

The background image shows a transit station with people, including a person in a white uniform and cap, and a map on the wall. A large green banner is overlaid on the image, containing the title and authors.

Understanding of Tourist Dynamics from Explicitly Disclosed Location Information

Fabien Girardin, Josep Blat Universitat Pompeu Fabra
Filippo Dal Fiore, Carlo Ratti, MIT SENSEable City Lab

4th International Symposium on LBS and Telecartography, Hong-Kong, November 9, 2007



Research questions

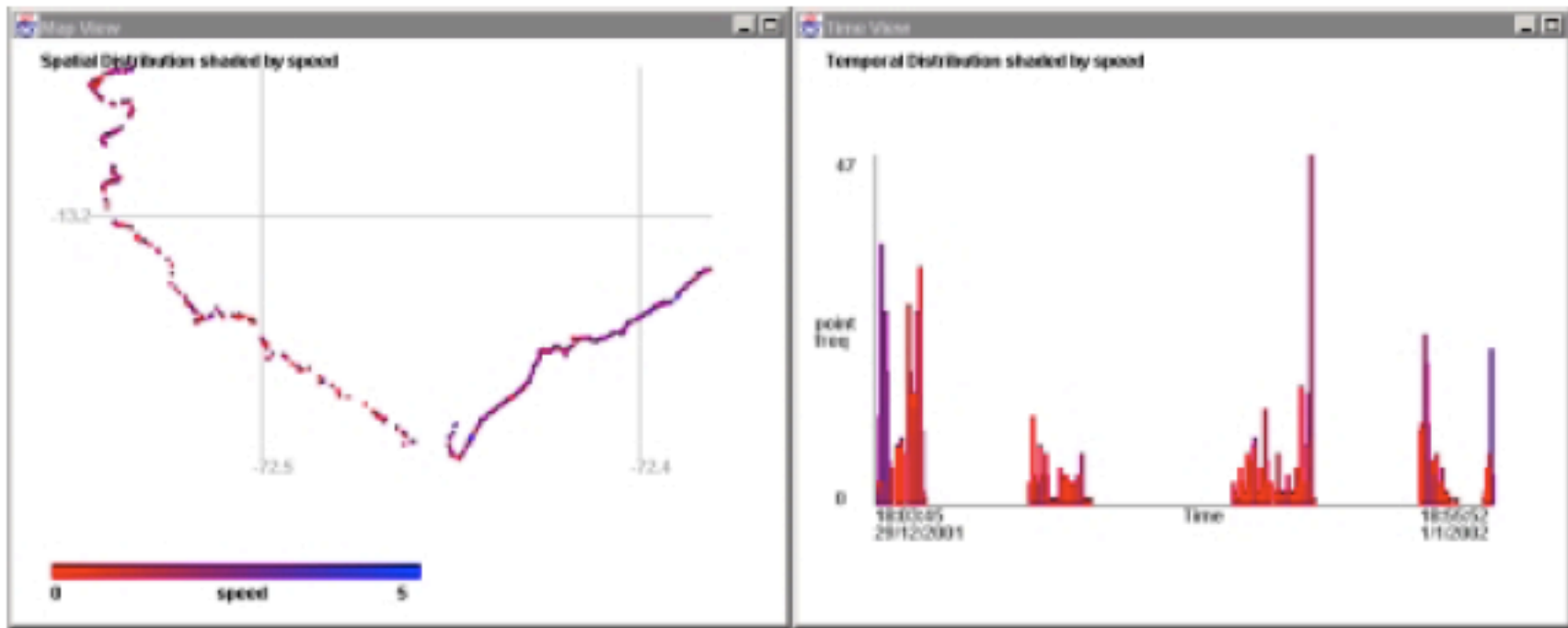
- How do tourists populate and move inside the area they visit?
- What can we know about them?
(how many/which nationality/which period of the year/which origin and destination?)

Why?

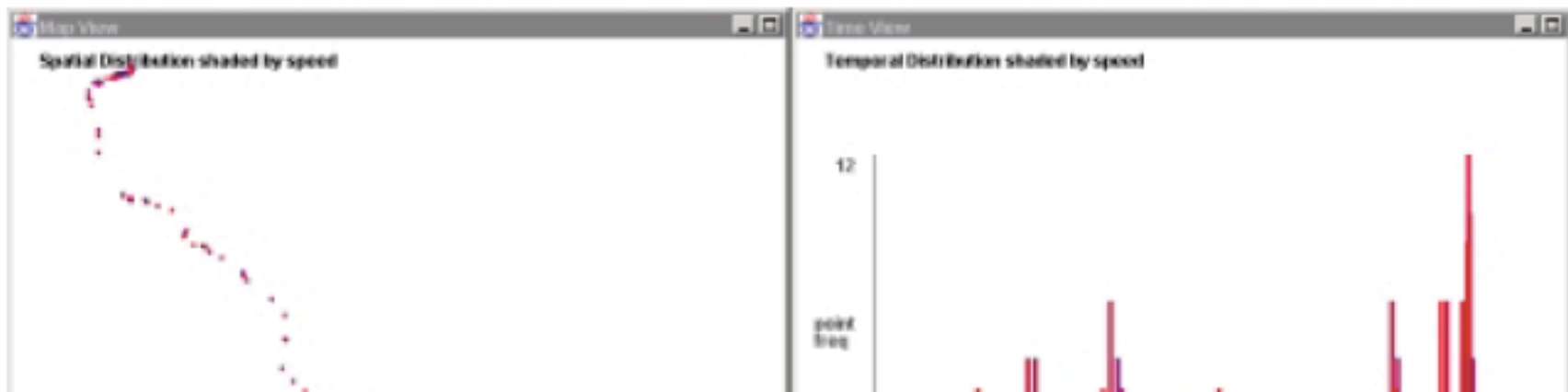
- provide **urban planners, local authorities, tourism authorities and traffic engineers** with useful information on how a city gets used by different groups.
- visualizations can be helpful to raise awareness among city **residents and visitors**, as for the current ways in which they populate the city as well as for possible better alternatives.
- **designers of location-based services** can tailor their services based on the history of past movements in space (area of influence and attention)

Travel surveys

- Museum, hotel surveys
- Time consuming and therefore costly
- Only a snapshot
- Many tourists remain invisible

