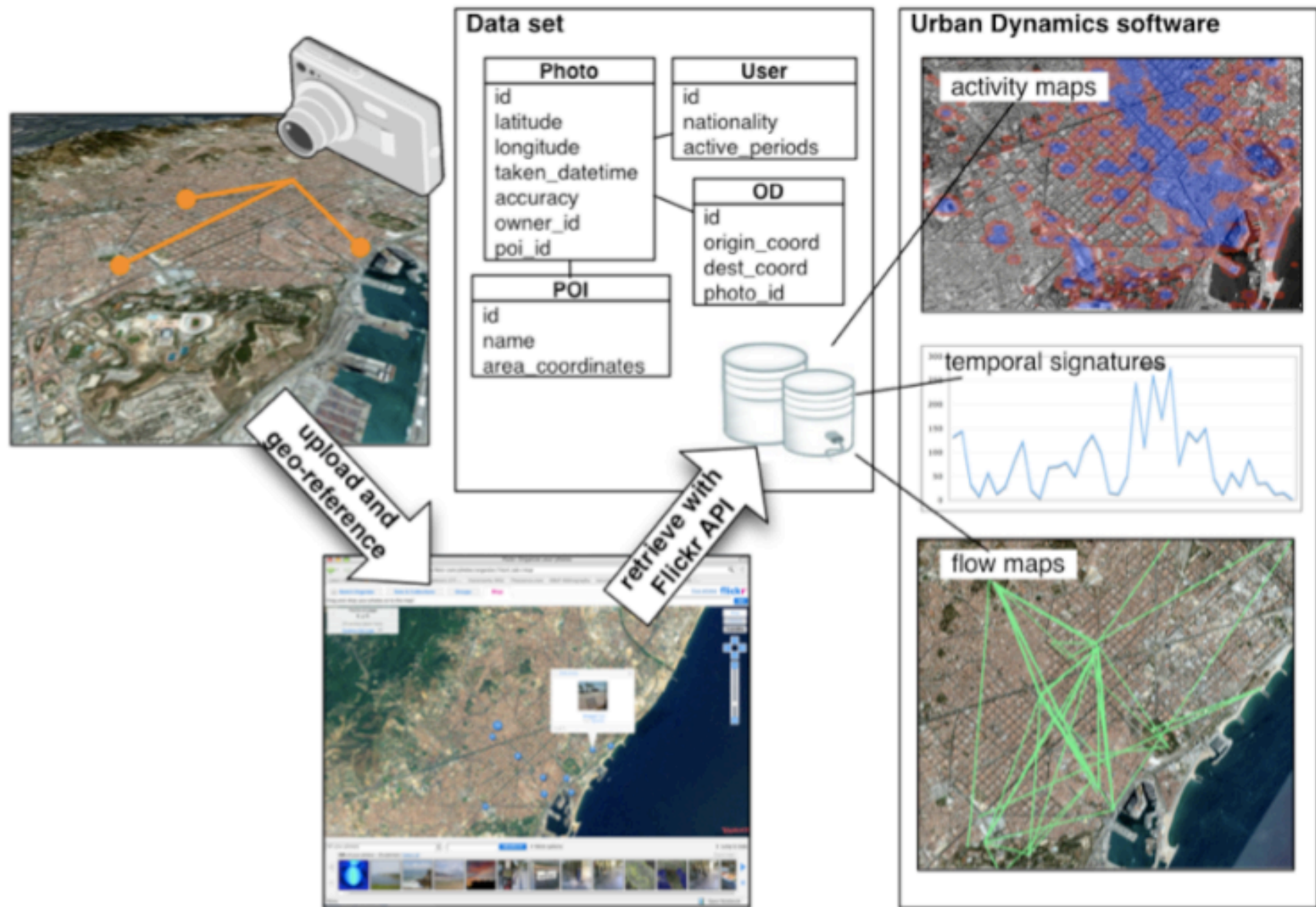
- Explicit user-generated content with geographic anchor: “from shoeboxes to digital footprints”
- Fall of prices to store data
- Raise of online social networks and ‘new cartography’ as ways to map and visualize the city through images and narrative descriptions



- I. gathering data from people without their knowledge?
- II. the risk to reveal individuals from anonymized and aggregated sensor data?
- III. how much are people willing to give to get a service in return?



