Urban Social Interactive design: Transmitting Urban Information as a Spatial Mediator in Real-time

_Urban systems design: from “Science for Design” to “Design in Science”_
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The aim of this paper is to conceptualize smart cities through the lens of social interaction, so that the designers, technicians and users think holistically about what the social interaction of a smart city occurs, and how data collected in real-time for urban variables are understood and implemented in design.
To date, research on smart cities has typically focused on developing a detailed, fragmented view of the influence of certain design cues on urban design systems.

1. Conceptualizes smart cities from a social interactive perspective and sets up the place seiners of place.

2. Designs a Spatial mediator for an information delivery platform prototype to conduct a field test and interview.

3. Provides insight into what different aspects of the conceptualization of a ‘smart city’ can do to compare existing guidelines.
Smart cities as social interactive place

*Smart city in urban design*

**place and space**

**city**

**place and space**

+ Systems
  + Structures
  + Networks
  + Flows
  + Processes

**Smart city**
Smart cities as social interactive place

Social Interactive place

Transmitting urban information for social interactive place
## Place scenarios in smart city

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<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>San Fran Emotional Map by Christian Nold</td>
<td>The San Francisco Emotion Map is an attempts to records the wearer's physiological reaction to the surroundings. Participants will go for a walk carrying the device and the data was then collected and visualized on the map to the right with color dots and annotations.</td>
<td><a href="http://www.sf.biomapping.net/map.htm">http://www.sf.biomapping.net/map.htm</a></td>
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<td>2</td>
<td>Piano stairs by TheFunTheory</td>
<td>Piano staircase is a staircase at Odelpaln subway exit at Stckhom. Light comes out of stairs by overlaying contact switch that looks like piano keyboard depend on people’s behavior.</td>
<td><a href="http://www.thefuntheory.com/piano-staircase">http://www.thefuntheory.com/piano-staircase</a></td>
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<td>3</td>
<td>Gates of light</td>
<td>The Afsluitdijk is the 32-kilometer-long dike which protects the Netherlands against water and flooding. The structures have been fully restored and augmented with a retro-reflective layer. In the dark, the architecture of these structures is illuminated by the headlamps of passing cars.</td>
<td><a href="https://www.studioroosegaarde.net/project/gates-of-light">https://www.studioroosegaarde.net/project/gates-of-light</a></td>
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<td>4</td>
<td>N-building by Qosmo and Teradadesign</td>
<td>Passengers are able to scan the building façade of large QR code, Façade design and see the information of the other people’s Twitter feeds, Flickr picture uploads, and general comments near the building.</td>
<td><a href="http://qosmo.jp/projects/2011/07/01/n-building/">http://qosmo.jp/projects/2011/07/01/n-building/</a></td>
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<td>6</td>
<td>SF Park by SFMTA</td>
<td>Sensor detects the vacant parking lot and up load the information via website from the City-owned garages. People easily find parking space from the Smartphone app.</td>
<td></td>
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<td>7</td>
<td>Air quality Balloons by Stacey Kuznetsov, Jian Cheung, George Davis and Eric Paulos</td>
<td>The balloons react to surrounding air quality. Inside each balloon is a tri-colored LED. This LED reacts to data from an air quality sensor, turning green, yellow or red based on low, average, and high values.</td>
<td><a href="http://www.instructables.com/id/Air-quality-balloons/">http://www.instructables.com/id/Air-quality-balloons/</a></td>
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Methods - Design of spatial mediator

- Spatial mediator panel

- 9 layers of 15 inch x 15 inch plexus panels
- Two colors of red and blue LED light
- Blue LED light imbedded in right and left side - activated by pressure
- Red LED light imbedded in top and bottom side - activated by noise level
Four steps included for the sensing urban data platform

1) choose a real-time urban data variables from the urban environment
   (real-time pressure point of someone sitting in the basement of a library and noise data from outside)
2) sensing real-time urban data
3) visualizing data by prototype element
4) getting real time urban data from the prototype
Interview

Semi-structured interview and in-depth discussions
a) What is the social interactive elements?
b) How is a Spatial Mediator used?
c) What is its relation to innovation?
d) What are the benefits to implementing design as a tool to improve the functionality of the place?
• Provides information for individual experience
• Supports citizen oriented urban condition
• Over all design provides for psychological amenity
• Technology systems supports the urban experience to keep the place in proper conditions
1) Provides information for individual experience
   - Usefulness and convenience

“To best detect noise, when the lobby is full of people at a party, I can easily estimate the crowd in the lobby.”

“It is impossible to detect the outside conditions from the basement library. I prefer to use this street because the Spatial Mediator is convenient method to see the conditions from a distance place where we cannot usually see.”
2) Supports citizen oriented urban condition
   - Social connectedness
   “I’m not in the basement of library, of course, but I can feel how dense the library was.”
   “Seeing the Spatial Mediator light change, affected my awareness; it feels like I can overlook the library conditions.”

   - Involvement at different degrees of exposure
   “Showing two different type of information in one panel is too confusing. I would like to see one set of information on one panel only.”
3) Design provides for psychological amenity
   - Sense of comfort
   “It was alarming how certain amount of noise and people near the library kept the occupancy rate near the library.”

   - Sensory pleasure
   “Seeing the Spatial Mediator light up, affects my awareness and it is interesting to change of color. I am more aware of change and willing to get closer or walk nearby.”

4) Technology system supports in order to keep the place proper environmental condition
   - Environmental comfort
   “Real time noise sensor is easy to notice change, so we can have a quick feedback loop for the environmental change.”
Discussion

Interactive social boundary for interactive place

- Provides information for individual experience
- usefulness and convenience
- Supports citizen oriented urban condition
- social connectedness
- involvement at different degrees of exposure

Design provides for psychological amenity
- sense of comfort
- sensory pleasure

Technology system supports in order to keep the place proper environmental condition
- Environmental comfort

Building design for psychological and physical intervention

- real-time urban data
- increase awareness of the spatial information and people can react a space by participating
What design for smart city is used for and its relationship with Innovation

Invisible urban information as a tool to design effectively urban space.

From this perspective, we need to consider the following characteristics:
1. Information capacity (city as an ambient information system by inserting data in the space)
2. Representation fidelity (relevant to graphical representation as well as physical movement and interaction as a building design element)
3. Degree of exposure (notification level, frequency, and duration considering sustainable building operation (LEED thermal comfort monitoring, E.Q. 7.2)
The goal of a smart city is to build the street for an enabled livability, sense of community and urbanity while including design aspects that are different from those of previous urban studies.

From this research, we proposed conceptualized aspects for a smart city. The development of the Spatial Mediator showed a new potential use for real-time urban information. Spatial Mediator could be method for designing a space, and could be applied to various place. It is possible to understand how non-physical urban information data can be an element for designing a space. Additionally, various place scenarios based on the human behavior of the Spatial Mediator could be implemented to provide necessary data to see the condition we cannot see.


