DAVA
Indianapolis, USA
October 28th 2016
In conjunction with CIKM 2016

Visual Comparison of Customer Stickiness in Retail Stores

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Outline

- Introduction & Related Works
- Task Characteristic
- Data and Analysis
- Visualization
- Case Study
- Conclusions

Introduction - Huge mobile location data

- Smart devices and mobile applications are growing quickly
- Access and utilize users' status, behavior and mobility
- Retail stores are facing fierce competition, from both offline competitors and online shopping website

Pics 1. http://us.zuuonline.com/archives/462 2. http://www.gbaprojects.com/news/messview.php?ID=18781
3. http://tickto.com/customer-focused-marketing-strategy-with-retail-analytics/

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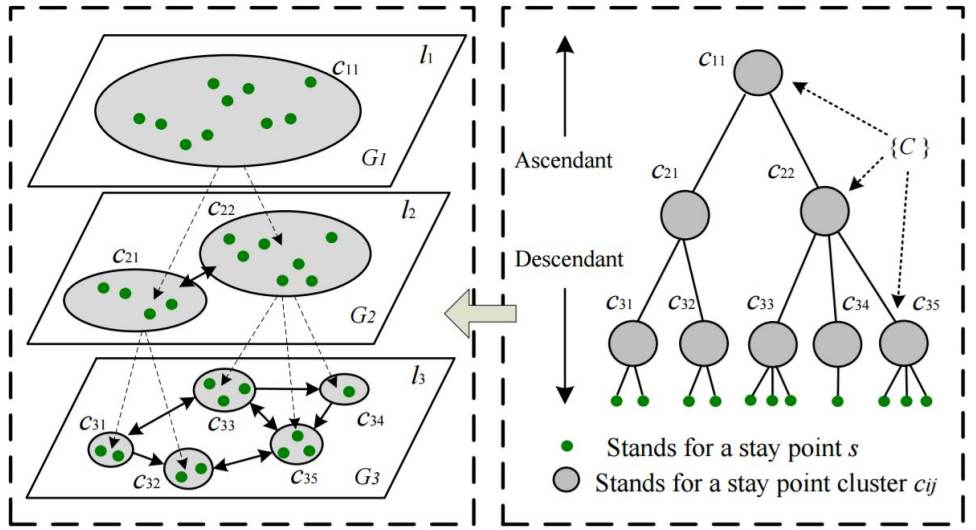
Introduction - Research on Customer Stickiness

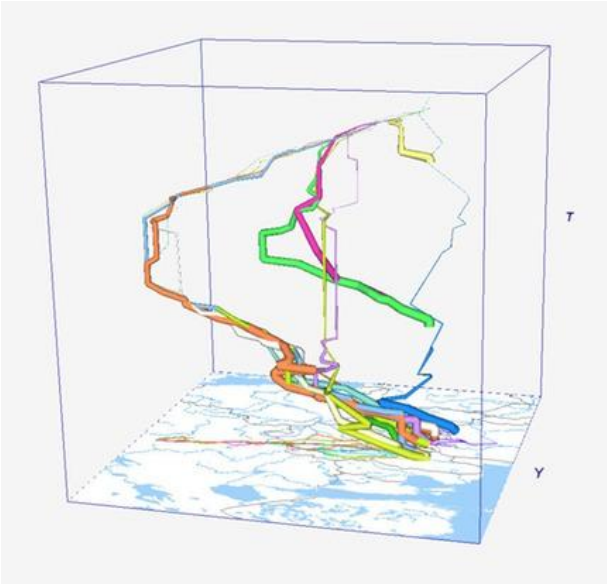
- Scope
  - Applying big mobile location data to traditional retail store customer analysis
  - Enable retail store managers to speed up their daily tasks
- Data Source
  - Collected from TalkingData SDK integrated within mobile apps
- Challenges
  - The unprocessed mobile location data are “tall and skiny”
  - New idea in mobile location data analysis excepts data mining methods
  - It is valuable to combine domain knowledge with big data itself in analyzing customers