Nowadays tourists leave digital footprints behind them



Digital footprinting

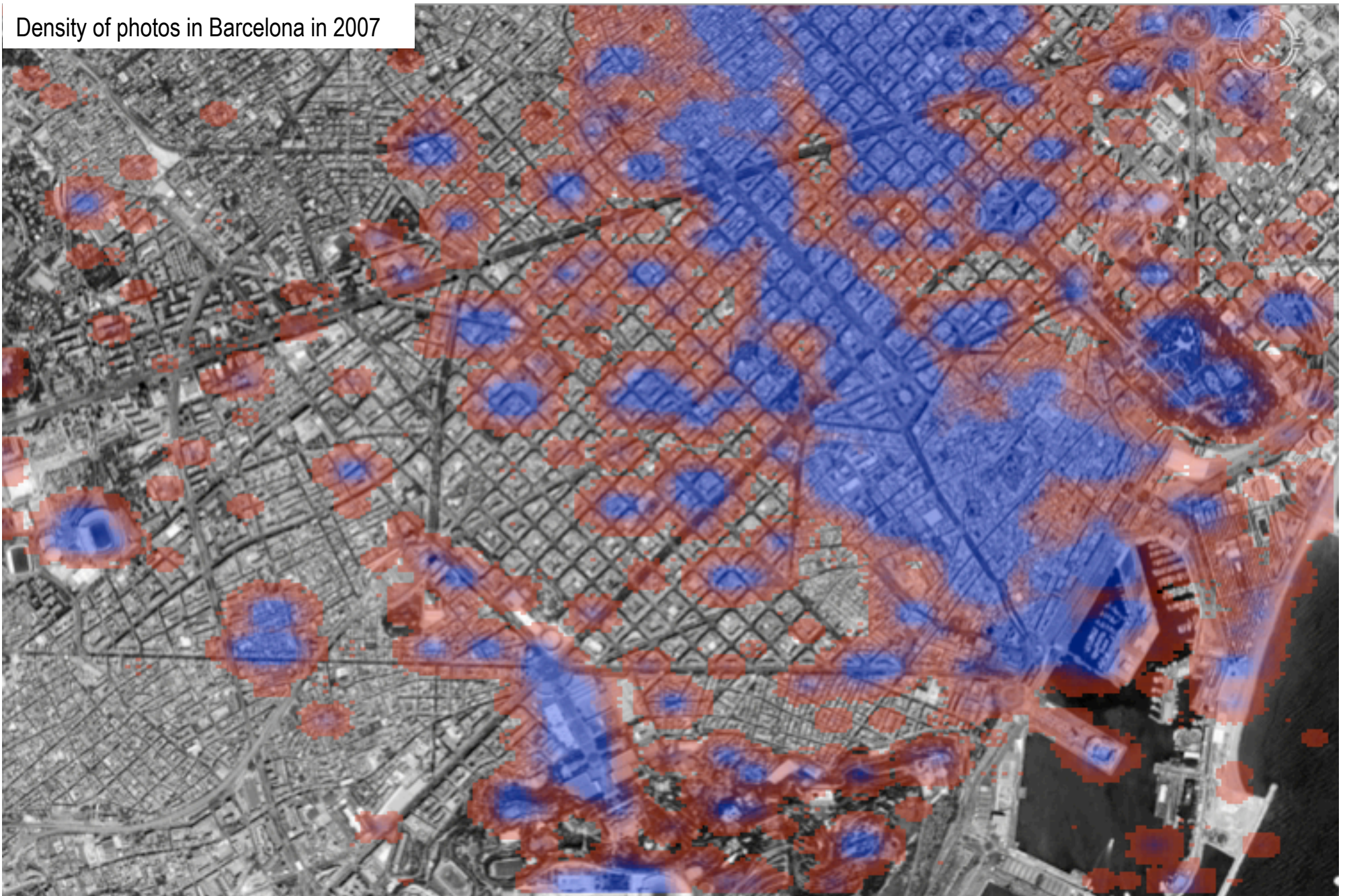
2 years (2005-2007)

Region	Photos	Photographers
Barcelona	154,106	5818
Province of Florence	81,017	4280
Rome	144,501	6018

