

Workshop: Information and Communication Systems  
and their application to vertical sectors

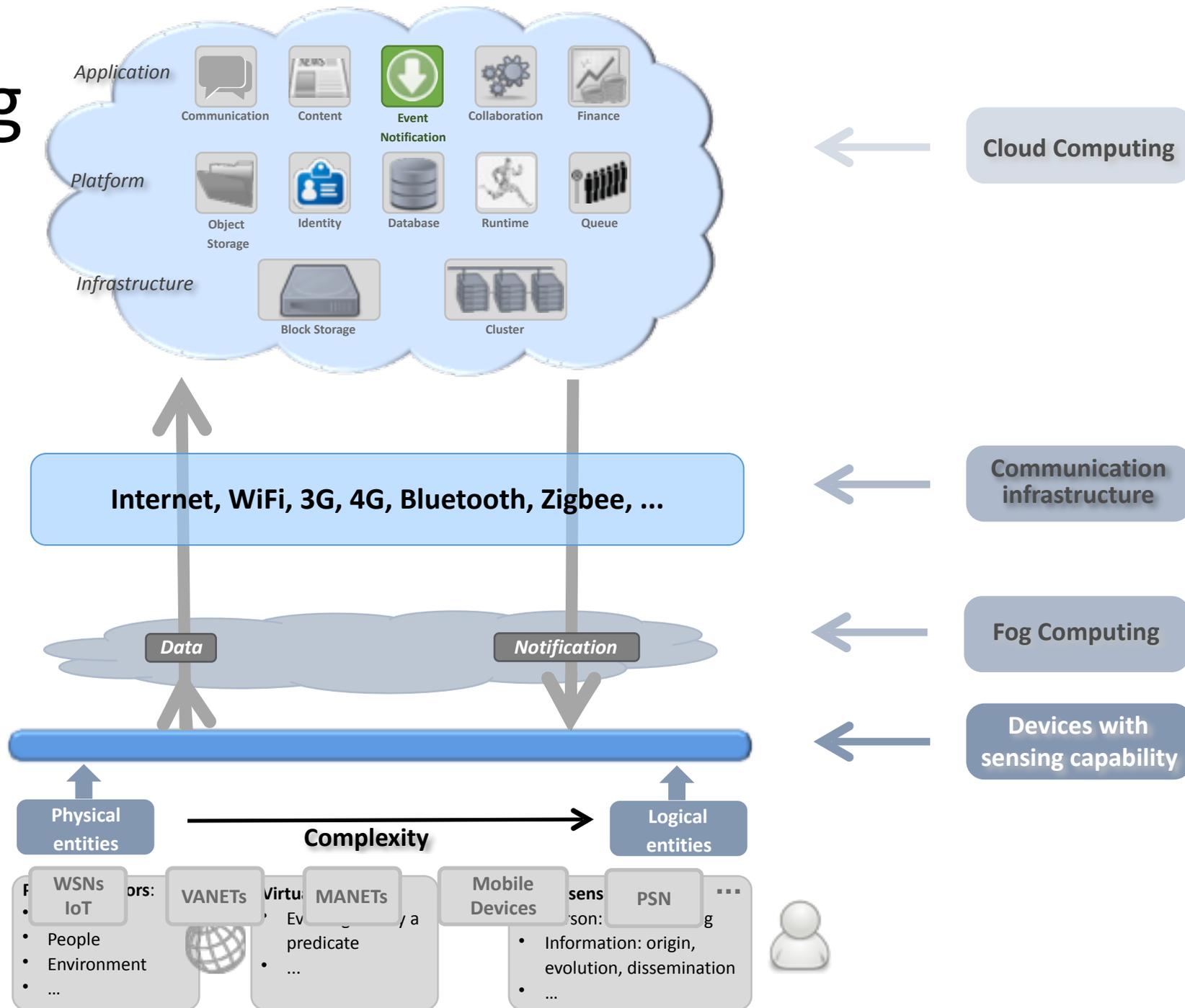
## Urban Social Behavior

Antonio A. F. Loureiro  
loureiro@dcc.ufmg.br

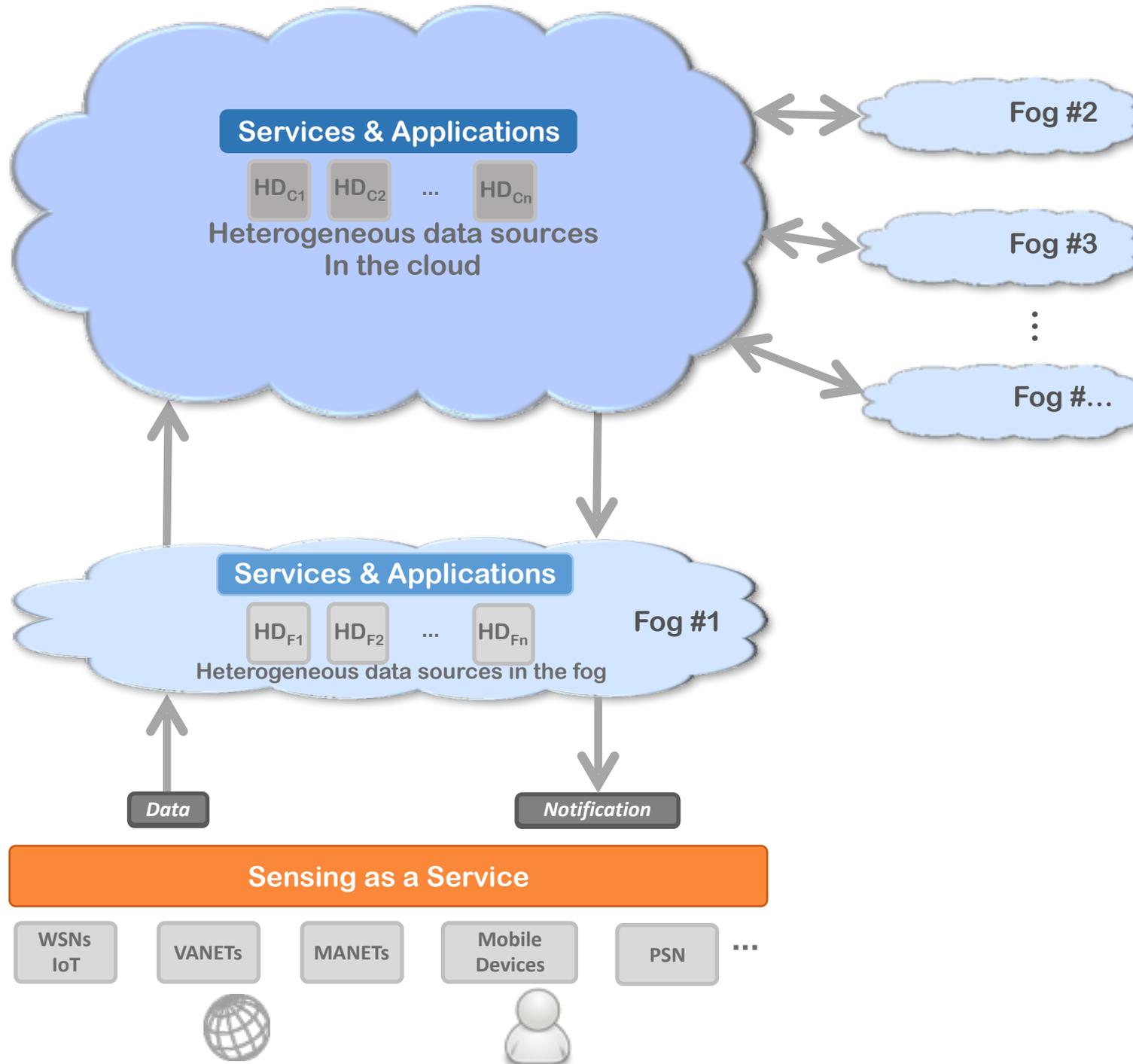
Department of Computer Science  
Universidade Federal de Minas Gerais, Brazil