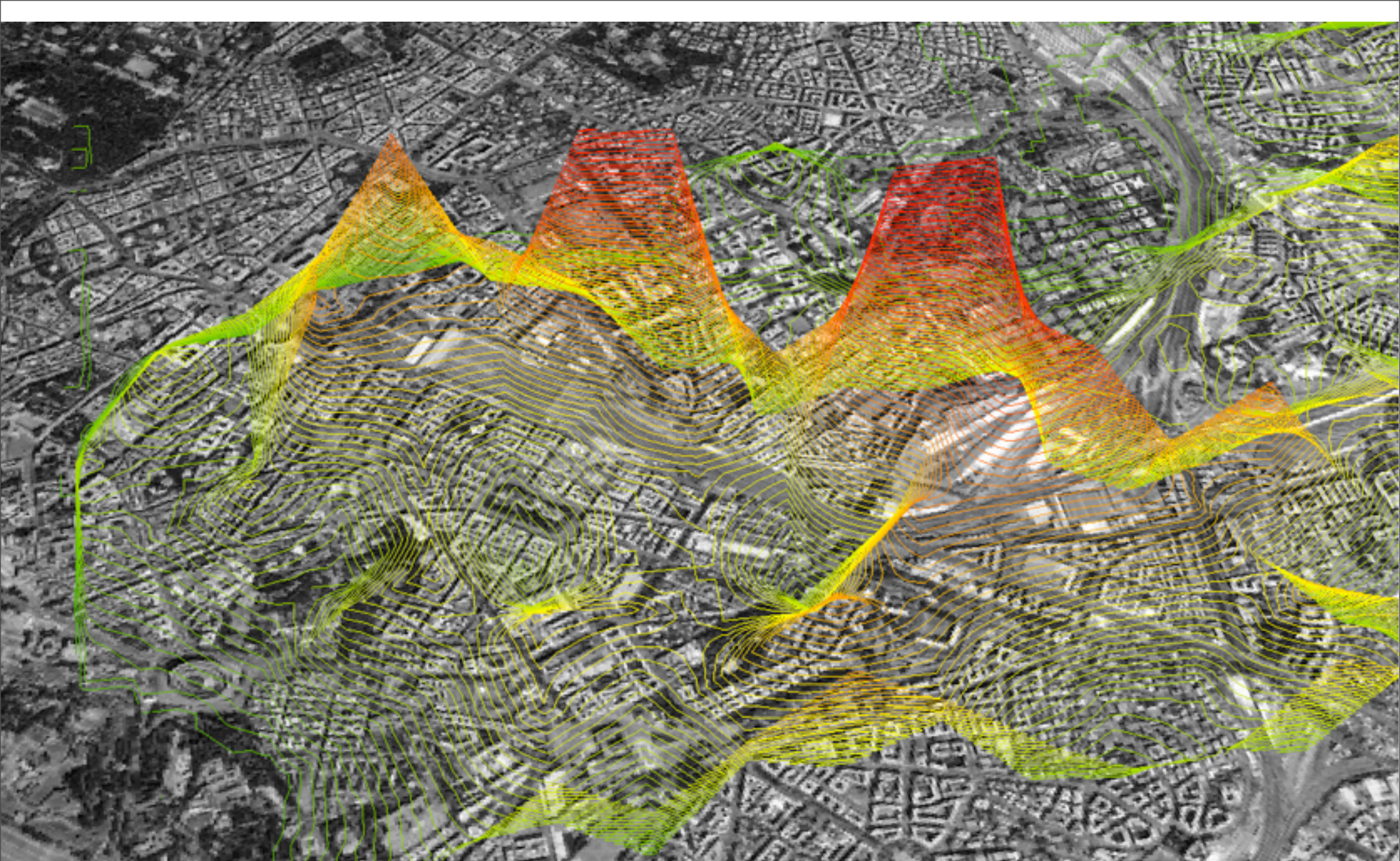


B



Explicit mobility data capture

Issues: scalability (infrastructure-dependent), longitude, privacy



Implicit mobility data capture

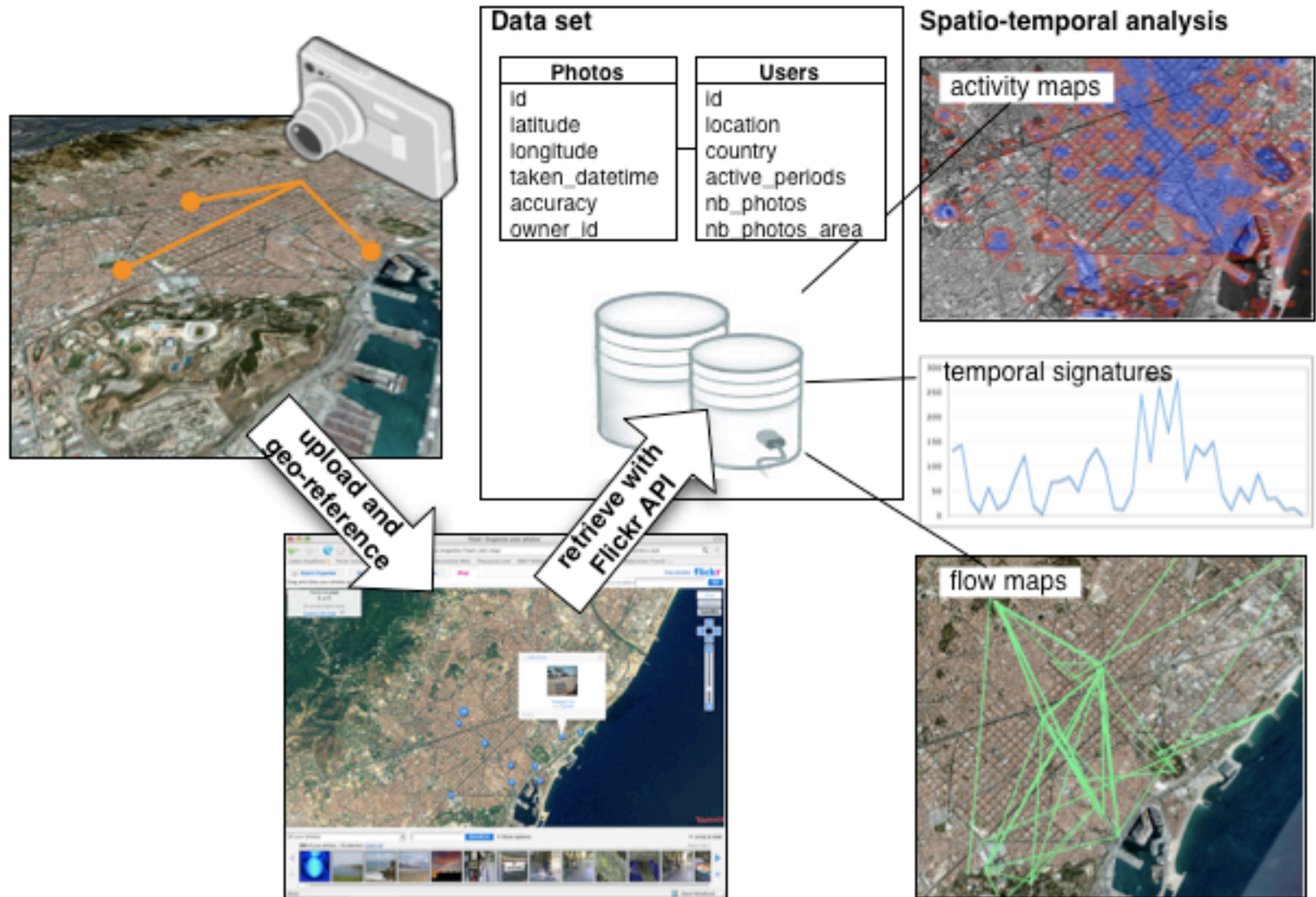


...but nowadays tourists leave digital traces behind them

New digital footprints

