GEVR: An Event Venue Recommendation System for Groups of Mobile Users

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OutWithFriendz Mobile System

"Understanding group event scheduling via the outwithfriendz mobile application."
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies 1, No. 4 (2018): 175.
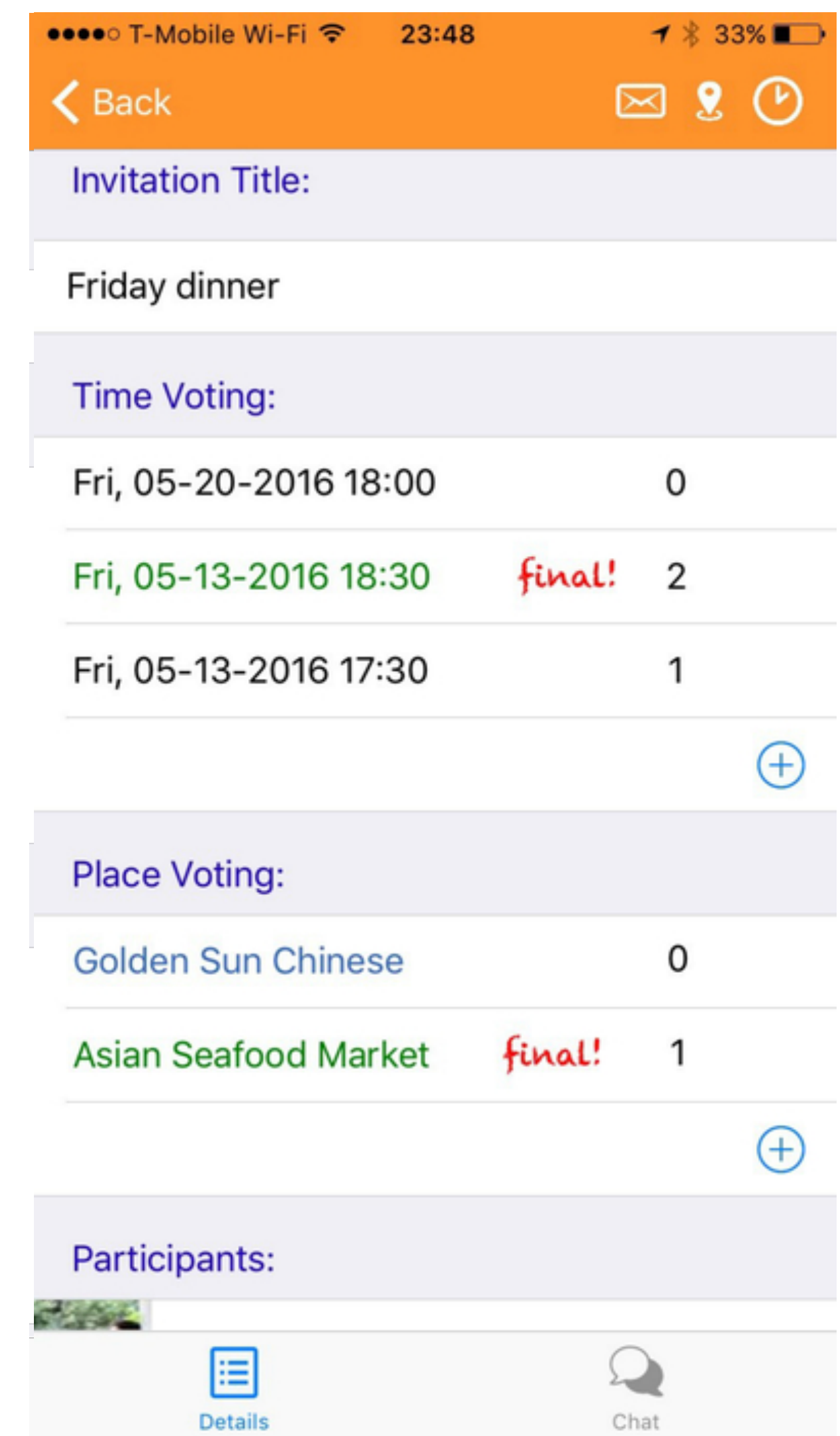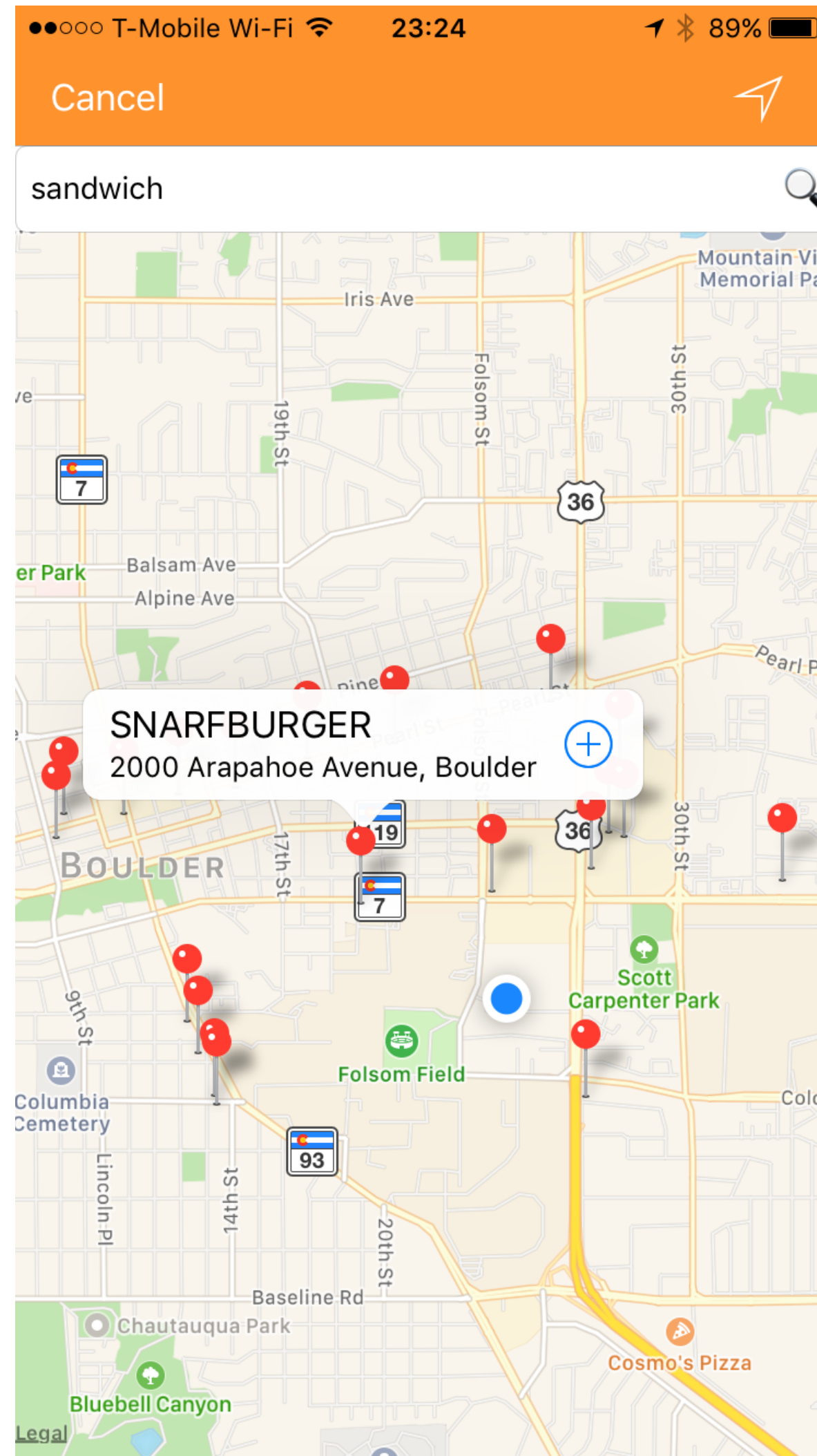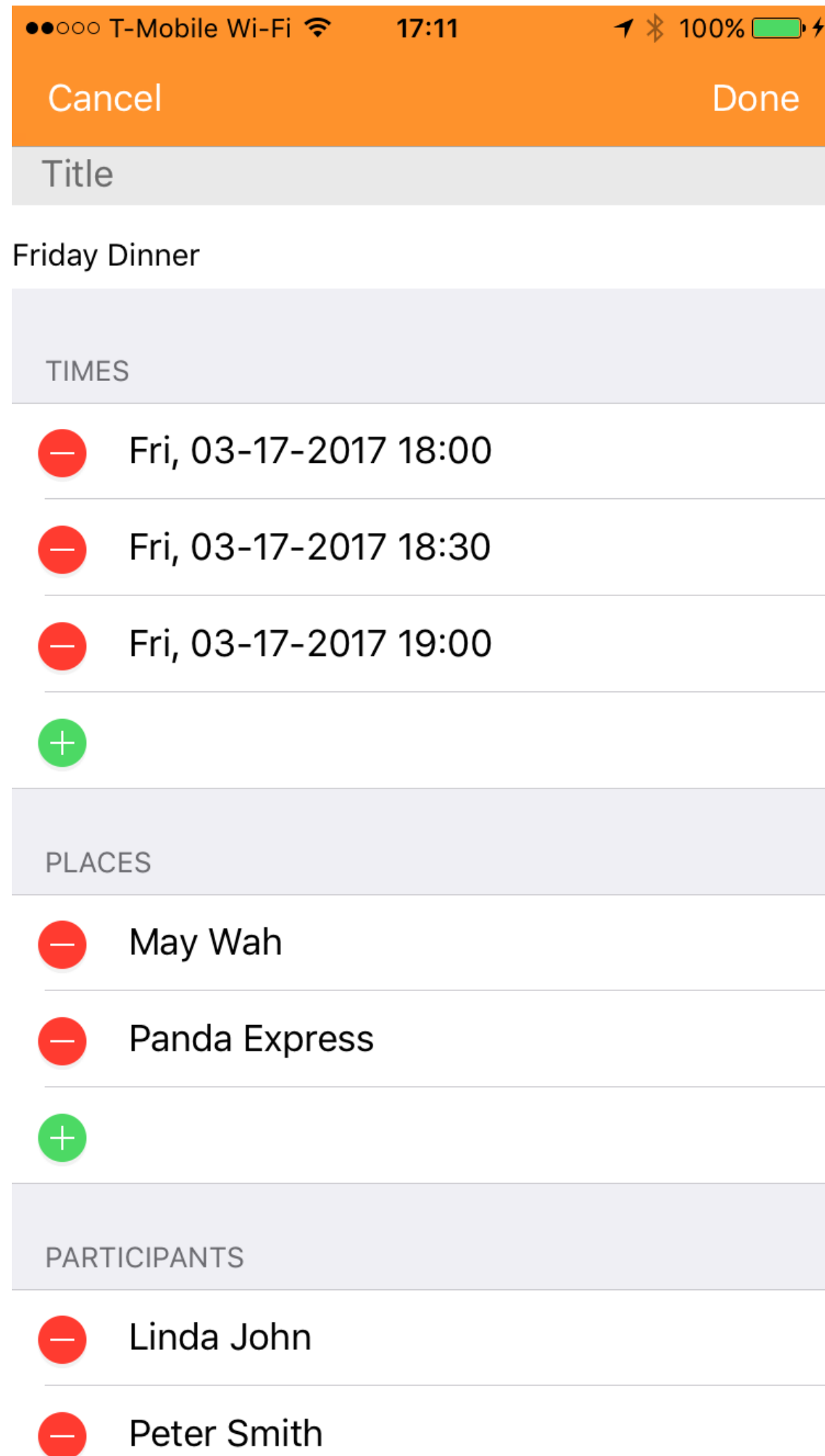
Event Coordinator Rate 5th Toughest