Joint work with Thiago Silva, Jussara Almeida, Pedro Vaz de Melo

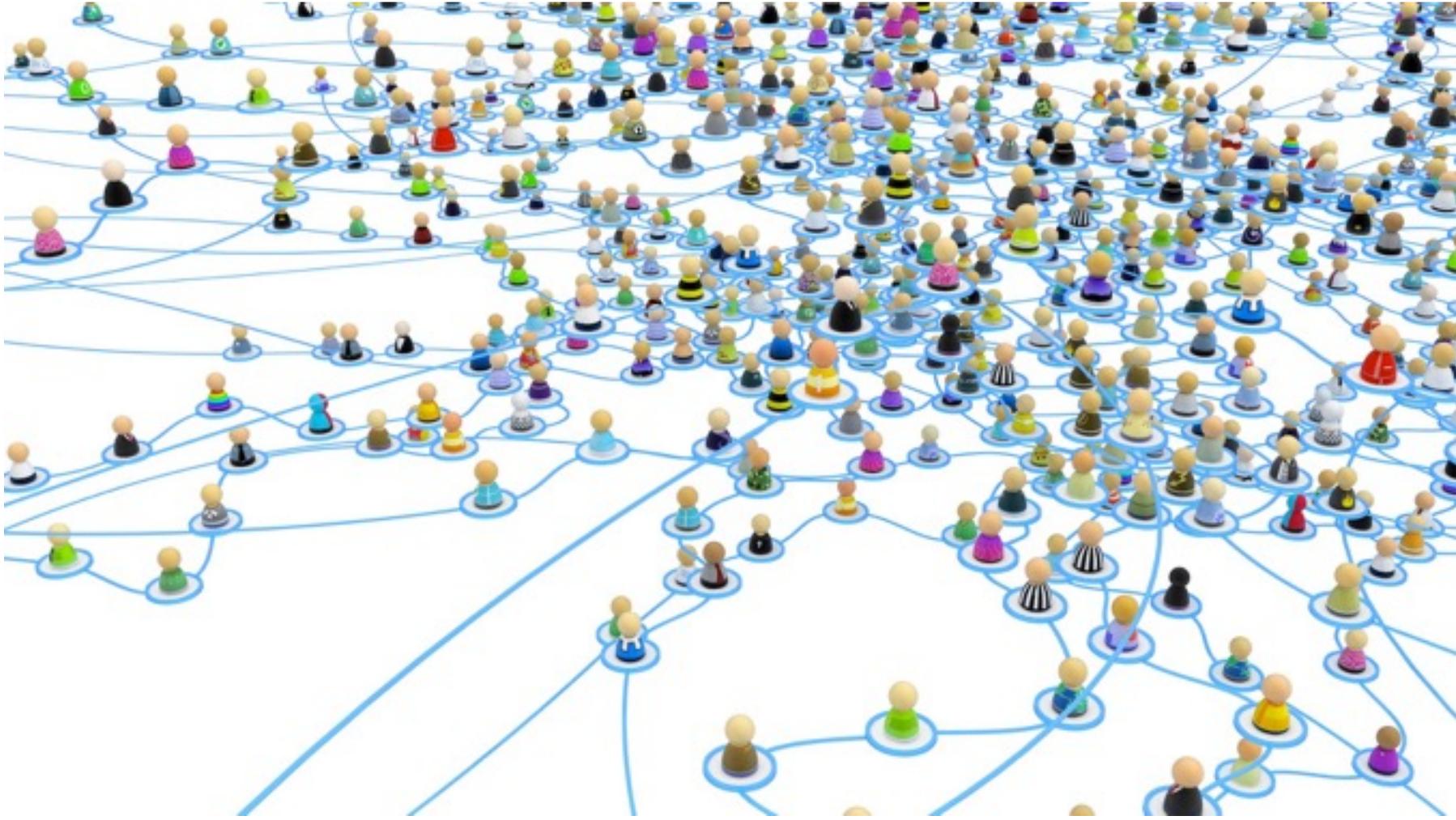
# Sensing in a broader context



# Sensing in a broader context

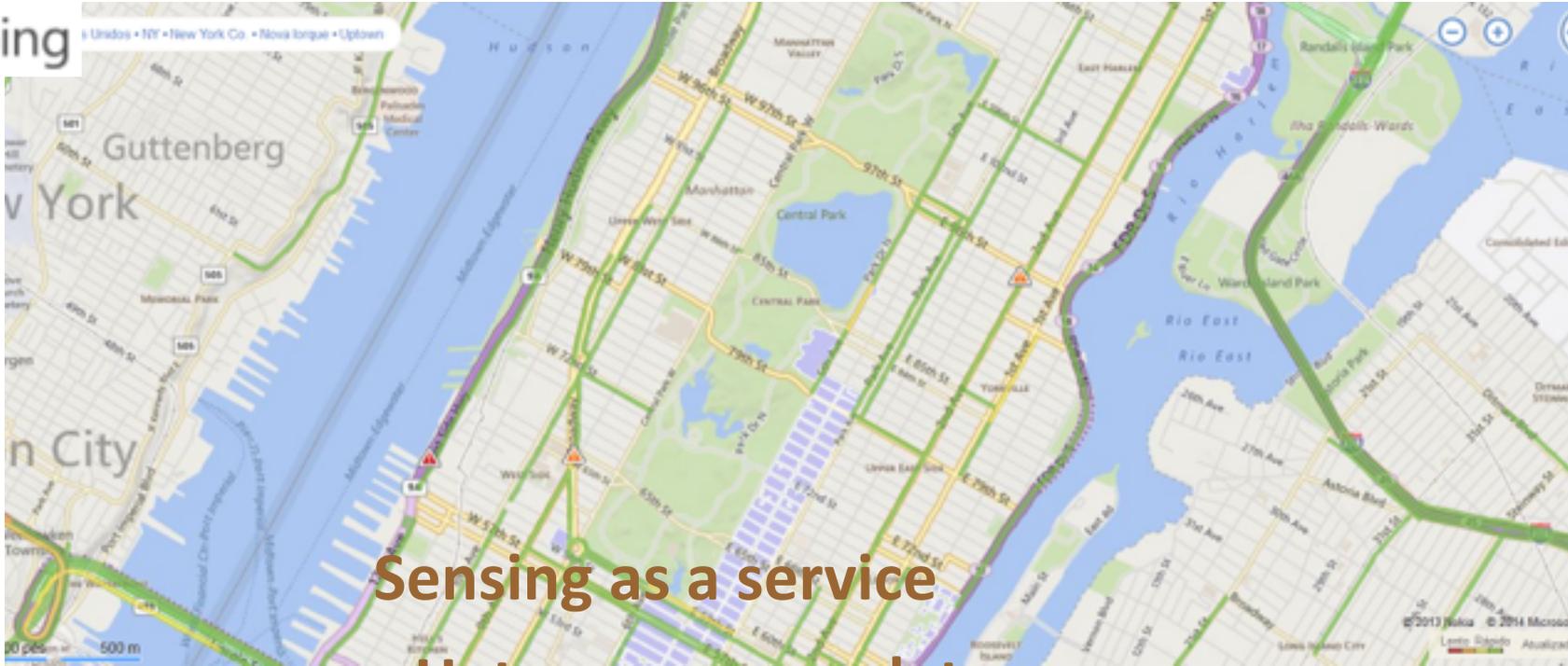


# Participatory Sensor Networks



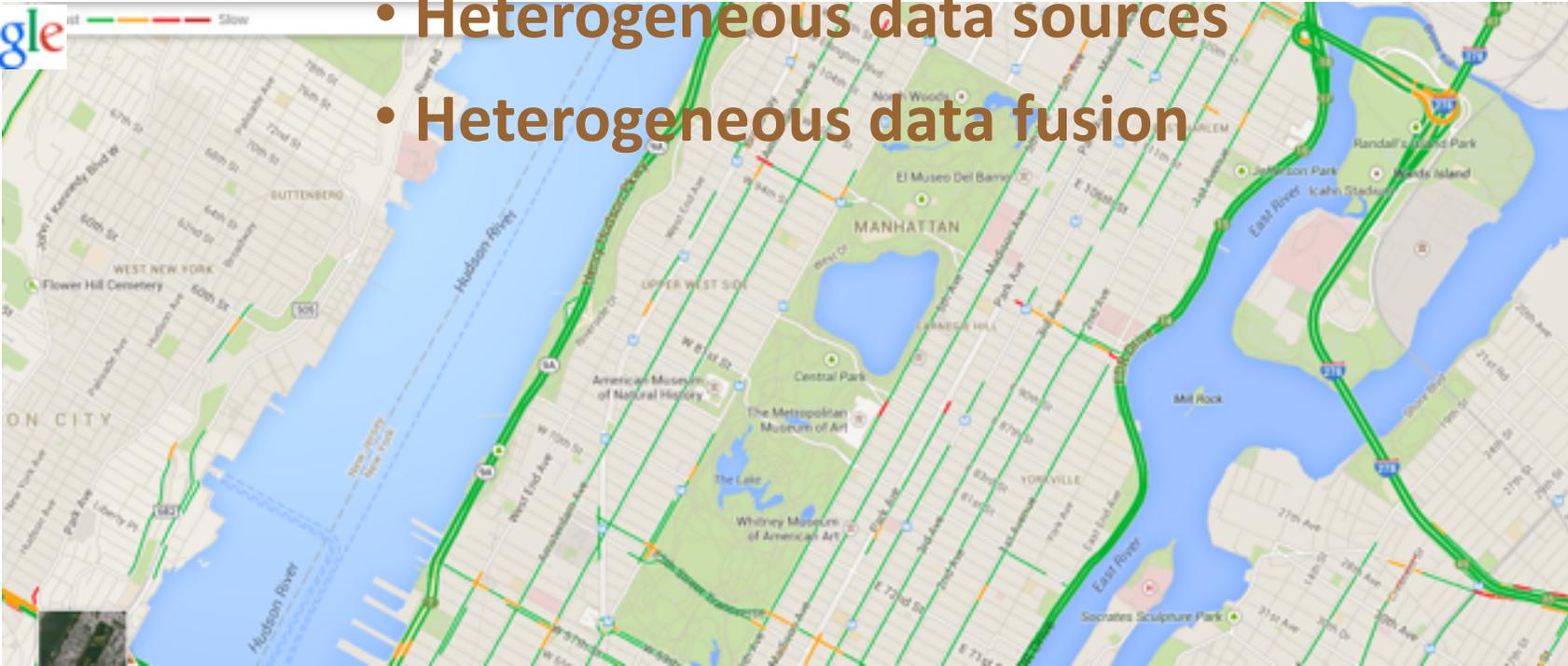
foursquare™  
Instagram