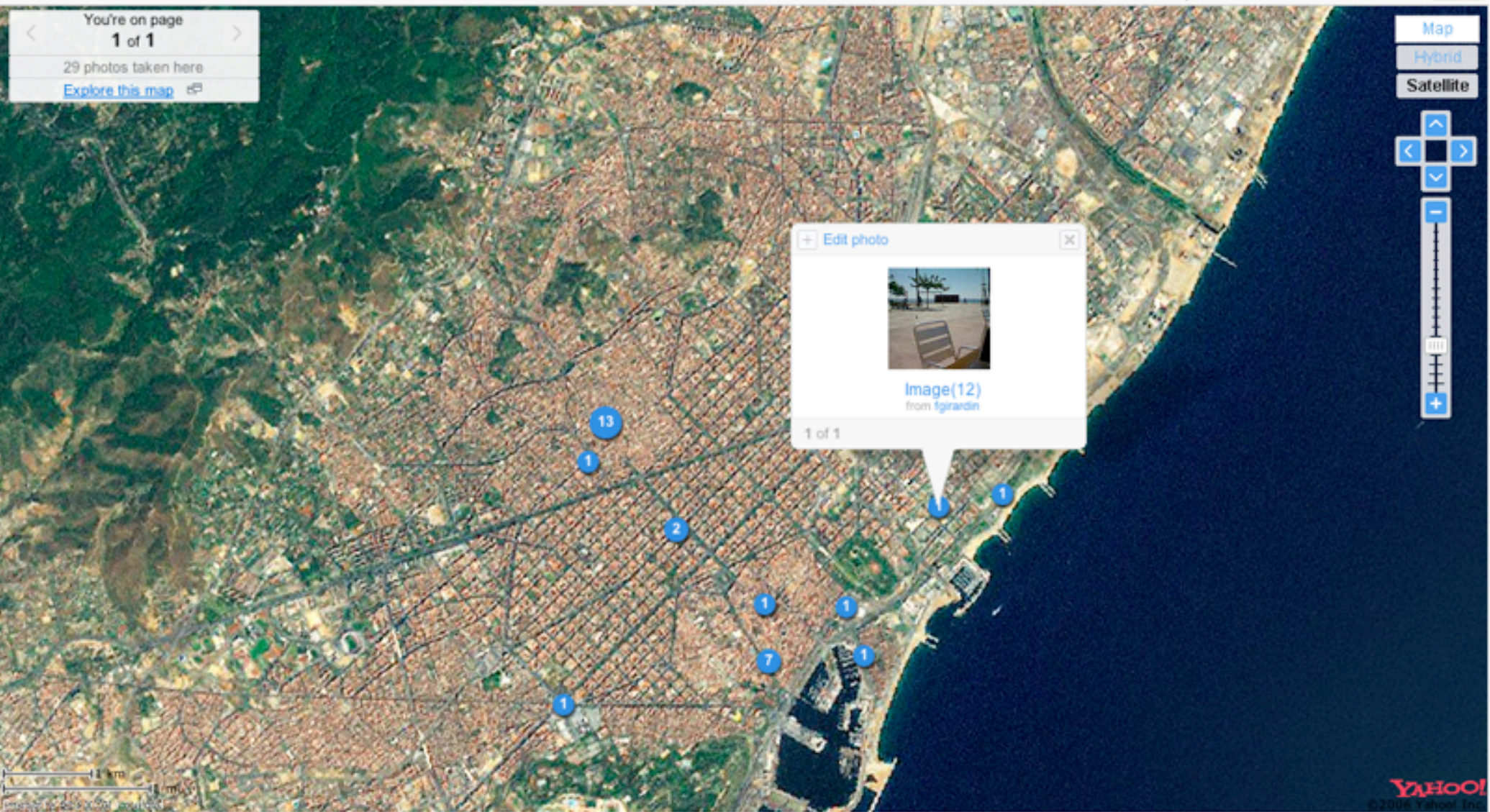
- Using explicitly disclosed geo-referenced information
- Social softwares with presence awareness (Twitter, Plazes, Jaiku, Flickr, ...) and geospatial web.
- Act of communication (lowers privacy issue)
- A proof of concept with Flickr

System



Drag and drop your photos on to the map!