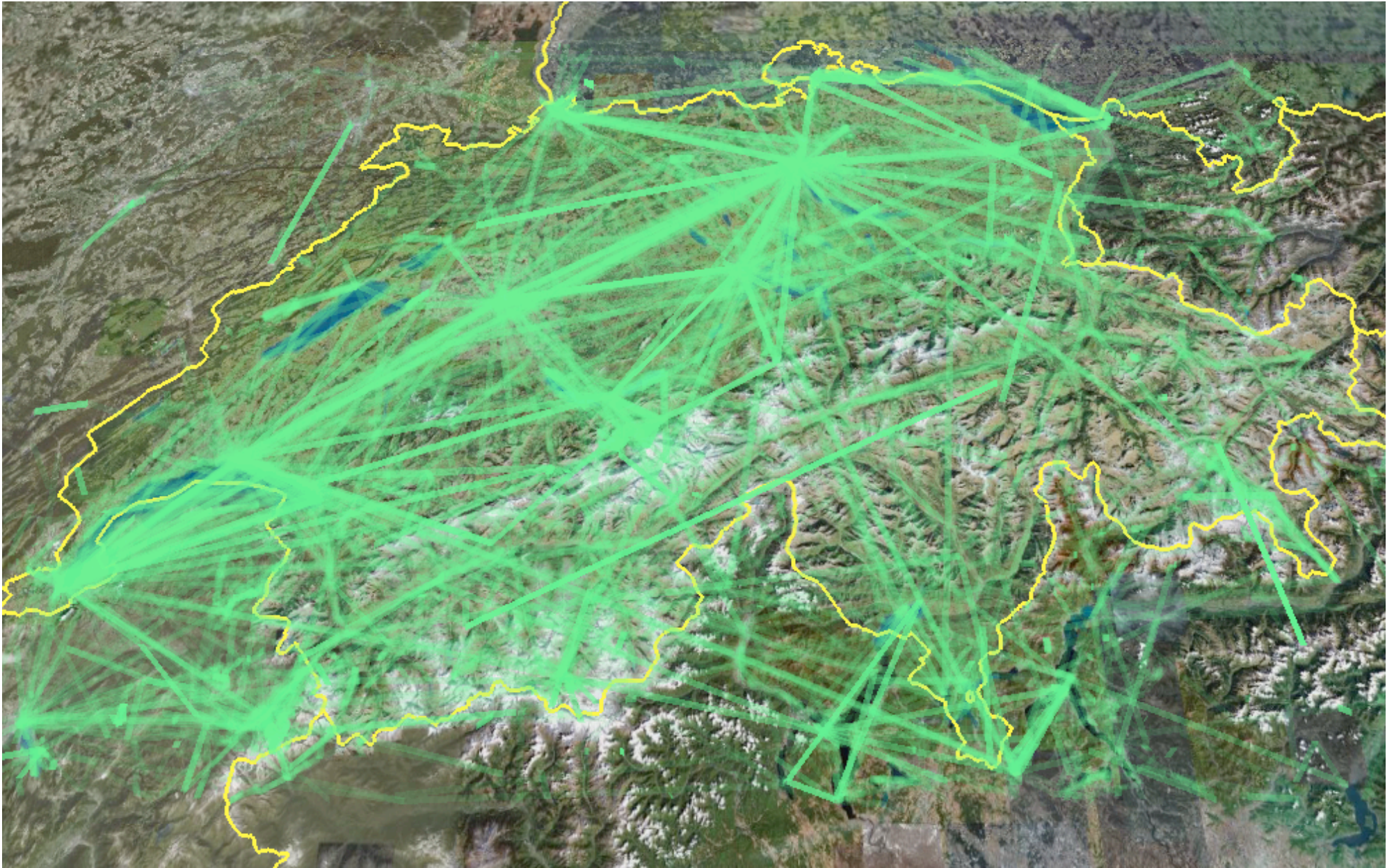


Scale

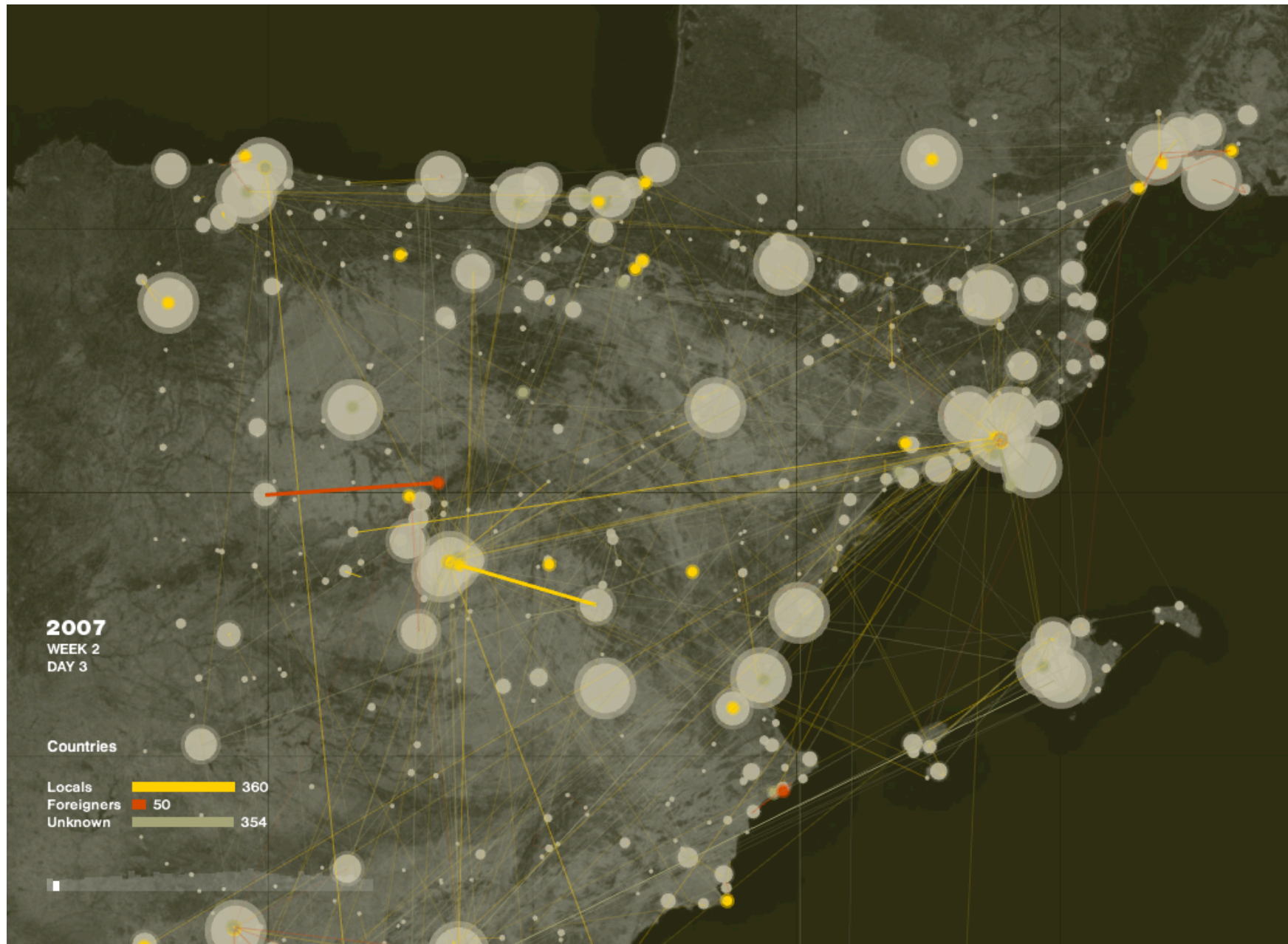
