1. Traffic Prediction with Partially Observed History


2. Traffic Prediction: Infer the traffic conditions in the future time span for a geographical area.

3. Partially Observed History: In the target area, some locations are not deployed with any sensors, their historical traffic conditions are not available.

4. The Goal: Make good predictions for every location in the target area based on the partially observed traffic history.

2. Location-Based Social Media (LBSM)

Why LBSM?
1. Cover much wider range of geographic areas.
2. Provide abundant information about the road users in real-time.
3. Dictation Systems (e.g. Siri) in smart phones or smart cars allow road user to post contents in LBSM easily.
4. By mining the semantic and spatial information from LBSM, we can effectively infer the future traffic conditions for many areas, including the road segments without sensors.

Target Area: Greater Los Angeles

Table 1: Average 
<table>
<thead>
<tr>
<th>Temporal Resolution</th>
<th>Spatial Resolution</th>
<th>Proc. (Time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 hour</td>
<td>1 x 1</td>
<td>47,113</td>
</tr>
<tr>
<td>1 hour</td>
<td>1 x 1</td>
<td>3,126</td>
</tr>
<tr>
<td>1 hour</td>
<td>2 x 2</td>
<td>1,004</td>
</tr>
<tr>
<td>1 hour</td>
<td>3 x 3</td>
<td>504</td>
</tr>
<tr>
<td>1 hour</td>
<td>4 x 4</td>
<td>389</td>
</tr>
<tr>
<td>1 hour</td>
<td>30 x 30</td>
<td>15</td>
</tr>
</tbody>
</table>

3. Collective Inference Framework

Our Model

4. Experiment Results

4.1 1/k regions are unobserved

4.2 1/3 Test Data 5 X 5 Grids

4.3 1/3 Test Data 20 X 20 Grids

4.4 1/4 Test Data

4.5 1/7 Test Data

5. Acknowledgement

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