Minimize the list of accessed items to get the ad-hoc basis on travel penalty, and calculate the ranking score on an

1) Preference Locality
2) Travel Locality

Location-Aware Recommender System

Non-Spatial Ratings for spatial Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bob</td>
<td>4.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

E.g.: Bob rating restaurant X located at Brooklyn Park, MN

Spatial Ratings for Non-spatial Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mike</td>
<td>4.0</td>
<td>0.5</td>
</tr>
</tbody>
</table>

E.g.: Mike located at home (Circle Pines, MN) rating “The Muppets” movie

Recommend me a nearby restaurant

User Partitioning

Three main goals:
1) Preference Locality
2) Scalability
3) Influence

Merging: reduces the number of maintained cells
Splitting: increases number of cells

Spatial Ratings for spatial Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pines, MN</td>
<td>4.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

E.g.: Mike located at Circle Pines, MN rating restaurant X at Brooklyn Park, MN

System Architecture

New Message
- Message ID, Content, TimeStamp, Spatial
- Relevant to user’s current location

New Rating
- Incorporate User Location
- Incorporate Item Location

Location-based News Feed Query
- Retrieves messages posted by users that have spatial extents covering the location of the requesting user.

Location-based Recommendation Query
- Suggests a set of items based on the user location, item location, and user/item ratings.

Location-Aware News Feed System

Three Approaches

1. Location-based approach
   - 1. location-based query
   - 2. User’s location
   - 3. Get message
   - 4. Messages in the cell

2. Spatial Pull approach
   - Spatial Pull approach
   - 1. location-based query
   - 2. Relevant Messages
   - Advantages: Good response time, reduced overhead
   - Disadvantages: Significant overhead to maintain the view

3. Spatial Push approach
   - 1. location-based query
   - 2. Relevant Messages
   - Advantages: Significant overhead to maintain the view
   - Disadvantages: Need to check if views can be shared

Decision Model

To favor user response time
- More spatial push approach will be adapted
- System is overlaid to maintain materialized views
- To favor system overhead
- More spatial pull approach may be adapted
- User suffers a significant delay to get her news feed

To make smart decisions for each query
- Guarantee the users get news feed within time constrain
- Minimize overall system overhead

If the news feed functionality is aware of the inherent locations of users and messages, more relevant news feed will be delivered.