(Universal) City Simulator

Open questions & Ideas for a Joint Research

Purpose of the research

How to make the simulator a reality?

To formalize the ***concept*** and the ***functioning*** of a multi-scale urban simulator, as much as to estimate the required ***resources***.

The aim of the research is to create mathematical and statistical models of an urban environment that allow to simulate urban scenarios and to create an exploratory and decision-making tool.

What is it?

A multi-layered virtual model of the city

- socio-economics characteristics
- physical space properties
- other spatial phenomena

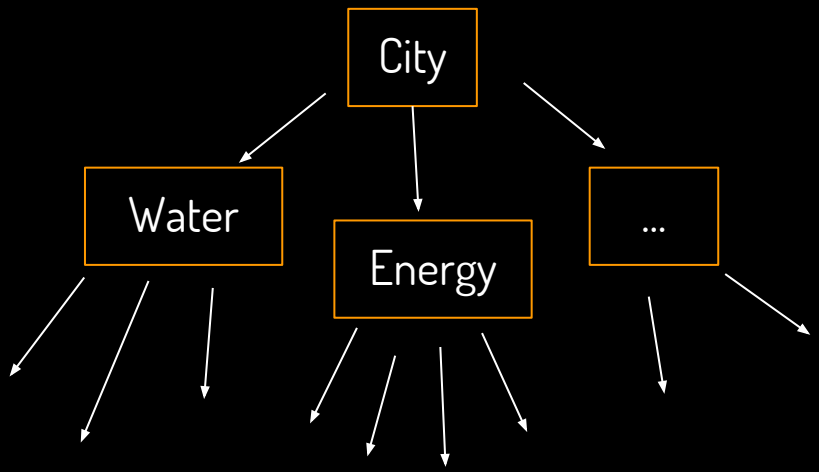
Urban phenomena of interest:

- energy
- water
- mobility
- morphology of the built environment
- socio-economic attributes
- tourism

Challenges

- Highly ***coupled subsystems*** of the City system
  - How to simulate them
  - How to make them communicate with each other
    - how to make information understandable
    - how this information affect other subsystems

- Double approach:
  - Define the City System of systems (set-up the system from the top)
  - Validate the City System structure while modelling its components (reshape the system from the bottom)



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→ Water System - Are its subsystems strongly coupled?

- production
- distribution
- treatment

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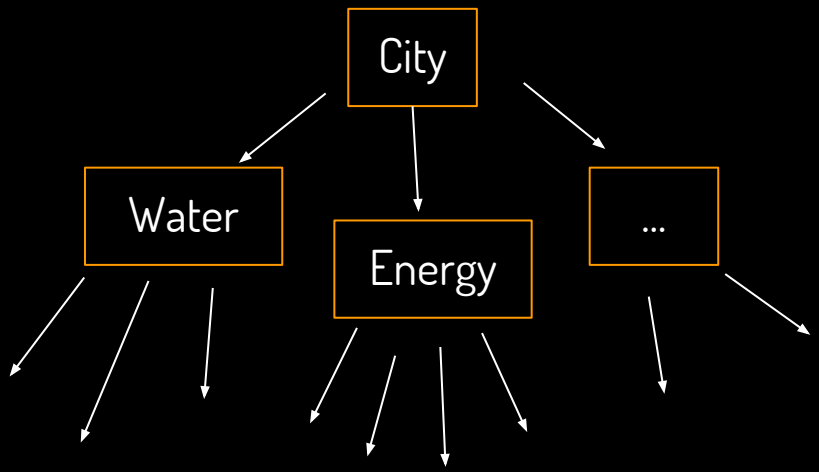

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→ Water System - Are its subsystems strongly coupled?
...No...

- production (climate)
- distribution (city policy)
- treatment (laws)

↓

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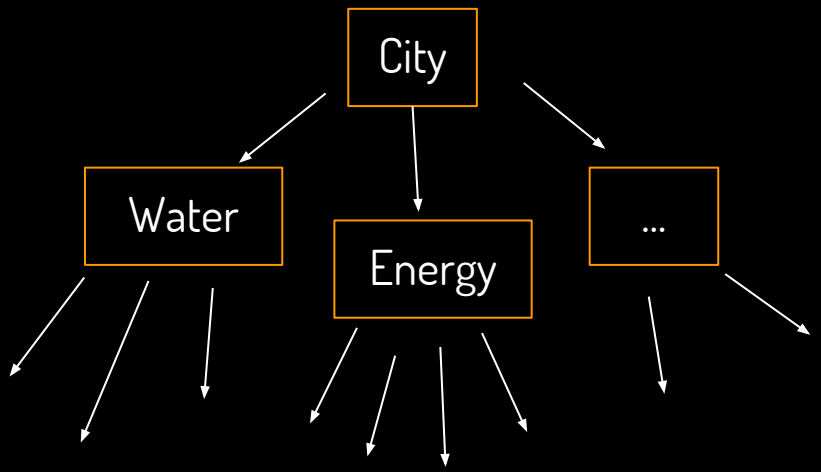


How to measure what people do?