Density of photos in Barcelona in 2007



Density

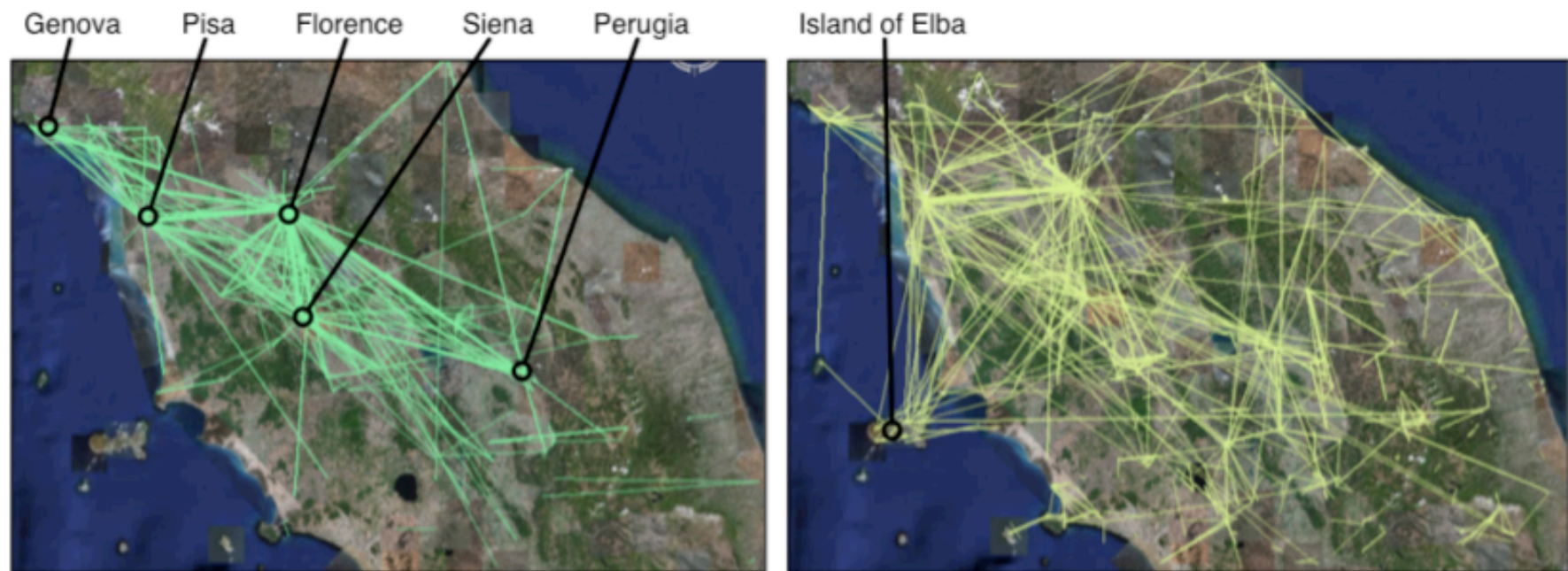


Traces