# Sensing in a broader context



## Sensing as a service

- Heterogeneous data sources
- Heterogeneous data fusion



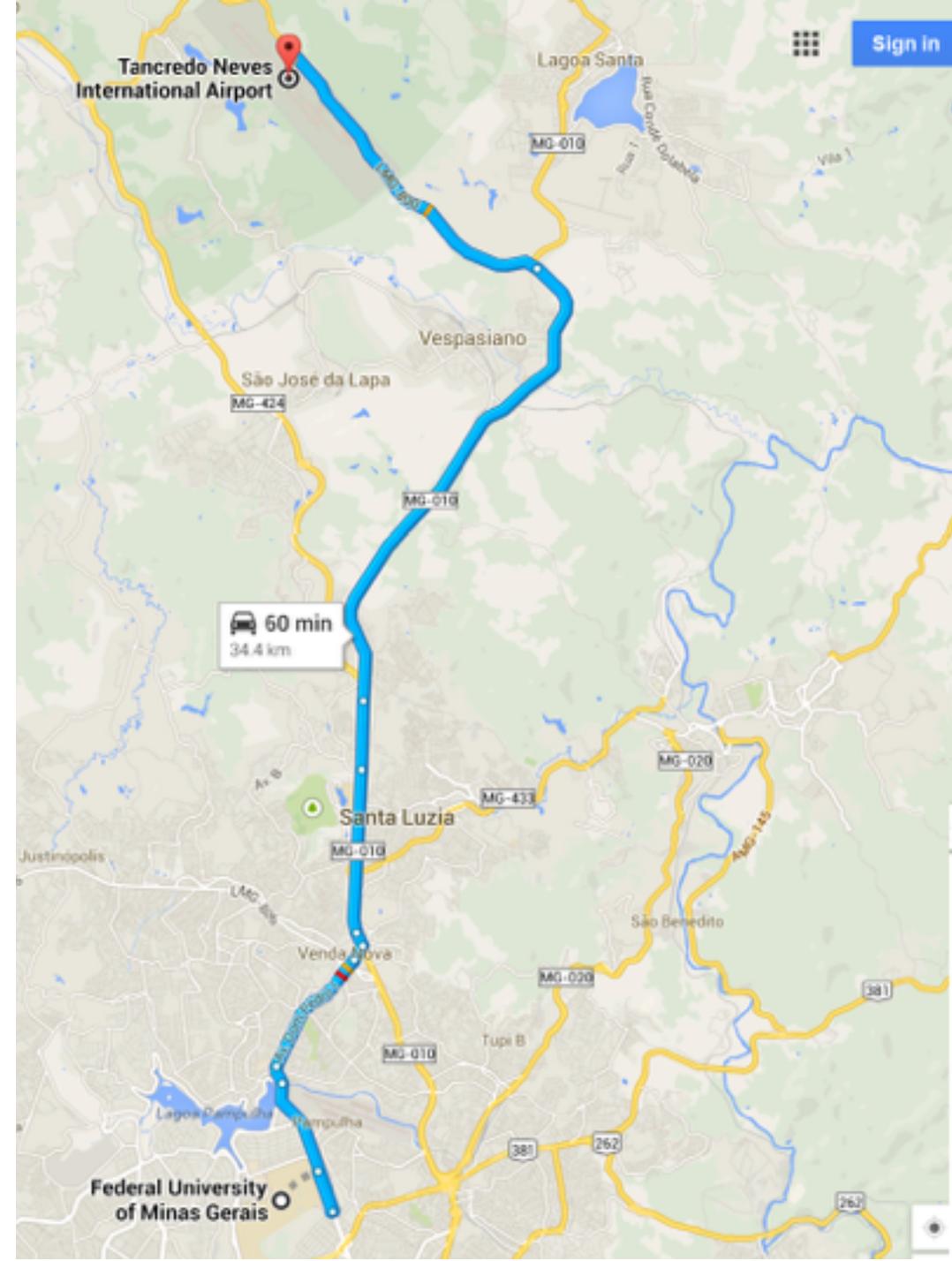
# Sensing

in a broader context

What time should I go to the airport to catch my flight at 6pm?

- Location
- Traffic condition
- Weather condition
- Unexpected conditions
- Parking availability
- Flight/Airplane