Find a location GO



All your photos SEARCH More options

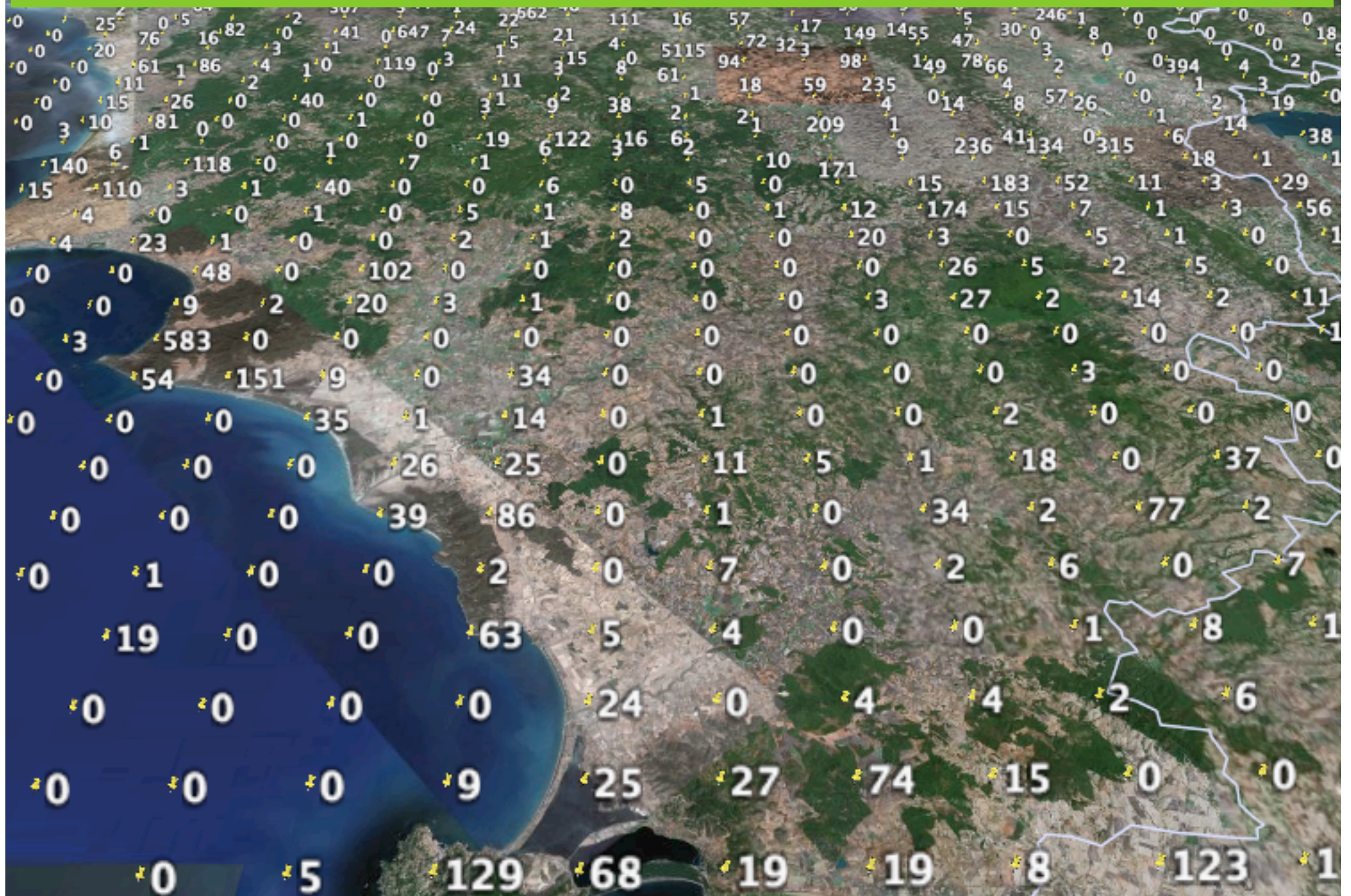
Jump to date

568 of your photos :: 0 selected [Select all](#)

Need help?



Matrix



Early results

- Based on the Province of Florence
- Tourist concentration
- Patterns of flow within the Province
- Inbound and outbound flows

City of Florence

Province of Florence

Capture area



image © 2007 TerraMetrics
Image © 2007 GeoContent

©2007 Google™

Data

- Period of 2 years and 4 months (January 2005 to April 2007)
- 85910 photos taken
- 3348 users

Retrieving tourists...

- Categorize tourists vs. residents based on periodicity (threshold)
- 65% of users disclosed their nationality

... and nationalities

	2005	2006	2007 ⁷
average of photos taken per day	39.72	127.6	129.3
average number of photographer per day	2.29	5.41	7.62

- not disclosed
- Italy
- USA
- UK
- Germany
- Spain
- Canada
- Netherlands
- France
- Switzerland
- Australia
- Belgium
- Brazil