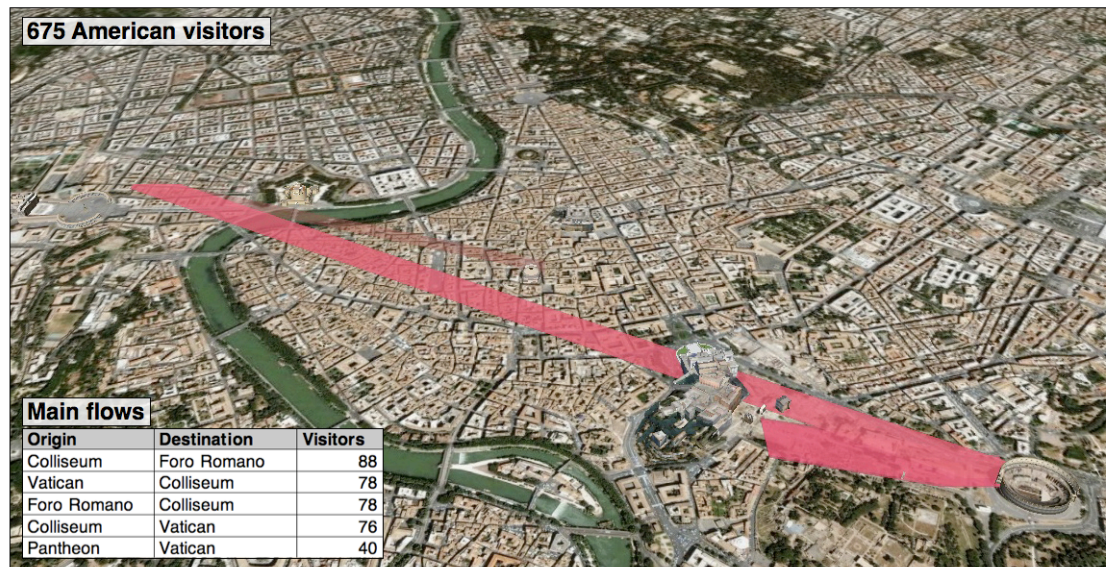
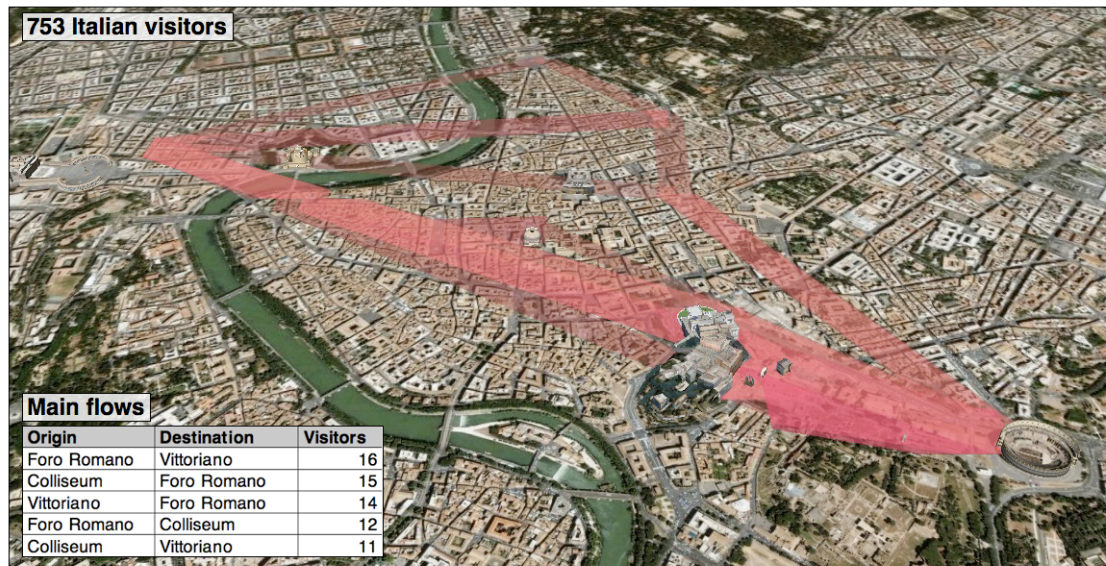
Spatio-temporal