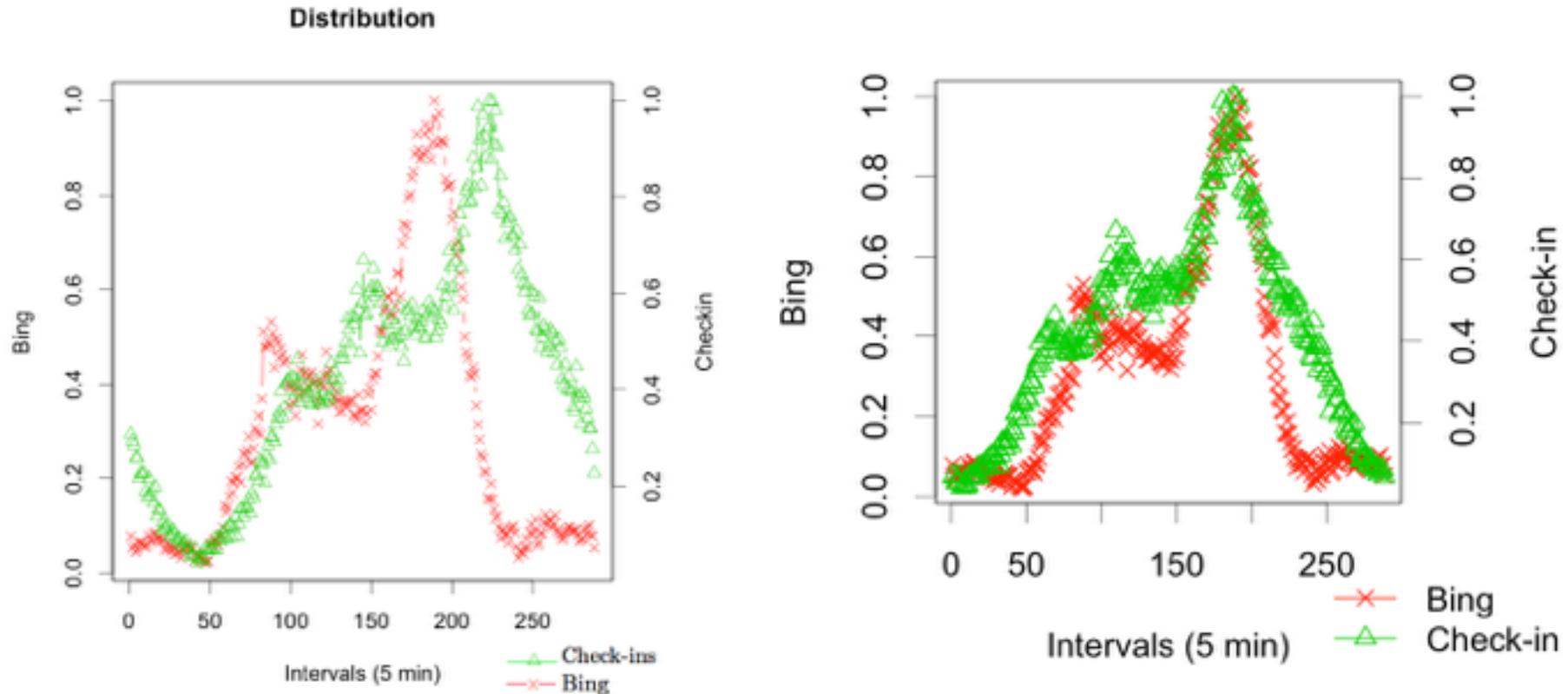
➔ Different data sources



# Sensing in a broader context

An experiment with two data sources: Foursquare & Bing

Is the traffic in New York and Foursquare check-ins correlated?



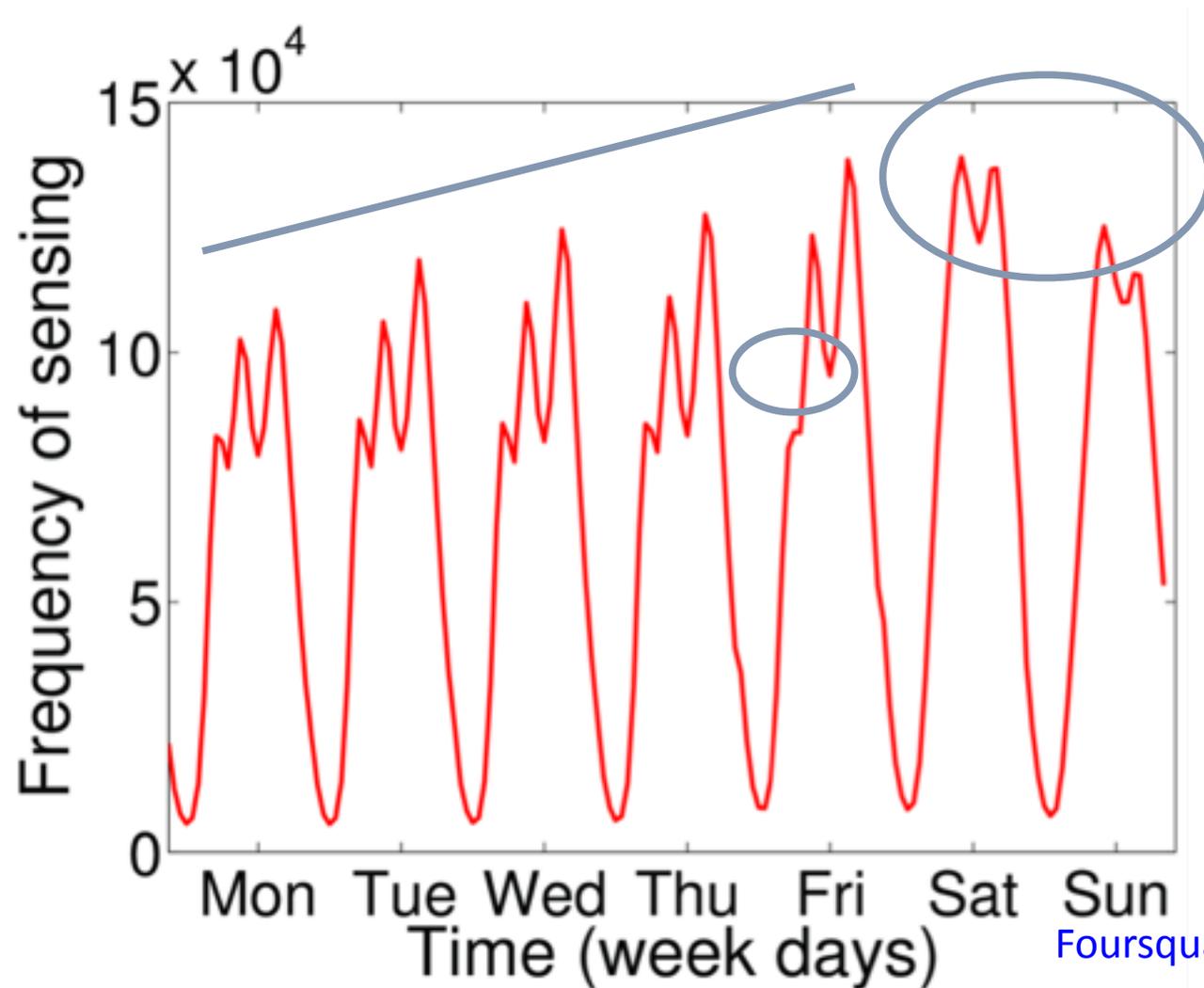
# Sensing in a broader context

## Other similar questions

- Personal habits:
  - What time should my alarm wake me up tomorrow?
- E-health monitoring:
  - Given my routine, what are the opportunities for improving my health with respect to exercises, diet, quality of life,... ?
- Basically, in all areas of our lives!