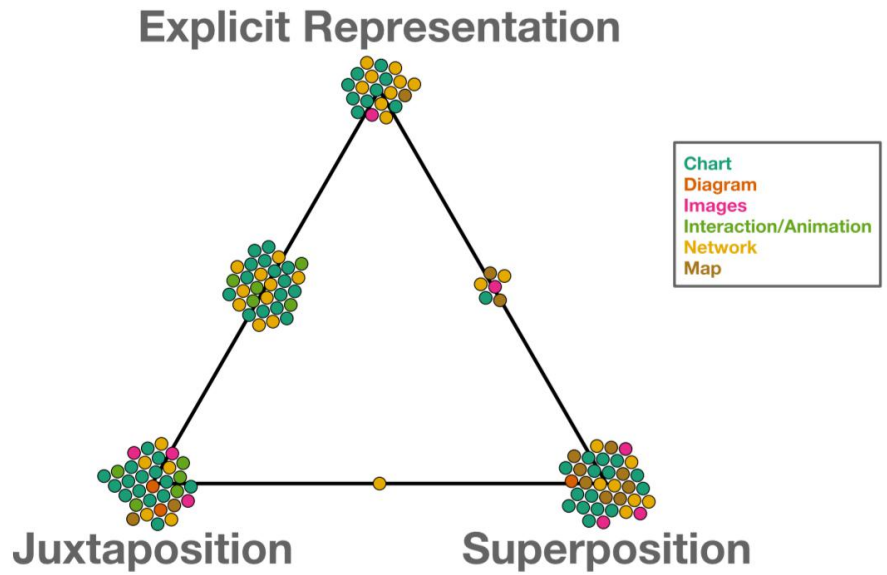
Related Works

- Spatio-temporal Data Visualization
  - space-time cube
  - node-link plot
  - heatmap
  - …
- Visual Comparison
  - regional flow data
  - network data
  - dynamic query visualizer
  - …



A Tree-Based Hierarchical Graph　　A Tree-Based Hierarchy





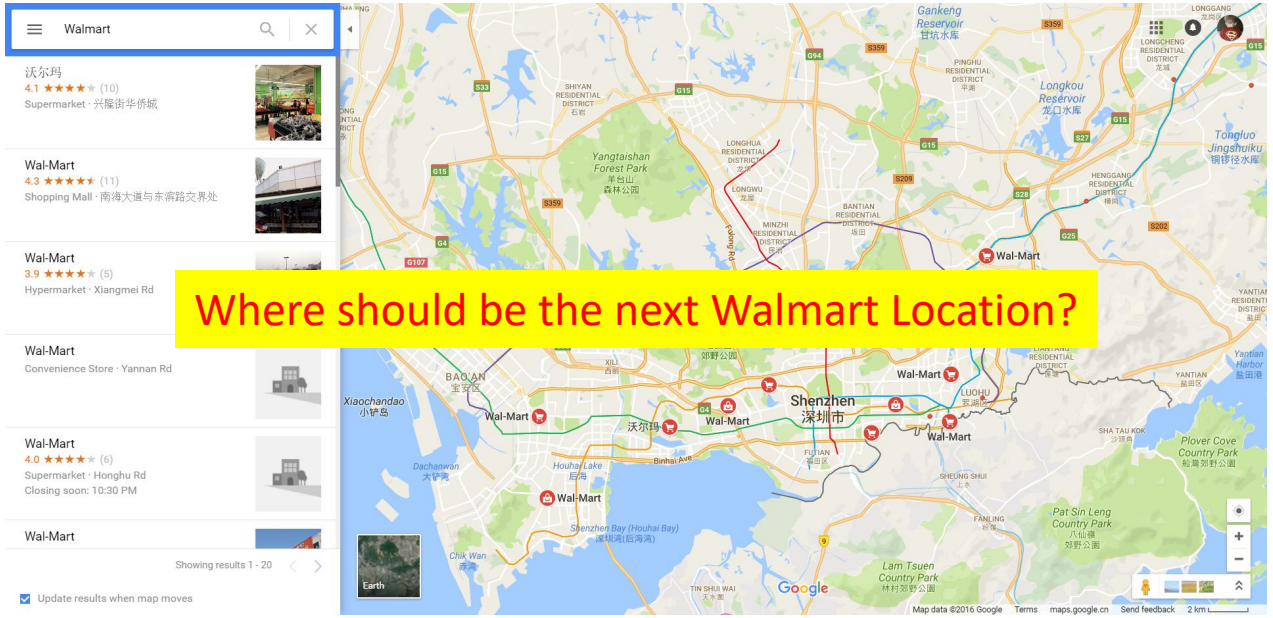
Pics 1. Zheng, Yu, et al. "Mining interesting locations and travel sequences from GPS trajectories." Proceedings of the 18th international conference on World wide web. ACM, 2009.

2. http://www.itc.nl/personal/kraak/move/

3. Gleicher, Michael, et al. "Visual comparison for information visualization." Information Visualization 10.4 (2011): 289-309.