Accumulated traces of italian (left) and american (right) photographers
in Tuscany and surroundings in 2007



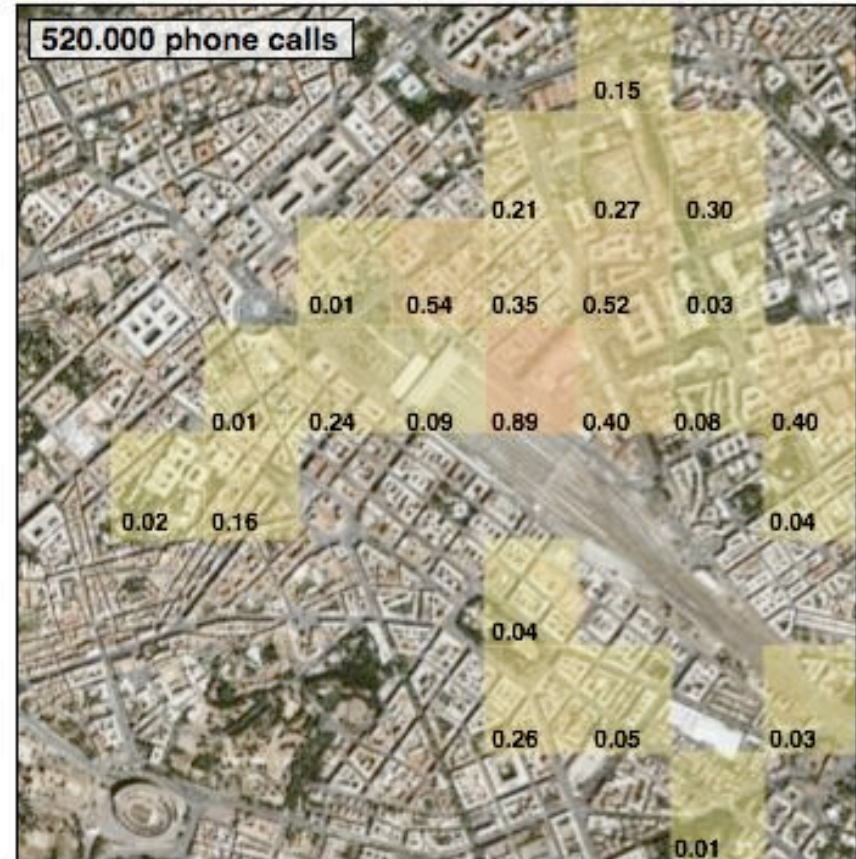
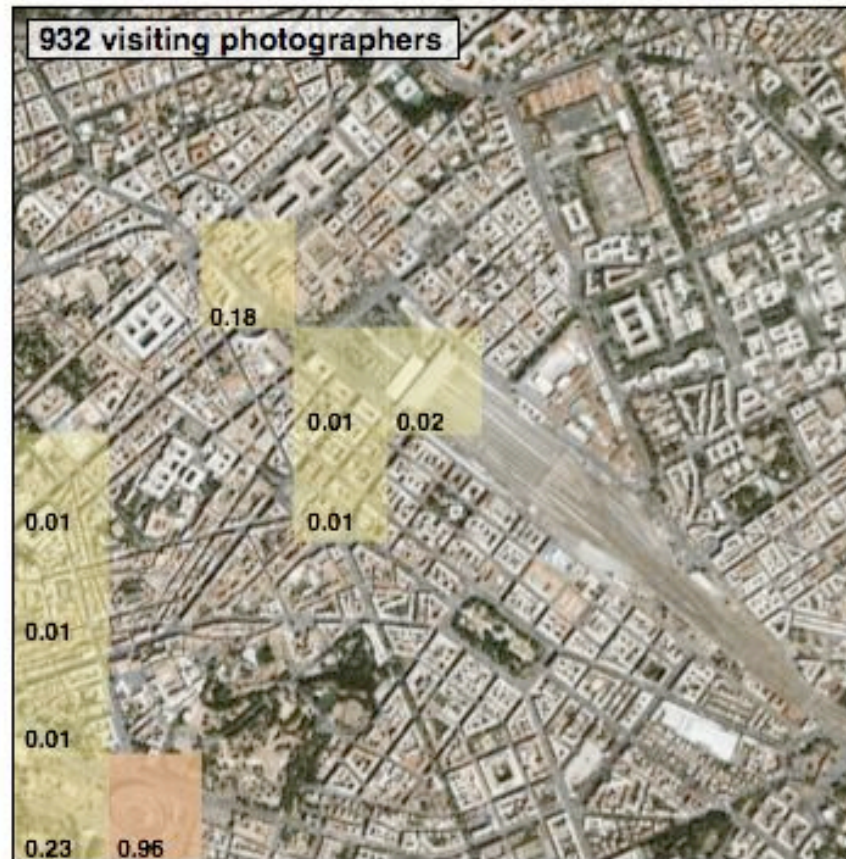
Origin of photographers