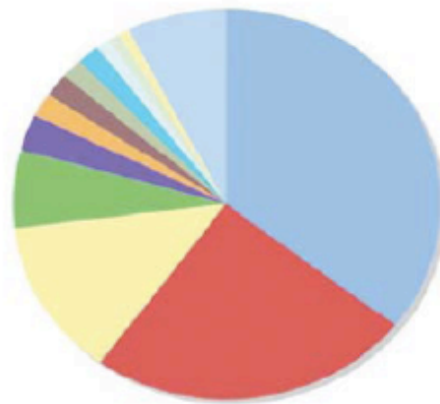
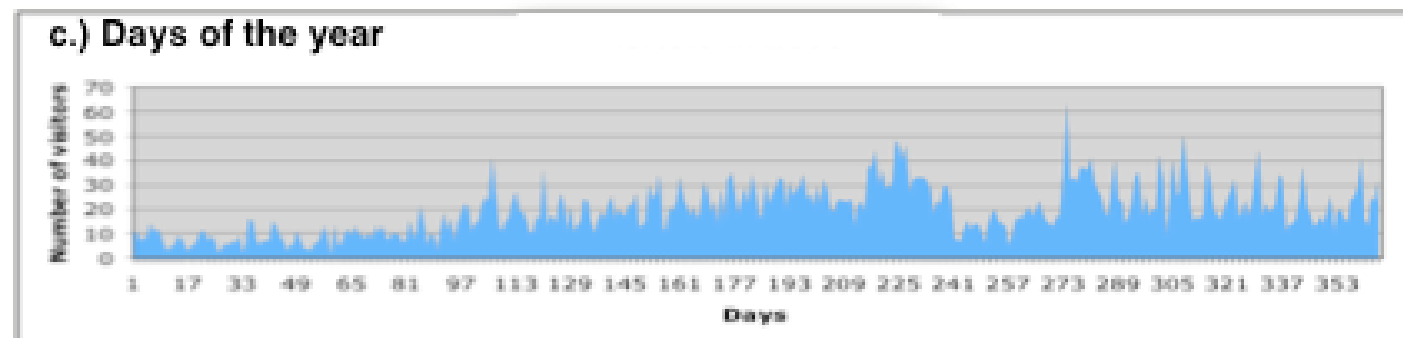
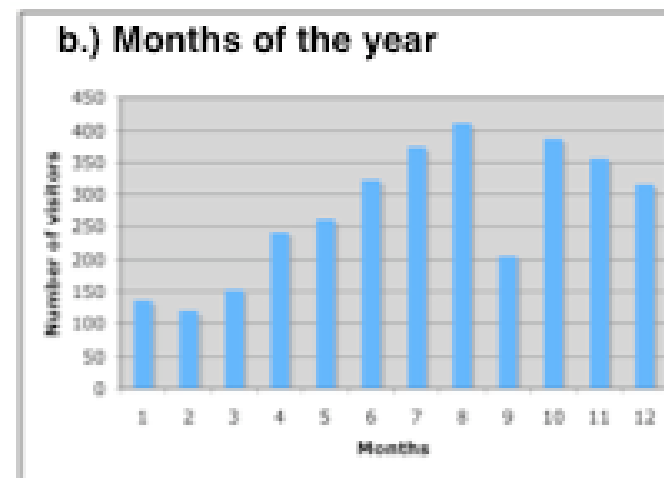
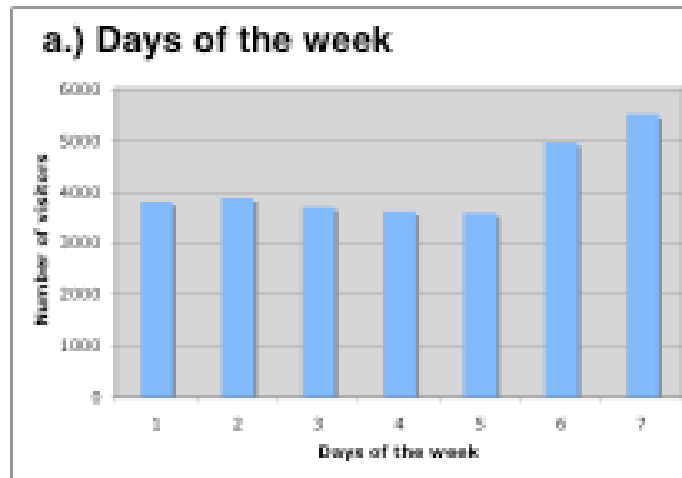


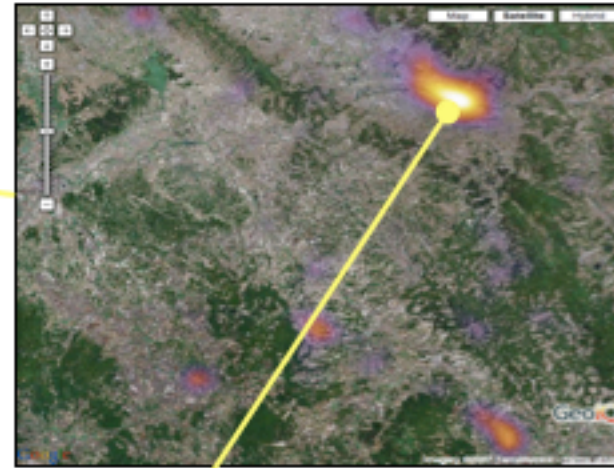
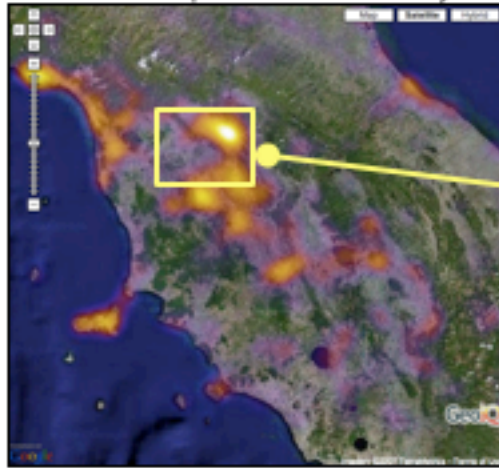
Table 5: Number of users associated to their country of "origin"

country of residence	number of users
not disclosed	1202
Italy	818
USA	440
UK	220
Germany	100
Spain	68
Canada	66
Netherlands	57
France	49
Switzerland	38
Australia	35
Belgium	23
Brazil	21