Event coordinator is the fifth most stressful job, right behind well-known tough ones, such as firefighters and soldiers. @careercast

OutWithFriendz Mobile System

Deployed on Mobile App Platforms

Google Cloud
Messaging Server

Google Map API

OutWithFriendz Data
Collection Server

■ 1. Data transmission

■ 2. Push notifications

■ 3. Location search

iOS

Android

Data Collection

high density • low density
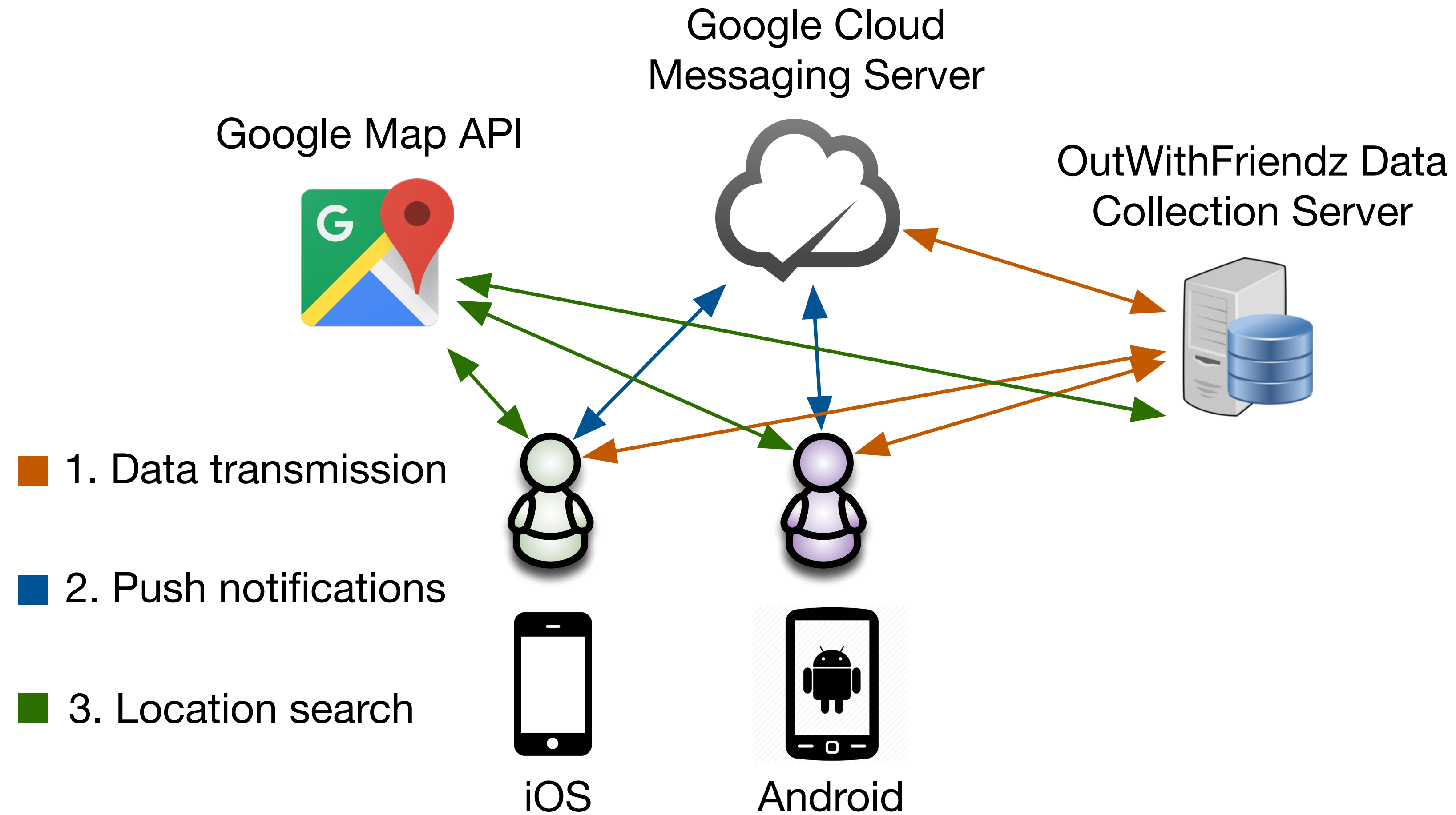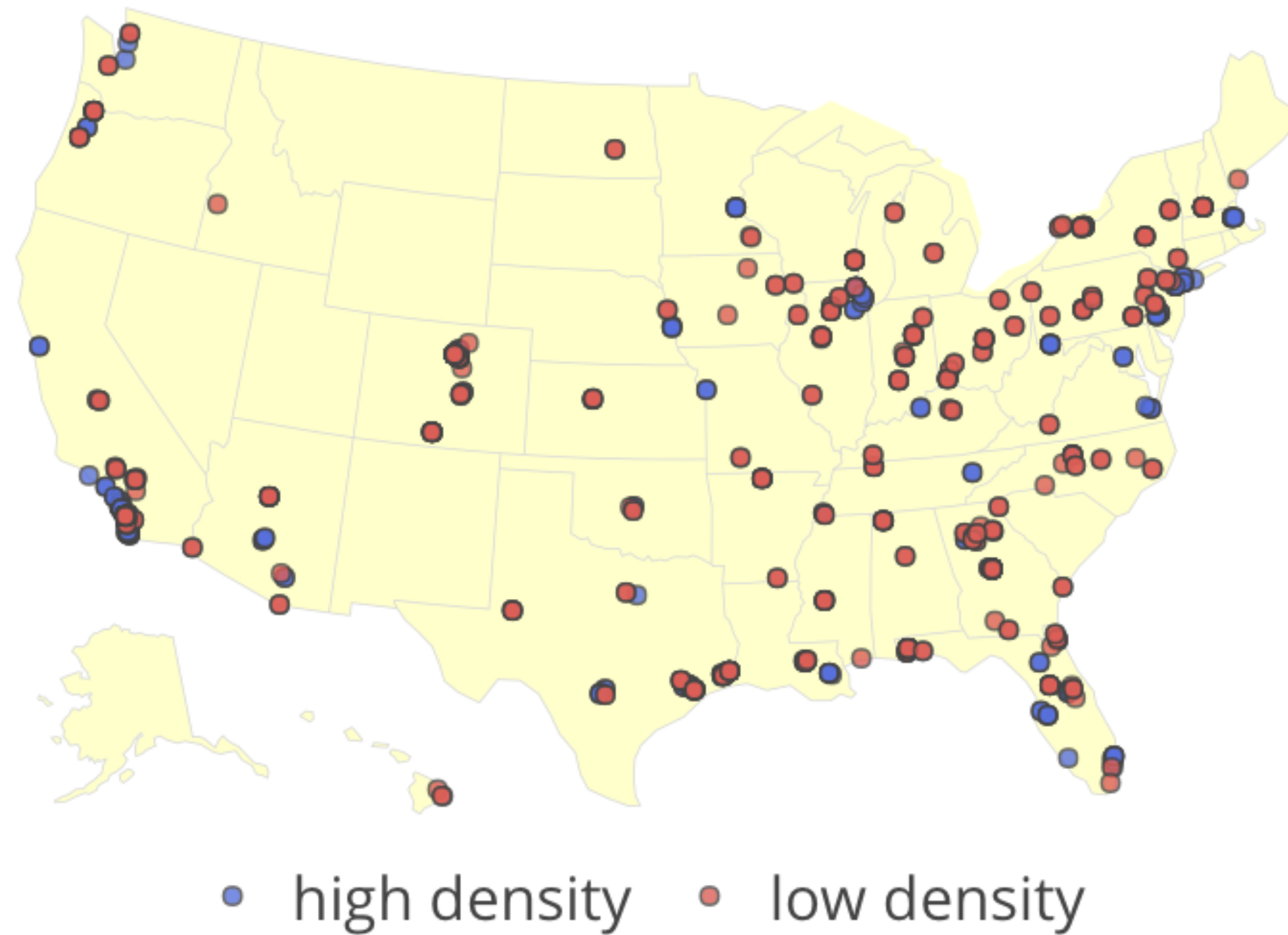
Events: 502