Task Characteristic

- Advertising strategy decision
- Shuttle route plan
- Suggesting retail store location



Pics 1. http://www.techclient.com/outdoor-advertising-billboard-signage-mockup-psd/
2. http://www.aiaa.com.hk/lang-en/shuttle.html
3. Screenshots from Google Map

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Data and Analysis

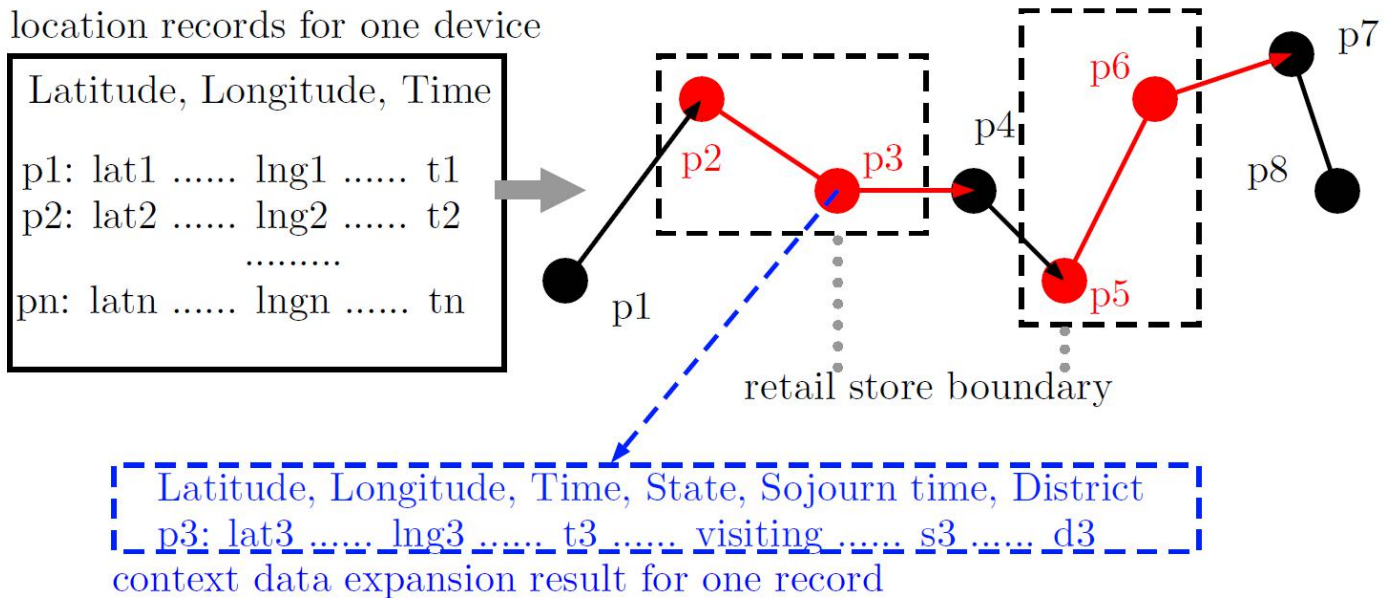
- Time and place: 1st - 31st Jan, 2015 in Shenzhen, China
- Data attributes: Device ID, location timestamp, latitude and longitude
- Data statistics: 4242579 devices, 212185208 records
- Target retail stores

Table 2: Retail Store Information

GeoID	Store Name	District
3392	海岸城购物中心	南山区
4078	沃尔玛	工业大道和东滨路交汇处
3726	世贸百货	龙岗区
171	华强电子世界	福田区
11249	大兴购物广场	龙岗区吉华路999号
11236	家润百货	坂田坂雪岗大道163号
5173	金光华广场	罗湖区
5182	天虹商场	罗湖区