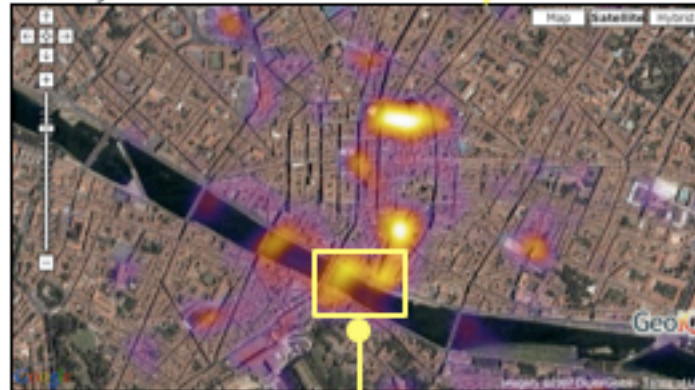
Temporal signatures



Tourist concentration



c. City center of Florence



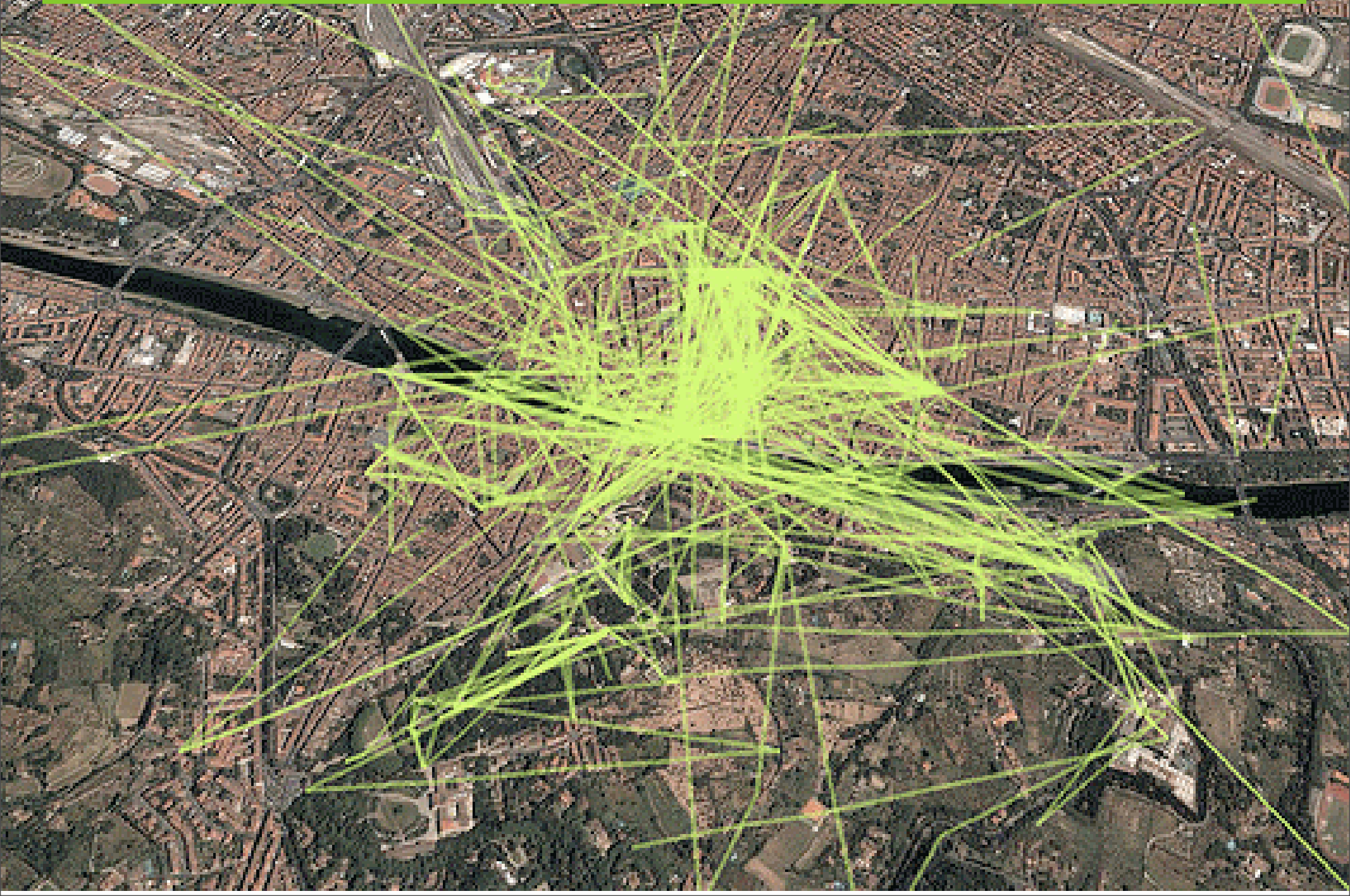
d. Ponte Vecchio bridge



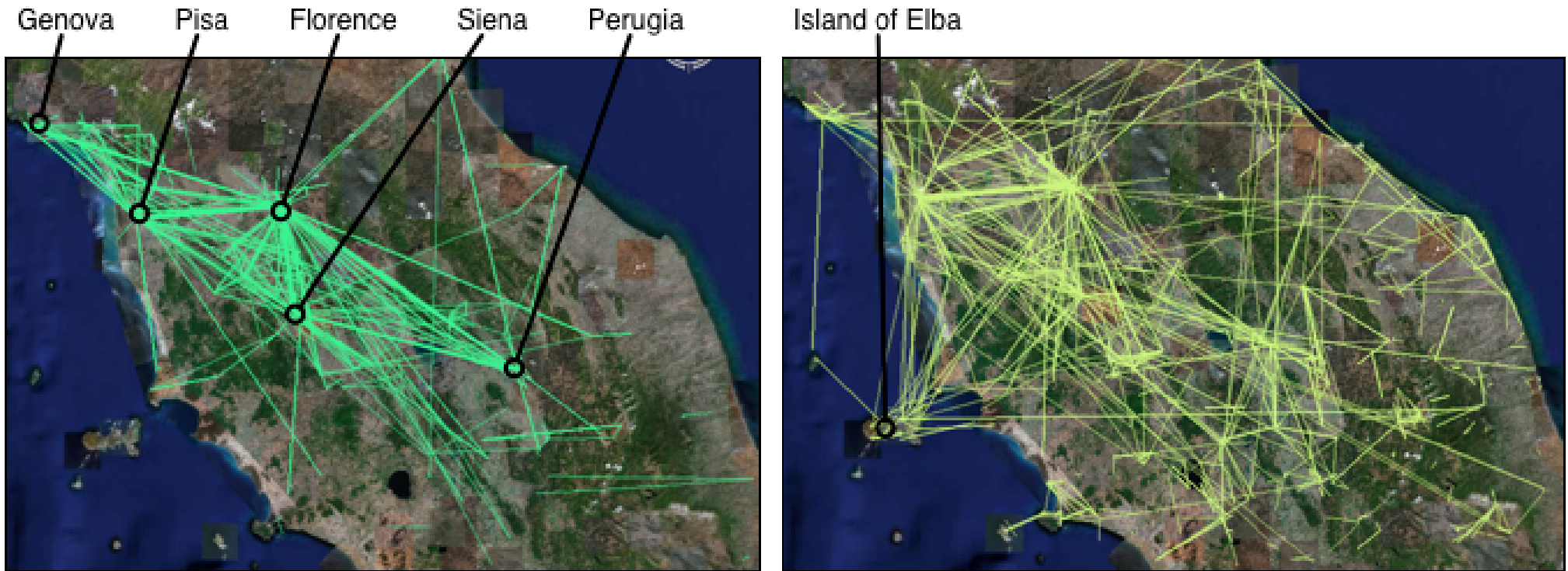