Main paths taken by tourists connecting the points of interests of Rome. 777 photographers form the largest desire line with their direct movement from Vatican to Colloseum.



Flows

Geovisualization of the presence of 932 tourist photographers (yellow-orange color range) and 520 000 foreigner's mobile phone calls (green color range) in the Colloseum-Piazza della Repubblica area from September to November 2006.

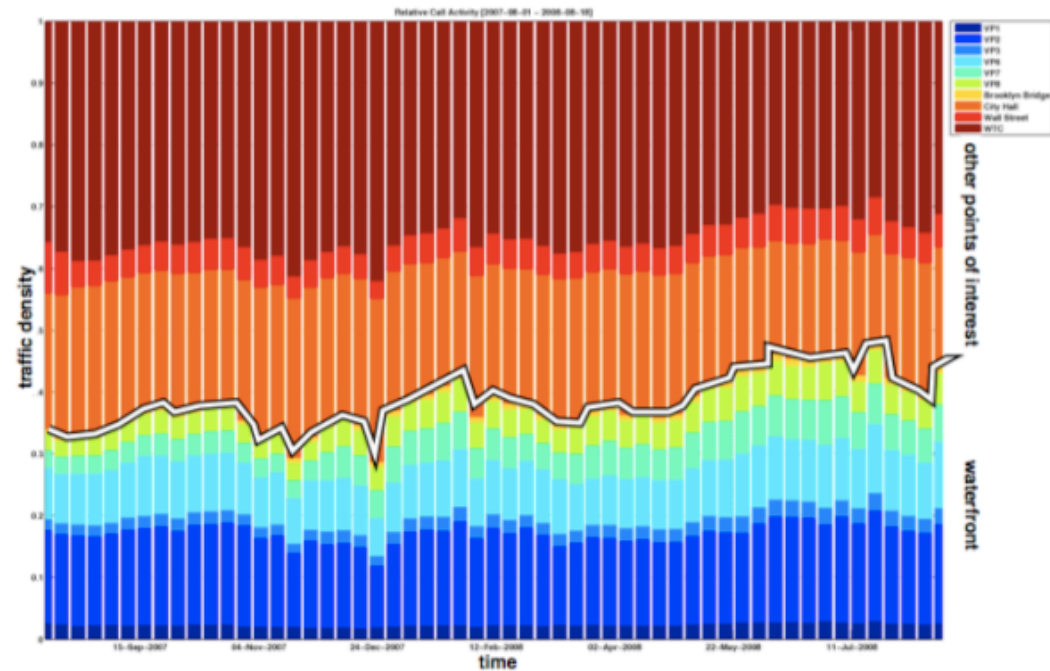


Types of tourist activity

Evolution of the relative strenght of points of interest in Lower Manhattan from August 2007 to August 2008



1. Vantage Point 1
2. World Trade Center
3. Wall Street
4. City Hall
5. Vantage Point 2
6. Vantage Point 3
7. Brooklyn Bridge
8. Vantage Point 6
9. Vantage Point 7
10. Vantage Point 8