# Sensing in a broader context

## Sensing seasonality in Foursquare

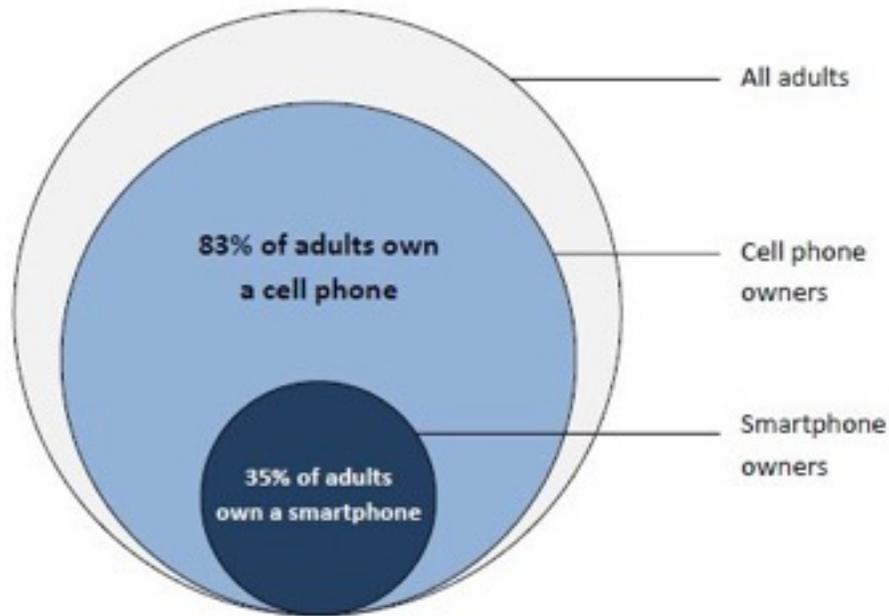


Foursquare dataset

# Smartphones and sensing



Best sensing devices available in the market



28% of American Adults use mobile and social location-based services

<http://pewinternet.org/Reports/2011/Location/Report/Smartphones.aspx>

## Physicist turns smartphones into pocket cosmic ray detectors

Oct. 1, 2014 | by Terry Devitt

Email 14 Tweet 1268 Share 2432



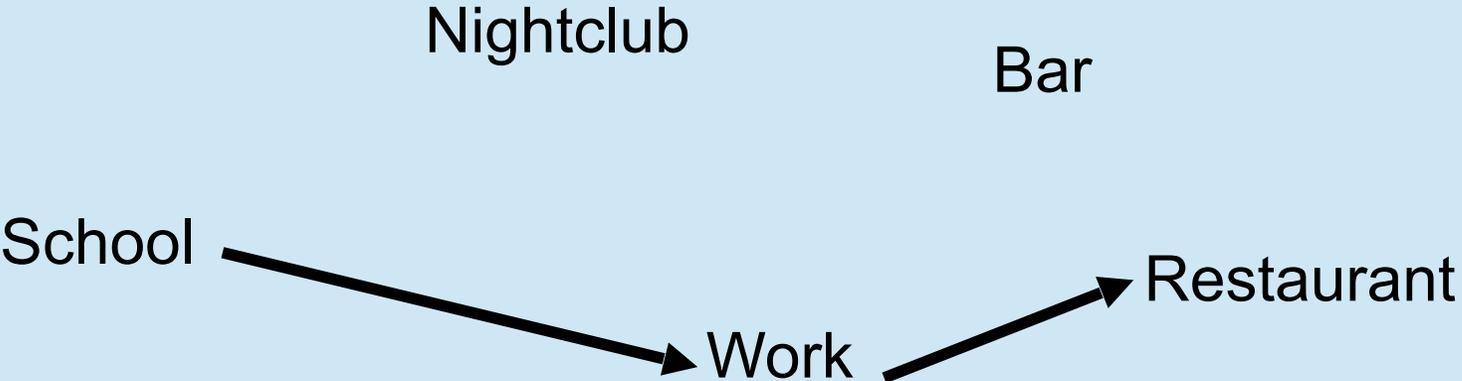
Justin Vandenbroucke, an assistant professor of physics, holds a pair of smartphones in Chamberlin Hall. Vandenbroucke has created a pocket cosmic ray detector app, DECO, which uses the image sensor of a cellphone camera.

# PSN Applicability: City Image

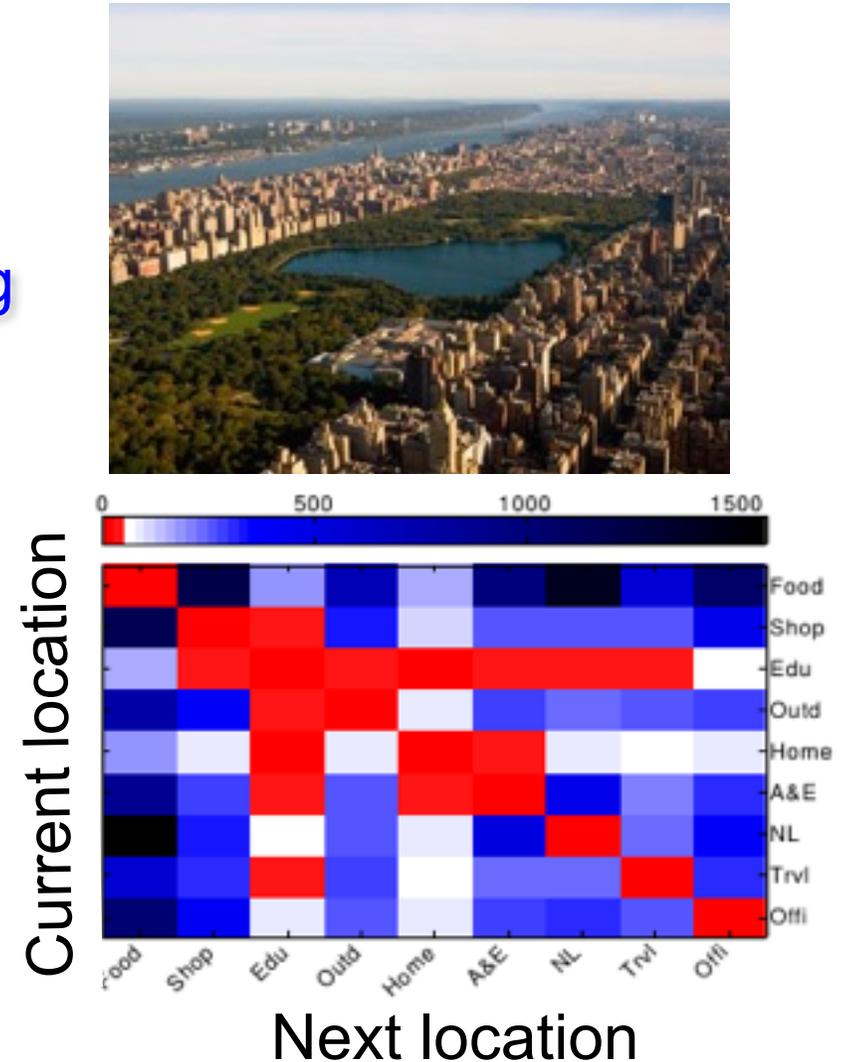
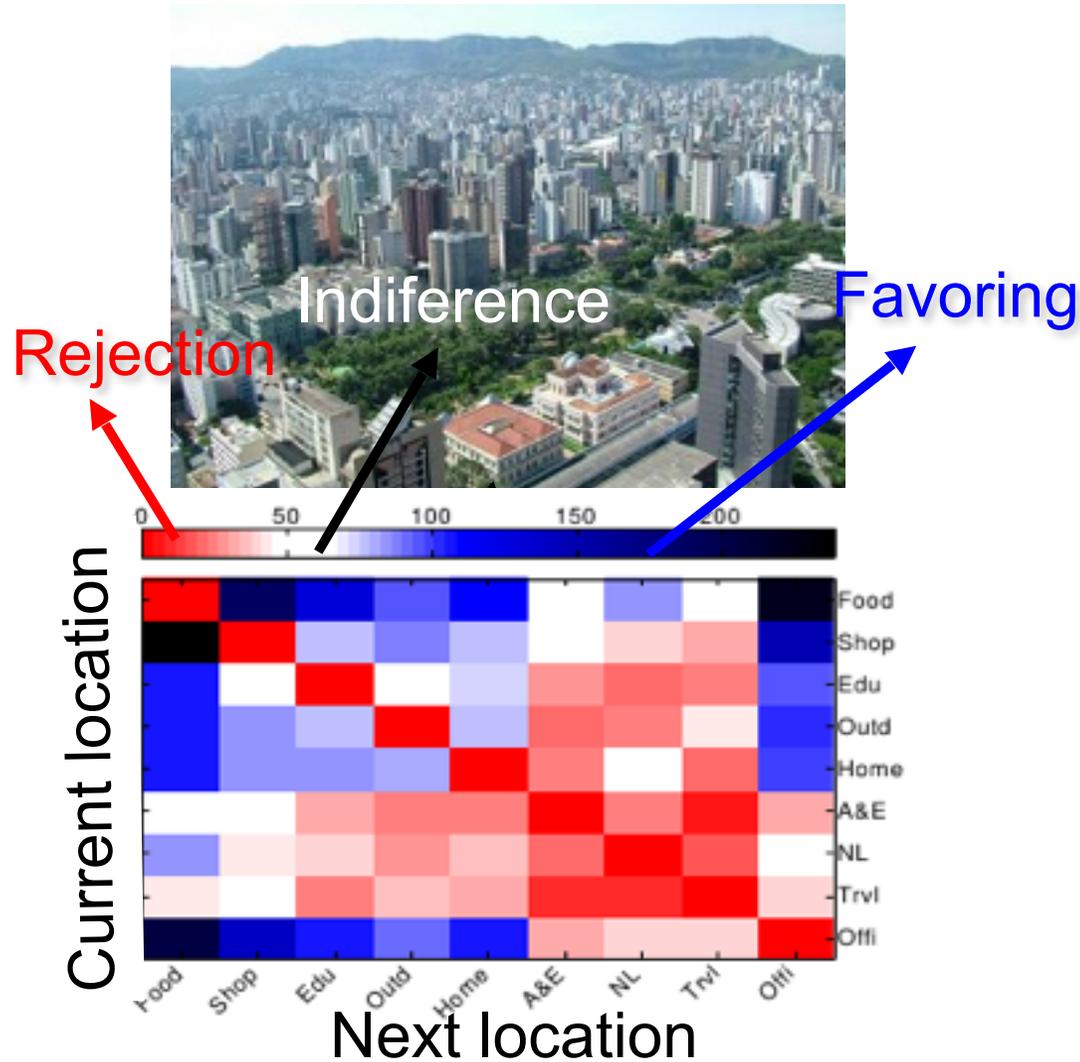