Works in major tourist areas



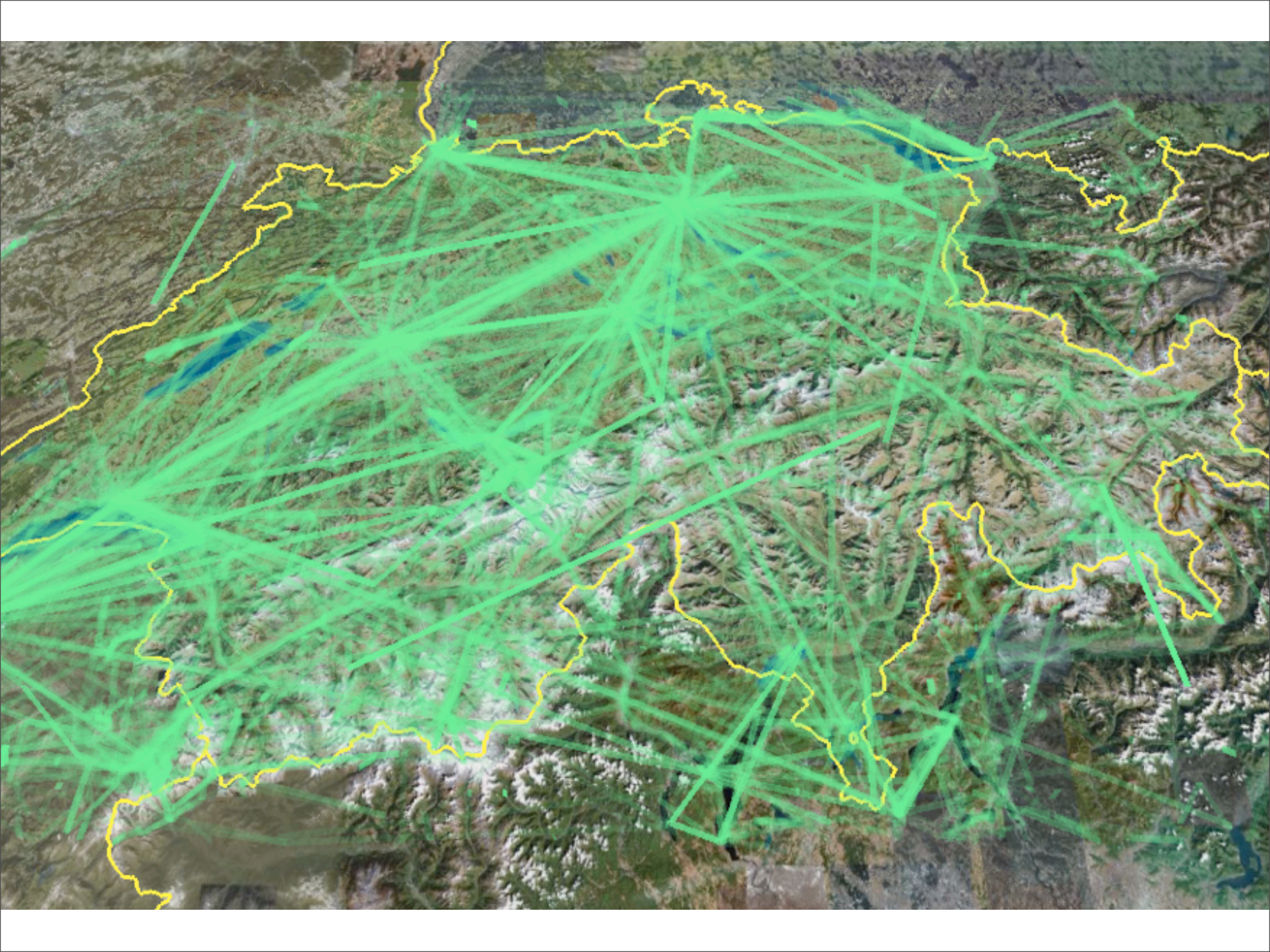
Patterns of flow



Patterns of flow



- They are more difficult to obtain through cross-data analysis on hotel presences