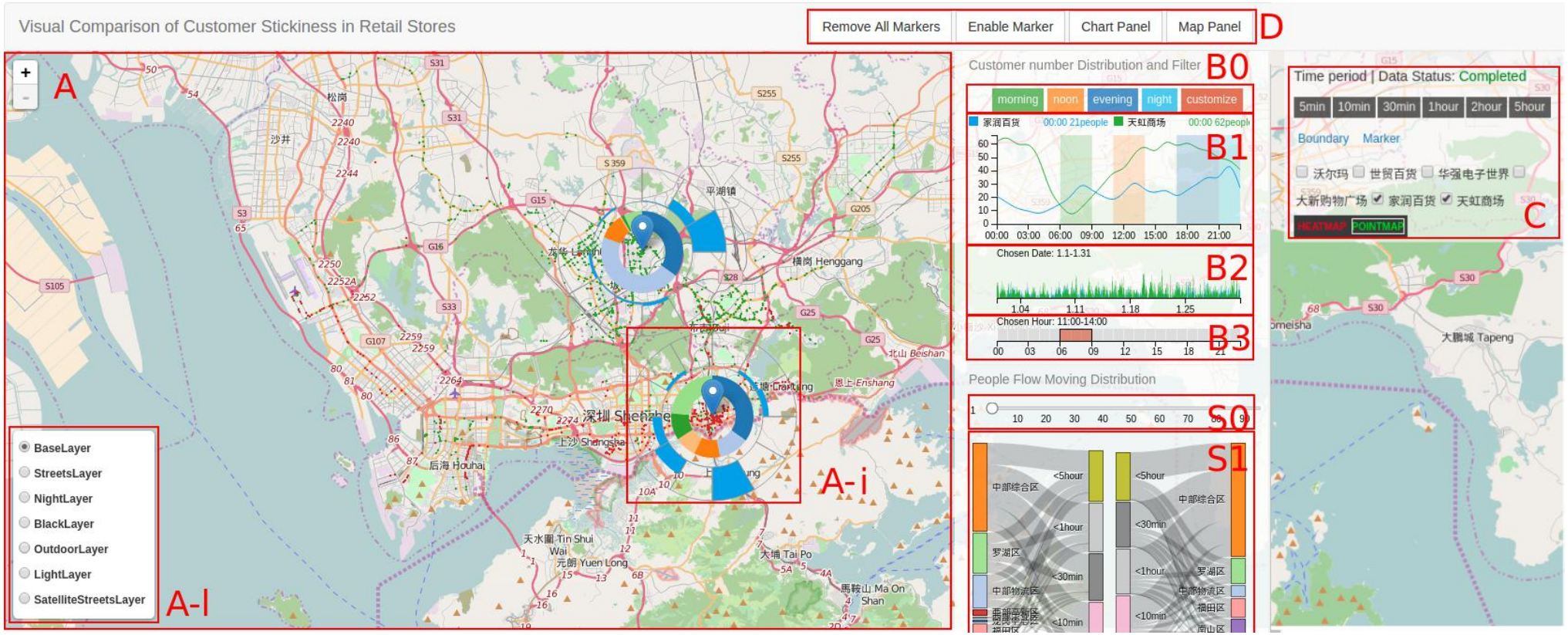
Data and Analysis

- Enriching data's attributes with their context
  - Visiting state
  - Sojourn time
  - Belonged district