Evolution of attractiveness

Evolution of photographers flows in Lower Manhattan. Use of the PlaceRank algorithm to measure the centrality of points of interests



Evolution of centrality

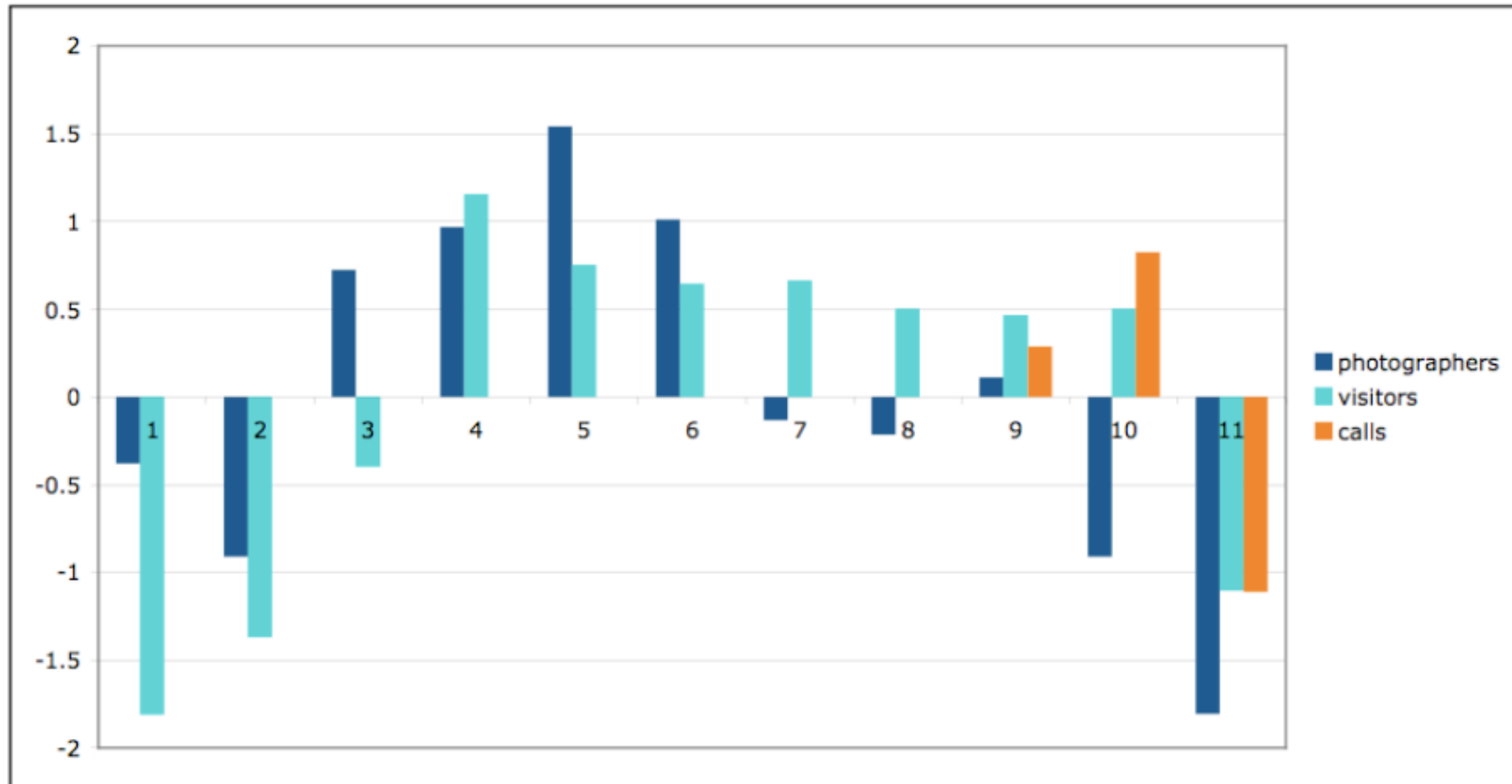
Limitations

- Provide a glimpse to reality. Sense what is cheap to sense, plus lack of data interoperability
- Reveal phenomena. But does not explain them
- Need to prove that these data bring at least the same amount of knowledge than survey data



Ground truth

Comparison of the presence of visitors in the Colloseum area from January to November 2006, from the number of tickets sold, average number of phone calls and number of photographers active in the zone



Correlation

Take-aways

- Massive amount of digital footprints and shadows
- Tools and techniques to uncover the presence and movements of tourists
- Provides one novel perspective
- Need to correlate with ground truth data to understand how this perspective complements

Thank you

Merci

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