Mobility and Visuality of the Digital World

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Locations are equally digitized
- resolutions
- updating frequency
- structured storage
- price policy based on unit area

Locations are not equally perceived
- a priori
- a posteriori
- ad hoc
- semi- or unstructured storage
- price policy based on demand-supply relation
Mobility

Humans

– anywhere business
– Infotainment
– multiple identities
– absent-mindedness
– the fear of missing out

Goods

– customers → goods
– goods → customers

Visuality

where
when
who
what
how much
how
why
Visuality-driven cartographic design

- Attention-guiding visualization
- Visual story telling
- Visual story making
Visuality-driven cartographic design

- Attention-guiding visualization
- Visual story telling
- Visual story making
Change of graphic variables may cause changes of eye movements

(Murphy 2014)
Los Angeles' parking signs
Visuality-driven cartographic design

- Attention-guiding visualization
- Visual story telling
- Visual story making
Visuality-driven cartographic design

• Attention-guiding visualization

• Visual storytelling

• Visual story making
Visual analytical approaches

Case 1: Visual stories from lightning data

Test dataset from April 26, 2013, between Munich and Prague (2919 IC, 5565 GC)
Track line of cluster centroids with quantity-based symbol size

Track lane of cluster convex hull with quantity-based symbol size

3D lightning points belonging to the associated trajectories

Space-Time Cube with convex hulls and centroids of quantity-based symbol size
Temporally clustered point data

Segmented KDE in one map

Buffered prediction uncertainty of nowcasting:
last two lightning clusters (left), predicted clusters (right); past and predicted clusters (middle)
Interactive system for lightning nowcast

Case 2: Visual stories from floating taxis

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GPS records of 2000 taxis (10s) from May 10 - June 30, 2010, Shanghai (Ding, 2015)
Stationary durations aggregated into quarterly intervals of 2000 taxis from May 10 – Jun 30, 2010

Footprints of one single taxi on May 12, 2010: occupied (red), not occupied (blue)

Income level vs. idle state of the taxis
The average hourly duration at the stationary spots for high income group (right) and low income group (left)

spots of traffic congestion (red), parking place (yellow)
Pick-up and drop-off behavior related to Pudong airport
To summarize