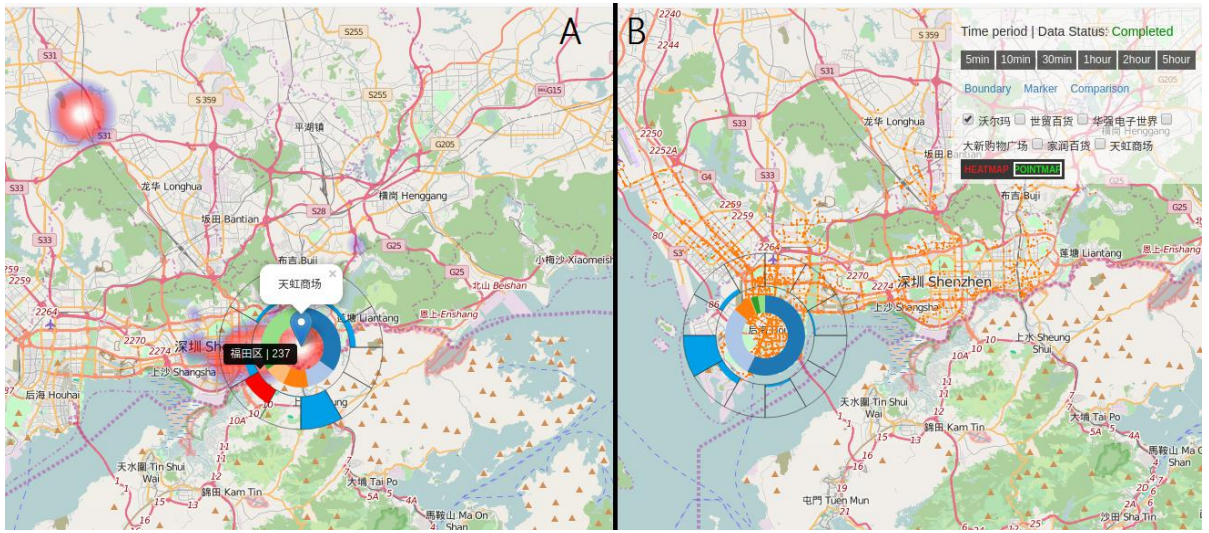
Visualization - Interface

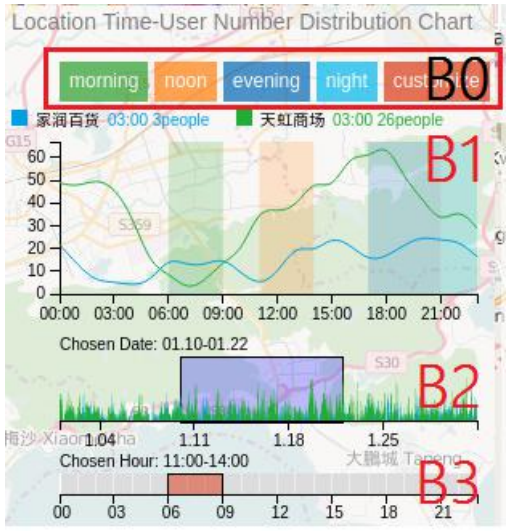
- User Interface: Spatio view + Temporal view + Interactions

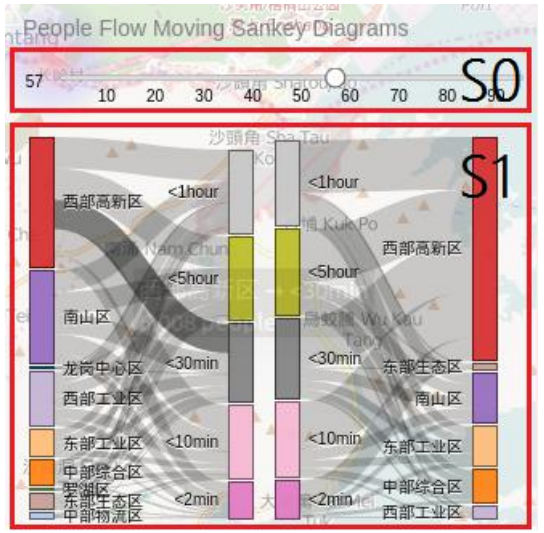


Visualization - Design and Visual Comparison

- Selection of analyzed objects
- Two retail stores' comparison
- Overview of customer number distribution
- Interactions





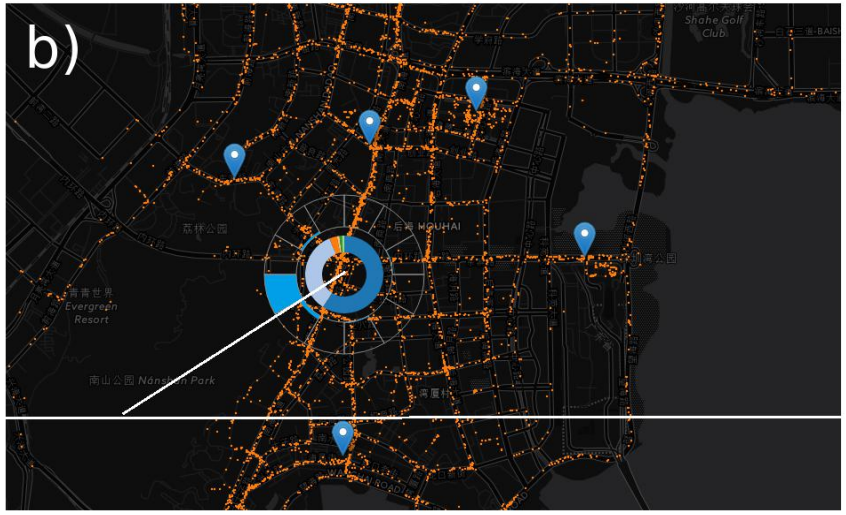


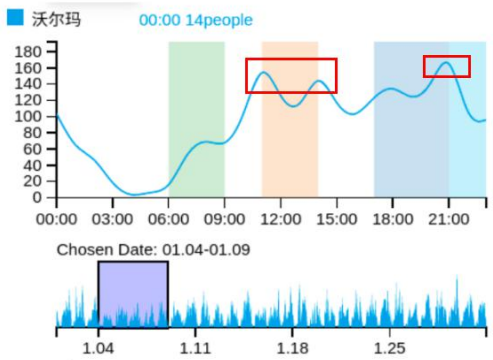
Case Study - Visual comparison of billboards placement