There are more favorable transitions than others

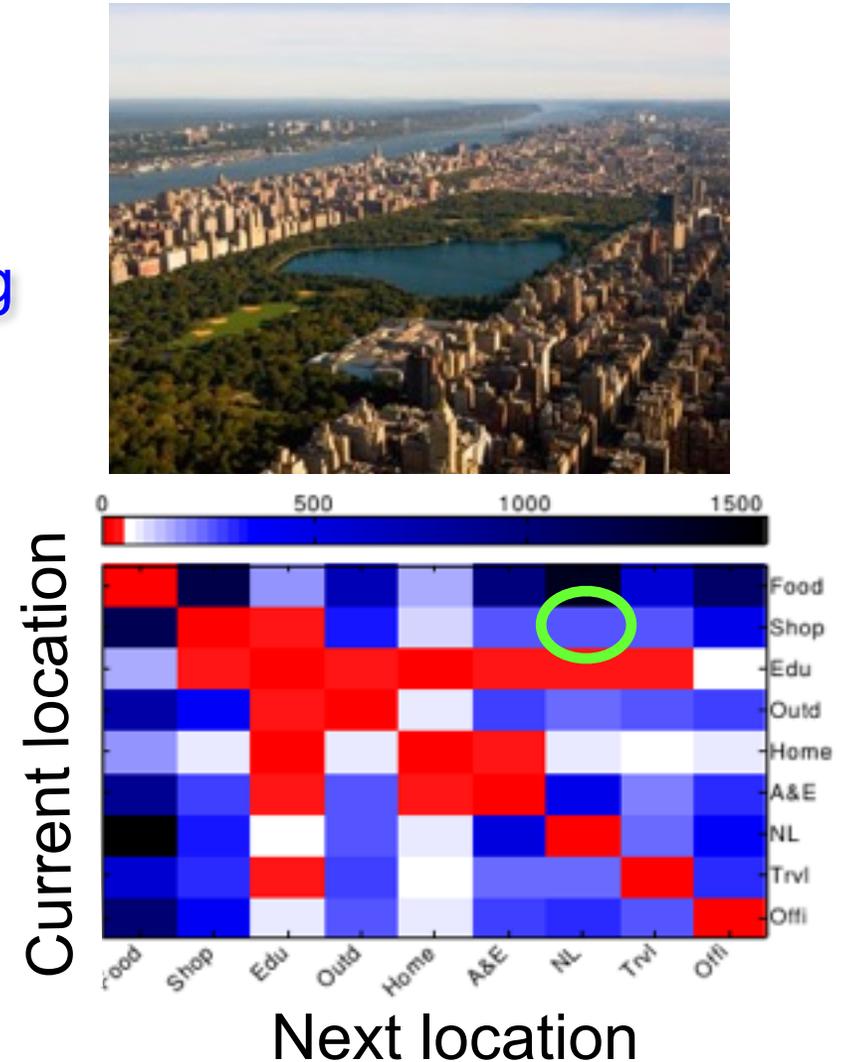
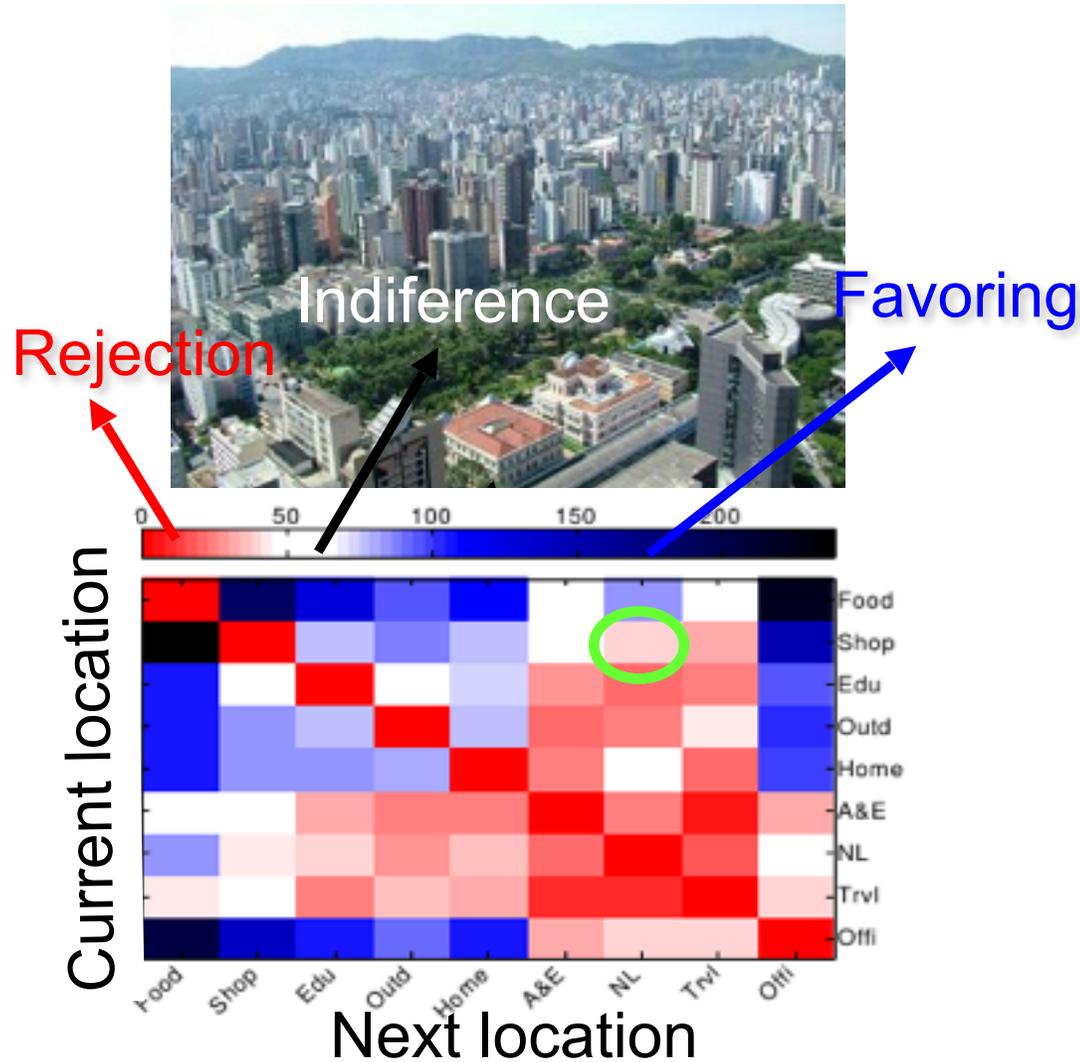
*Typical Monday*