Project #Cuentalo

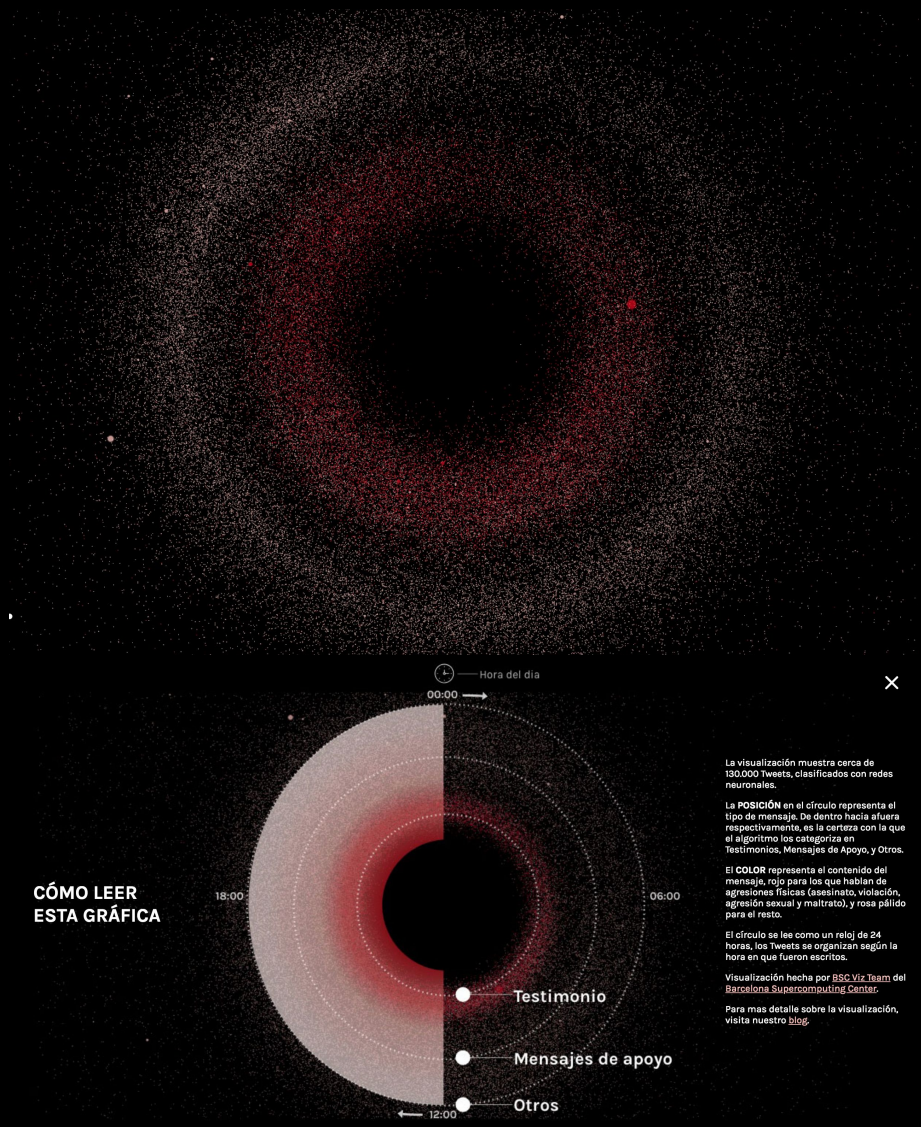
Tweets Analysis

http://proyectocuentalo.org/

Project #Cuentalo

- Topic: Gender-based violence
- 3 millions tweets in 10 days
- 130.000 original tweets

- Supervised Learning
- 10.000 tweets manually tagged (who, thematic)
- Confidence Level:
  Who: 70%
  Theme: 80%



Virtual Social Networks

- Sentiment analysis (text, emoji)
  - Transport system satisfaction (E. Graells-Garrido, D. Caro: Transantiago users' perception)
- Automatically measure metrics from text
  #CityBicyclePath, #StatalTrainNetwork
- Simulating how people interact
- Self-reported data
- Bias
- Written production
- Irony - Sarcasm

Thank you