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
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 skinny”
  • 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
  • ...
Task Characteristic

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

Where should be the next Walmart Location?

Where is a good billboard's placement?

How to plan a good shuttle route?

3. Screenshots from Google Map
Data and Analysis

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

<table>
<thead>
<tr>
<th>GeoID</th>
<th>Store Name</th>
<th>District</th>
</tr>
</thead>
<tbody>
<tr>
<td>3392</td>
<td>海岸城购物中心</td>
<td>南山区</td>
</tr>
<tr>
<td>4078</td>
<td>沃尔玛</td>
<td>工业大道和东滨路交汇处</td>
</tr>
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<td>3726</td>
<td>世贸百货</td>
<td>龙岗区</td>
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<td>华强电子世界</td>
<td>福田区</td>
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<td>大兴购物广场</td>
<td>龙岗区吉华路999号</td>
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<td>坂田坂雪岗大道163号</td>
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<td>罗湖区</td>
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<tr>
<td>5182</td>
<td>天虹商场</td>
<td>罗湖区</td>
</tr>
</tbody>
</table>
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

retail store (GeoID: 4078)

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
Case Study - Suggesting retail store location
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
Thanks!

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