5 minutes

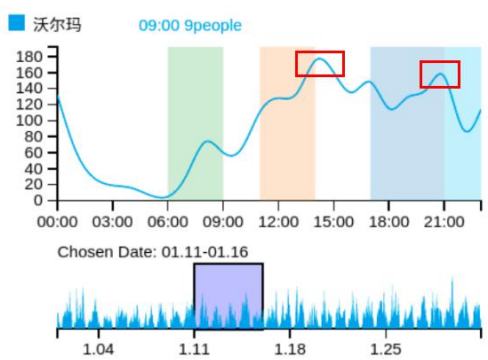
30 minutes

1 hour

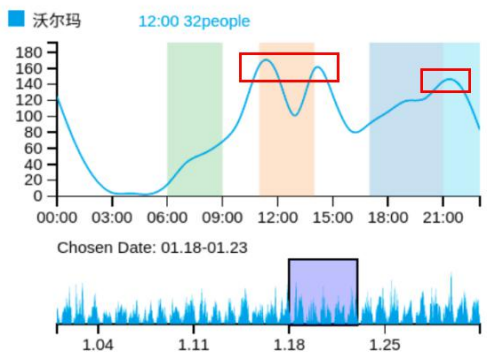




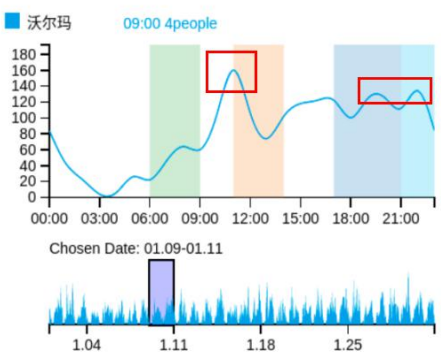
d) Date 1.4-1.9 weekday



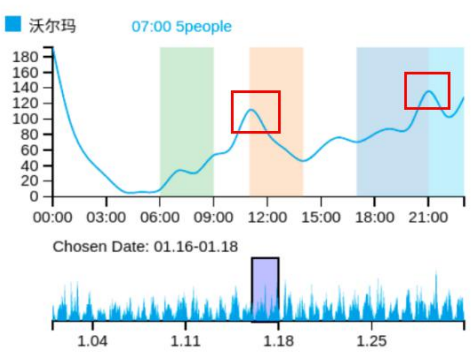
e) Date 1.11-1.16 weekday



f) Date 1.18-1.23 weekday



g) Date 1.9-1.11 weekend



h) Date 1.16-1.18 weekend

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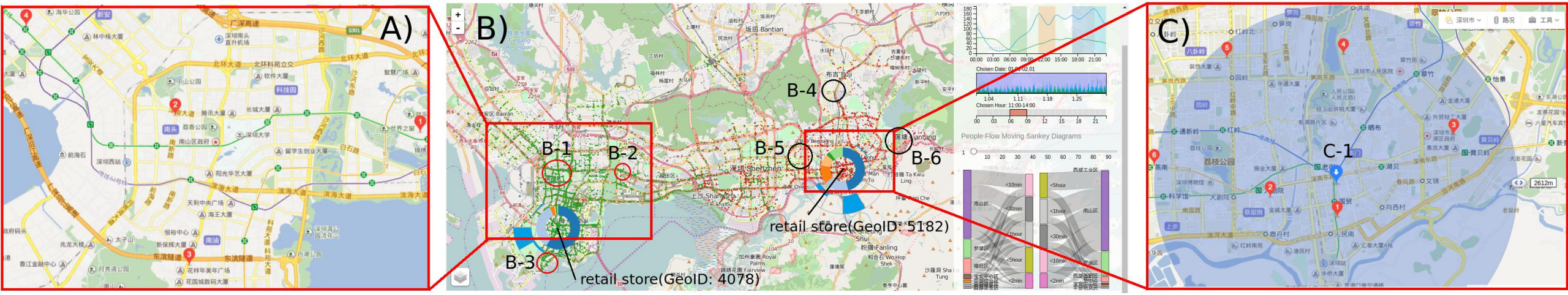
Case Study - Suggesting retail store location



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Conclusions

- Contributions
  - Visual analytics framework for the mobile location data
  - Task characterization
  - Novel visualization design
- Future works
  - Integrate more data sources
  - More interactive designs can be incorporated
  - System's expandability

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Thanks!

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