# Mobility models for social communication or the city DNA

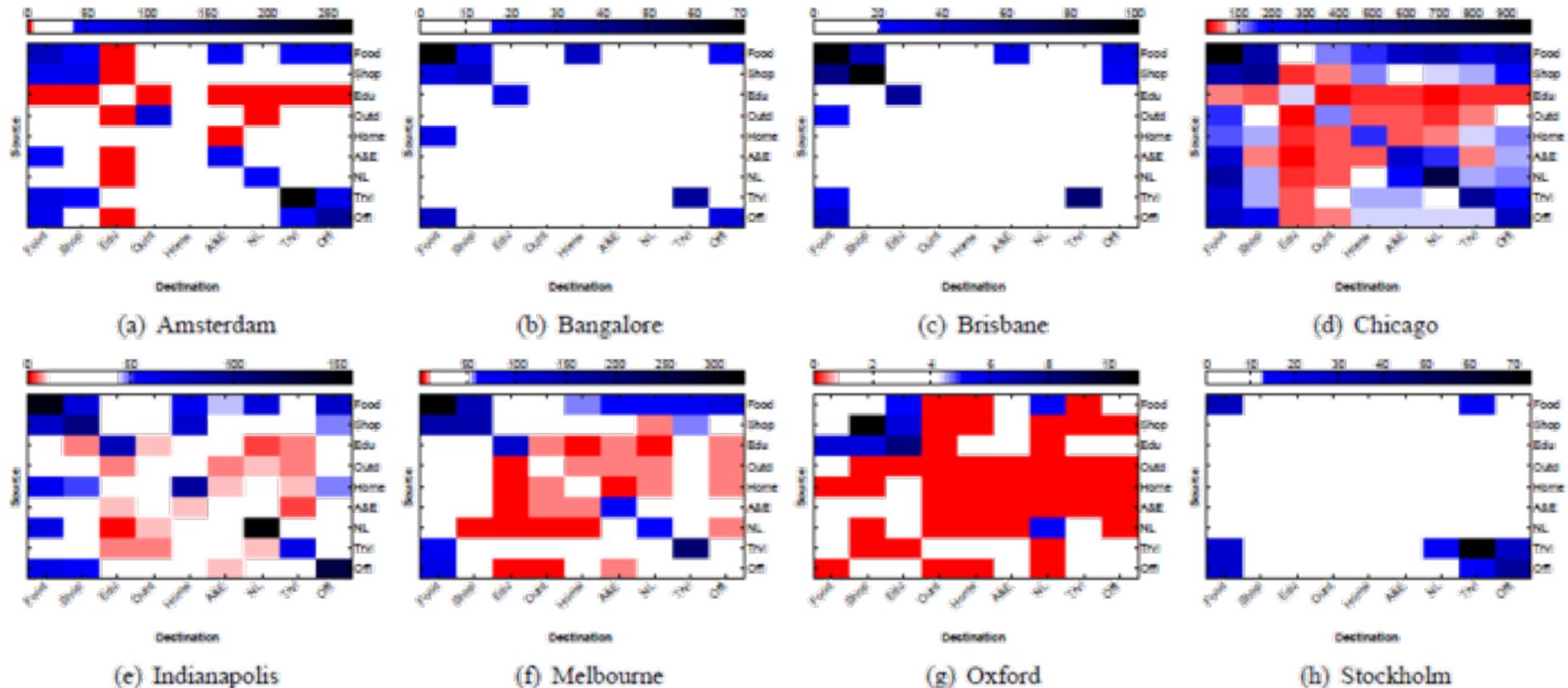


# Mobility models for social communication or the city DNA



# Mobility models for social communication or the city DNA

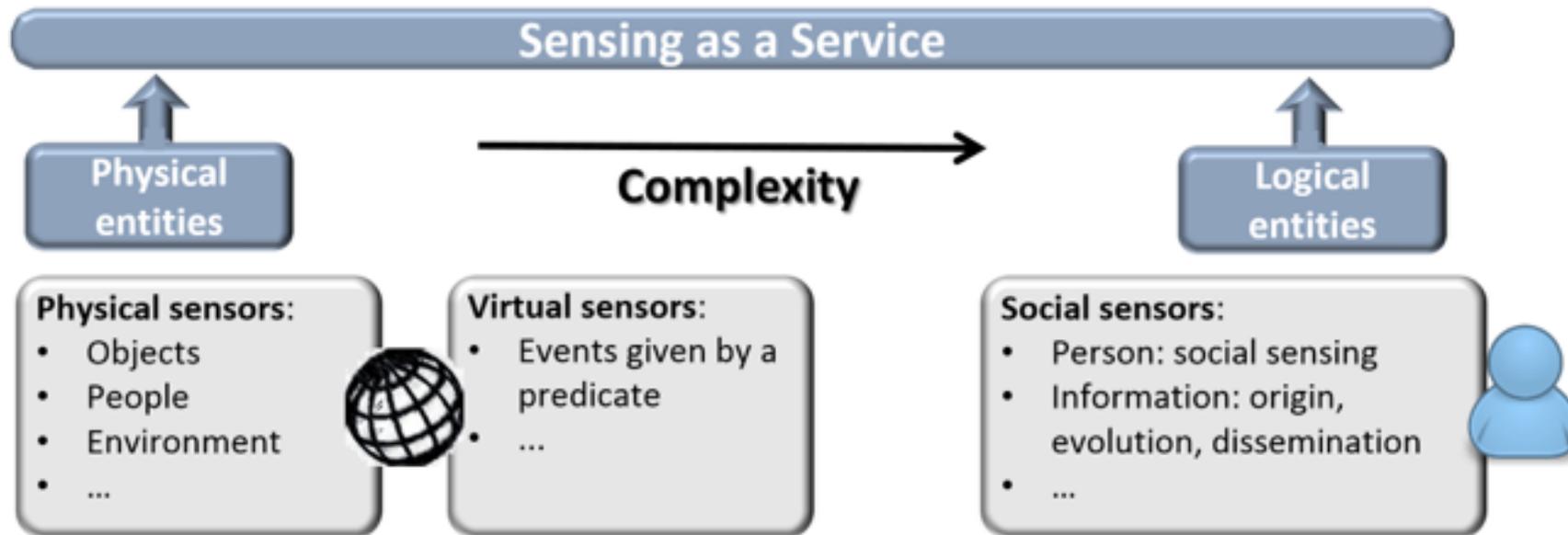
- Example: checkins in Foursquare work as social sensors