Origin and destination

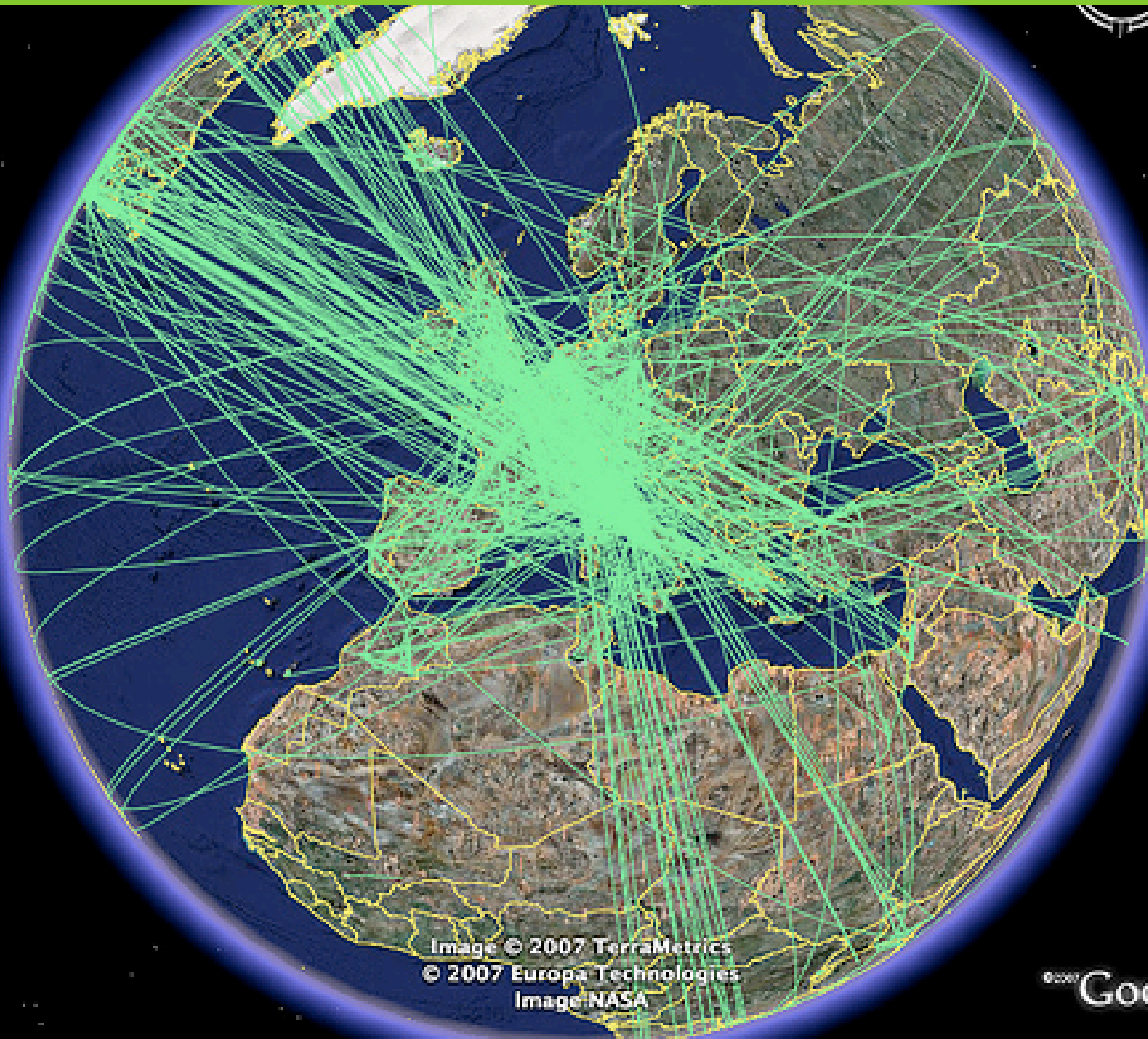


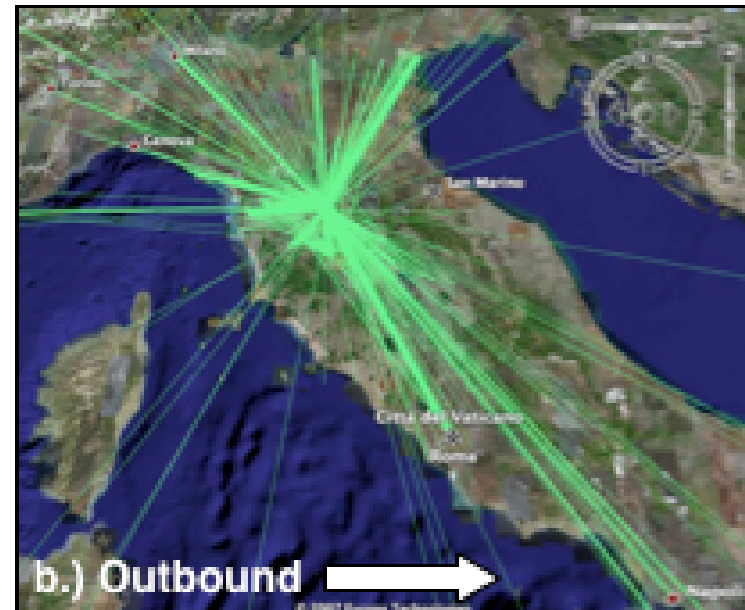
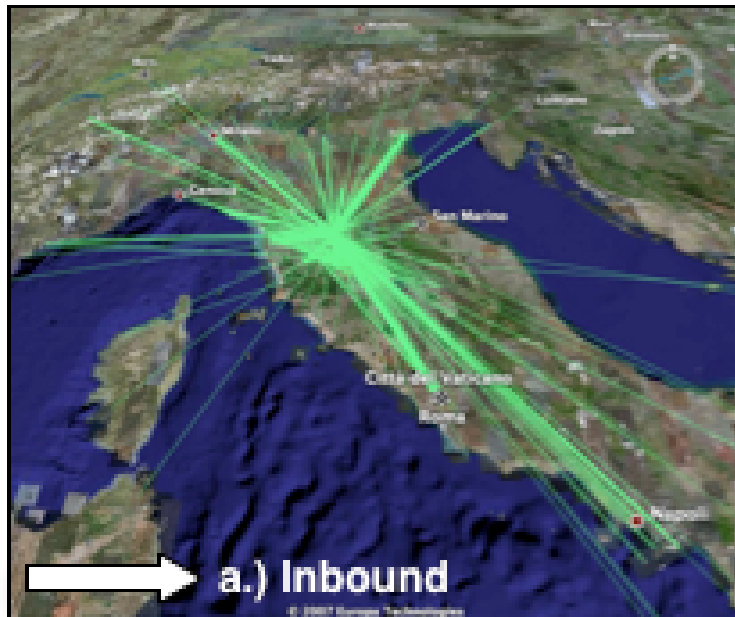
Image © 2007 TerraMetrics
© 2007 Europa Technologies
Image NASA

Google™

Streaming 100%

Eye alt 7007.62 km

Origin and destination



- Day tripper become visible

Limitations

- Tourist population is skewed (tech savvy)
- Data not fully trustable (timestamp, location quality) -> uncertainty

Opportunities

- Flickr contains more than 20 million photos linked to a physical location (as of March 2007).
- Cities such as London or New York contain each more than 250'000 photos and counting (growing pace of around 400 photos per day in London)
- “Quantify” maps and extrapolate data (database query)
- Return collective knowledge to users

Take aways

- Complementary perspective from new types of digital footprints for mobility / urban / travel studies
- Act of communication “I was here”
- Scalable, longititude, infrastructure-free
- Inform the design of LBS
define area of attention, influence, granularity
- Feedback loop
people's past interactions with the urban environment and infrastructure become recommendations and impact the perception of the space

Future work

- Analysis tool for multiple types of mobility data (GSM, hotel / museum surveys)
- Description of the space (semantic)
- Help create informed decision
- Return the information for awareness (social navigation), different types of mobility

Thank you

Tracing the visitor's eye:

<http://www.girardin.org/fabien/tracing>

Fabien.Girardin@upf.edu