LIVE Singapore!
DATA BROWSER

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team
Rex Britter, Benedikt Gross, Thomas Holleczek, Kristian Kloeckl, Joseph Kang Lee, Martina Maitan, Naveen Nandan, Christopher Pietsch, Abhinav Rajan, Carlo Ratti, Oliver Senn, Anthony Vanky, Liang Yu
enormous amounts of data generated in our cities
LIVE Singapore!

how to harness these increasing streams of data for the better understanding, planning and management of cities
urban demo 2011
LIVE Singapore! @ SAM

real-time talk

Singapore's mobile phone penetration is above 140%, many own more than one device. How do we make use of the island's cell phone network via voice calls and text messages? How can this inform us about the usage of urban space in real-time? Find out by looking at this map, where height (logarithmic scale) and color intensity (linear scale) indicate the level of cell phone network usage.
urban demo 2012
visual explorations of urban mobility
complex process

multidisciplinary team

several months
how to transform a lengthy and complex process...
...into a tool for many to use
LIVE Singapore! data browser

enable others to put their hands into big urban data
What is this for?

. overcoming the limitation of existing data management platforms (GIS, data cube, ...)

. combining, manipulating and visualizing large data streams and data sets

. gaining new insights into urban dynamics

. exploring opportunities for new applications by data combinations
Who is this for?

- organizations that generate diverse data
- cities to bring together diverse data
- broaden the participants in a discourse based on data
- expert and non-expert users
Data browser process sequence

- **Sources**
  - Sensor networks
  - Urban systems (telco, transport, energy, ...)
  - Stream simulator

- **Upload**
  - Data connectors
  - Data base subscription

- **Semantic Structuring**
  - Semantic description

- **Extraction**
  - Data processing

- **Reduction**
  - Reduction of values to representable dimensions (x,y,z,color,...)

- **Front end – representation and interaction**
  - Pallet of visualization modules
  - Final visualization
  - User interaction modalities
### Data browser process sequence

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<td>reduction of values to representable dimensions (x,y,z,color,...)</td>
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<td>data base subscription</td>
<td>ontology</td>
<td>operations (aggregation, interpolation,...)</td>
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#### Front end - representation and interaction
- pallet of visualisation modules
- final visualisation
- user interaction
- modalities
- API

**plug-in modules for operations**

**Monday, November 26, 2012**
How can people access it?

- web application
- stand alone application
- plug-in tool system
- ...

- urban demo 2013 with reduced and simplified interface for a wide audience
Urban Demo 2013 @ Singapore City Gallery
interface and interaction for general public

Monday, November 26, 2012
Urban Demo 2013 @ Singapore City Gallery
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- Incoming data feeds
- Selection of data domains
- Selections of time period
Urban Demo 2013 @ Singapore City Gallery
interface and interaction for general public

- Incoming data feeds
- Selection of data domains
- Selections of time period
- Selection of domain values
- Combination of data types
Urban Demo 2013 @ Singapore City Gallery
interface and interaction for general public

zone 1
- Incoming data feeds
- Selection of data domains
- Selections of time period

zone 2
- Selection of domain values
- Combination of data types

zone 3
- Customization of visualization
- Viz interaction/exploration
- Final result saving
Urban Demo 2013
interface and interaction for general public

animation of user interaction
Singapore map is shown
Singapore map is shown
Multiple data streams originating in the city
Multiple data streams originating in the city
A set of icons represents all available data domains.
A set of icons represents all available data domains.
The user selects one
The user selects one
Information about the selected data stream
BUS
Do aute cupidatat sint laborum ipsum exercitation amet do, nisi minim anim duis incididunt eiusmod excepteur deserunt. Et id non; veniam qui sint elit laborum dolor sunt; dolor culpa consequat culpa sit ipsum nostrud voluptate ullamco.

DATA PROVIDER:
Dolore consectetur fugiat cillum ullamco ex aliquip, ad dolor
The user can select a time period.

**DATA PROVIDER:**
Dolore consectetur fugiat cillum ullamco ex aliquip, ad dolor

**OBJECT:**
BUS
Do aute cupidatat sint laborum ipsum exercitation amet do, nisi minim anim duis incidunt excepteur deserunt. Et id non: veniam qui sint elit laborum dolor sunt; dolor culpa consequat culpa sit ipsum nostrud voluptate ullamco.

**DATA PROVIDER:**
Dolore consectetur fugiat cillum ullamco ex aliquip, ad dolor

Monday, November 26, 2012
The user can select a time period.

**OBJECT:**

**BUS**
Do aute cupidatat sint laborum ipsum exercitation amet do, nisi minim anim dui incididunt excepteur deserunt. Et id non: veniam qui sint elit laborum dolor sunt; dolor culpa consequat culpa sit ipsum nostrud voluptate ullamco.

**DATA PROVIDER:**
Dolore consectetur fugiat cillum ullamco ex aliquip, ad dolor
Multiple data types can be selected together
Multiple data types can be selected together.
Adjustment of time period
Adjustment of time period
Activate data streams
Activate data streams
Domain specific values are displayed
Domain specific values are displayed
The user can select specific values and create data combinations.
The user can select specific values and create data combinations.
Information about each value is provided.
Information about each value is provided.
Data streams are sent to the visualization zone.
Data streams are sent to the visualization zone
The data combination is shown on the map.
The data combination is shown on the map.
The user can browse the map
The user can browse the map
The visualization can be customized.
The visualization can be customized
And the results can be saved.
And the results can be saved
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