# Understanding the challenges

Starts with the sensing and considering  $a, b, c, \dots$

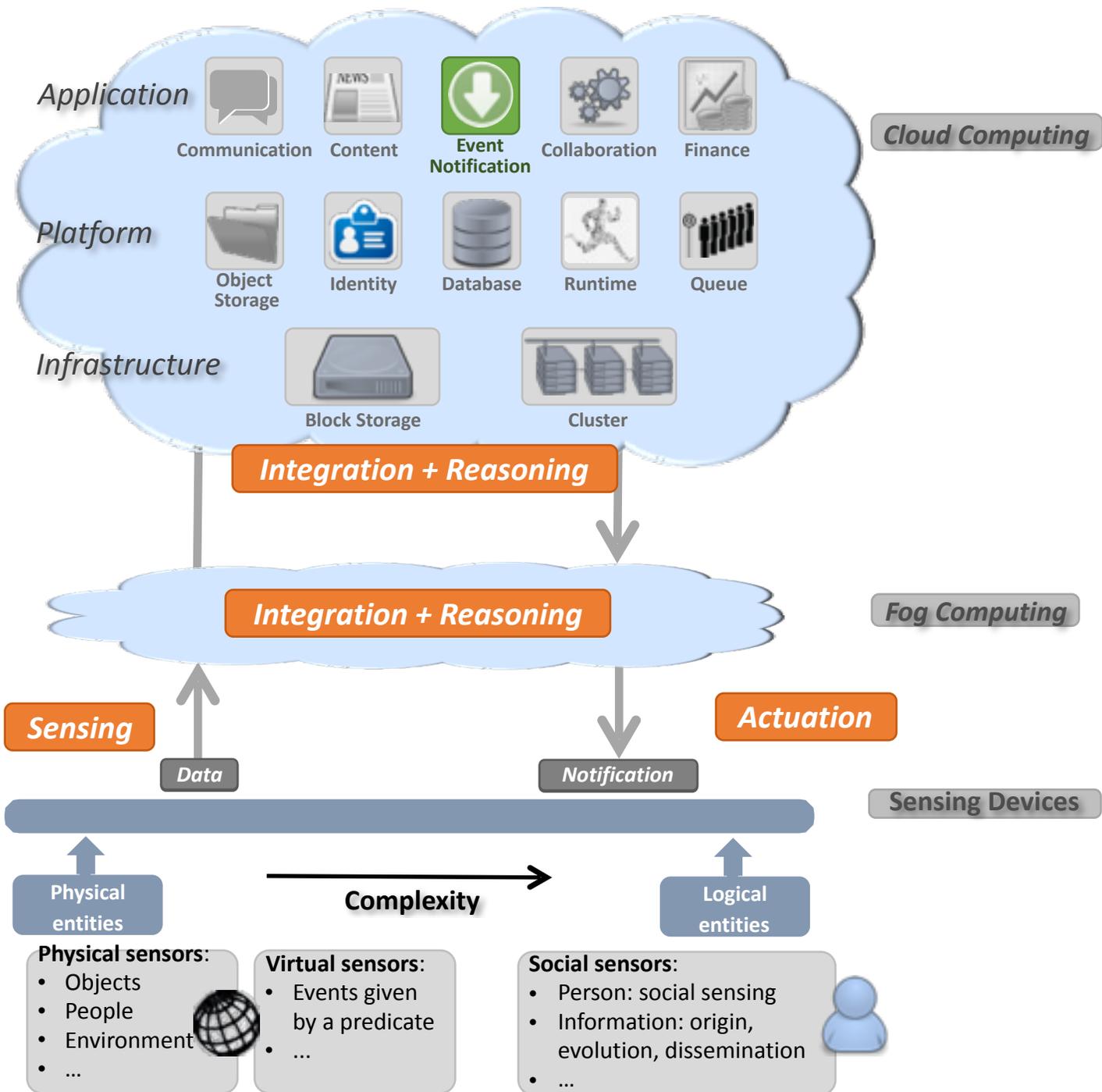
➔ A broad spectrum



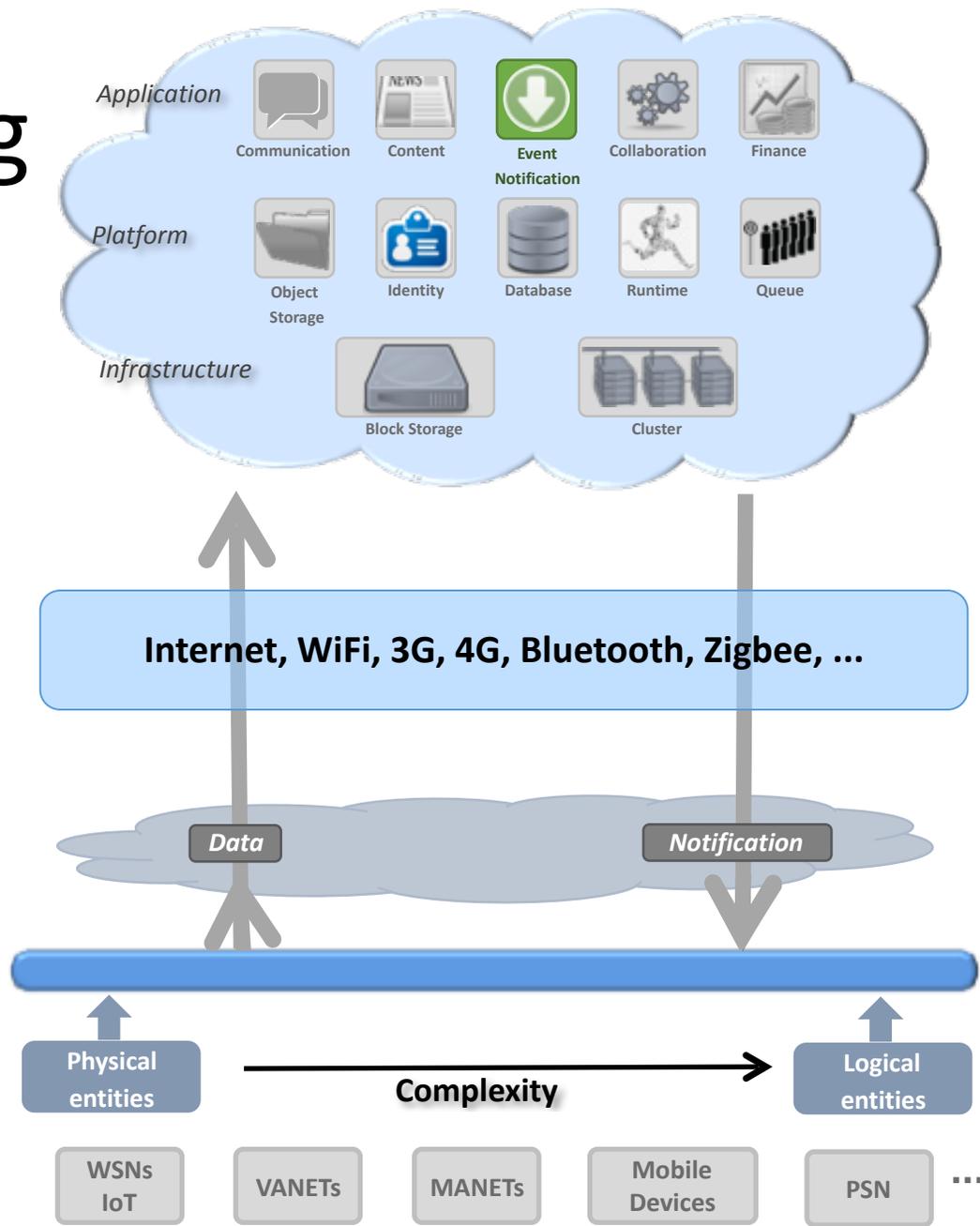
➔ Challenge: treatment of individual sources and combination of them

# Some perspectives

## Integration & Reasoning

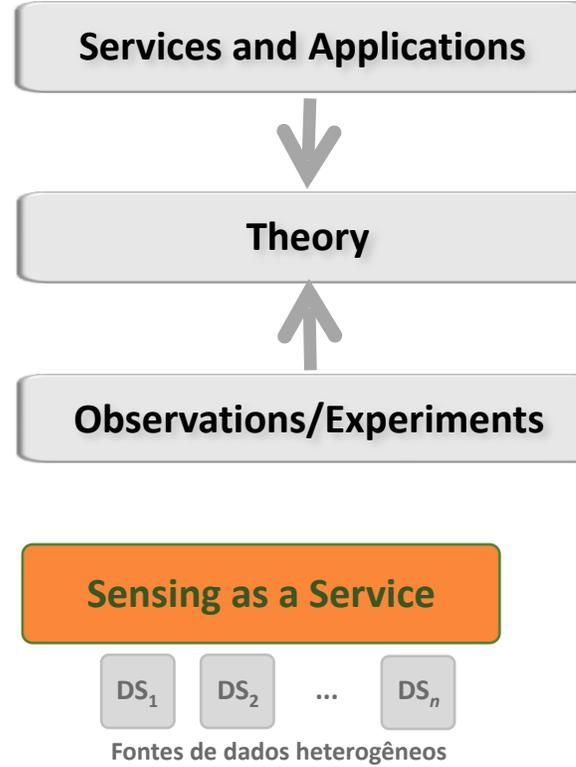


# Sensing in a broader context



## Some fundamental building blocks:

- Heterogeneous data fusion
- Localization & Tracking
- Context awareness
- Privacy
- Cloud offloading
- ....



# Some perspectives

- Open data platform
- Personalized applications and services
- We need advance the state of the art in several different areas
- We need to better prepare our students!

# Conclusion

- We need to understand the data before using it!
- Lots of opportunities!!
- This is the area of the “ice cream problem”



# Thank you!

Antonio A. F. Loureiro  
loureiro@dcc.ufmg.br  
Wisemap Lab

Department of Computer Science  
Universidade Federal de Minas Gerais, Brazil

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