Users: 625

(75 campus, 550 Crowdsource)

States: 40

Cities: 117

GEVR: An Event Venue Recommendation System for Groups of Mobile Users

- Step 1: Group location cluster detection

- Step 2: Group location cluster prediction

- Step 3: Event venue recommendation

Step 1: Group Location Cluster Detection
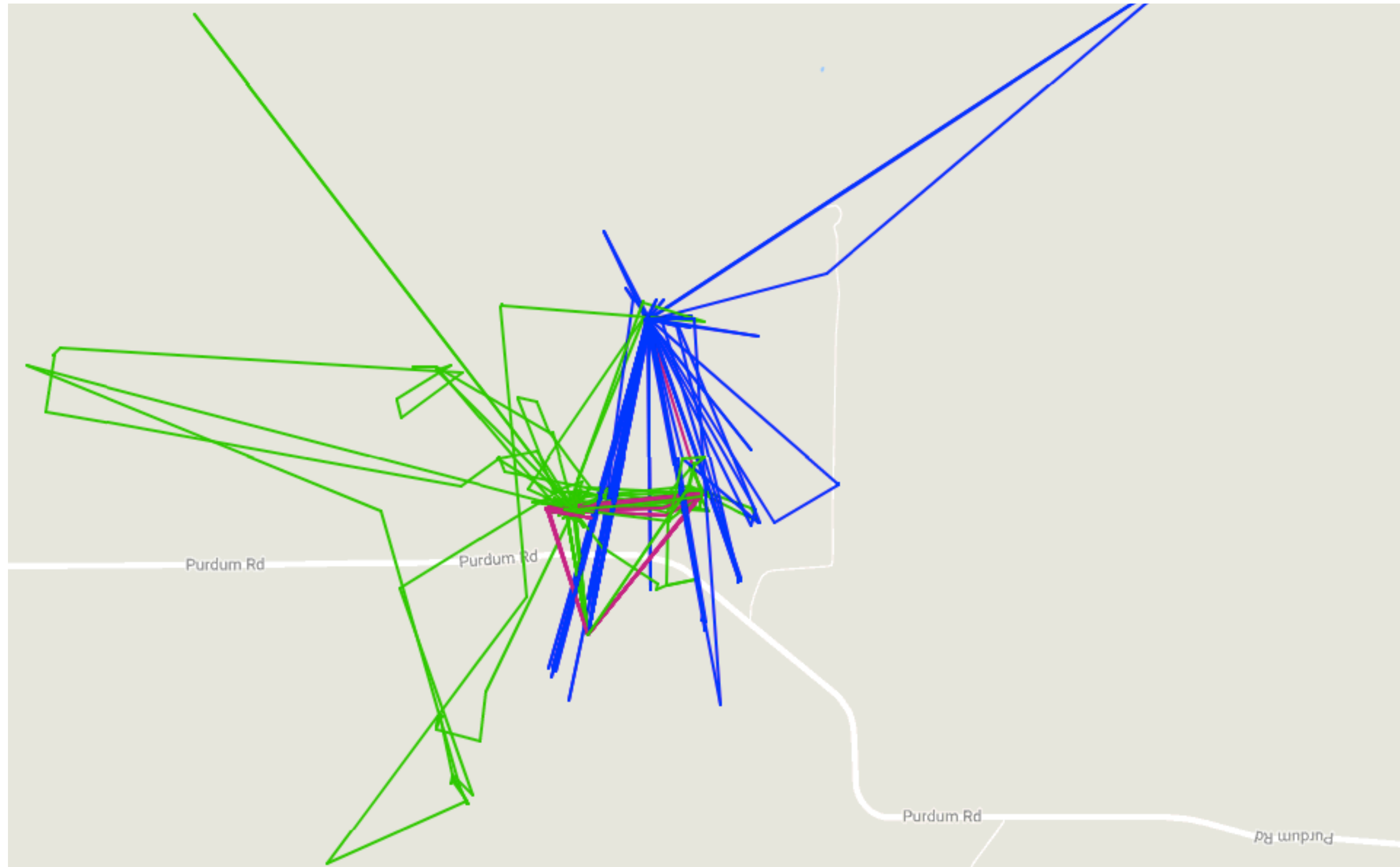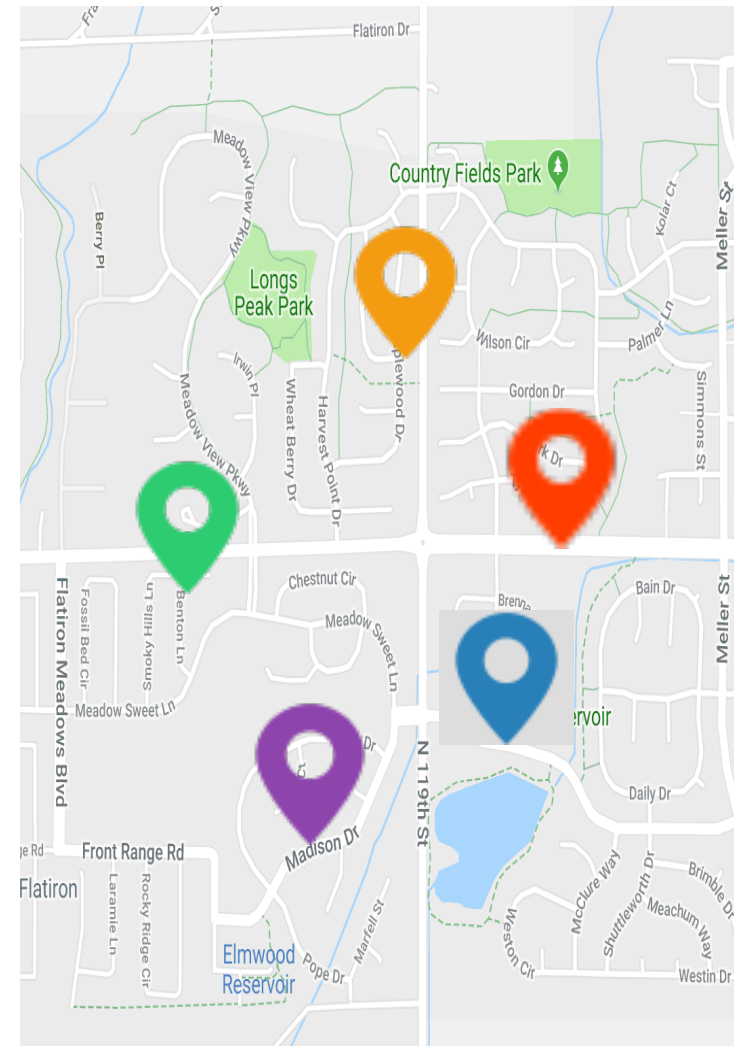
Step 1: Group Location Cluster Detection

- DBSCAN location clustering algorithm

- More than 90% final event venues fall into one of the detected location clusters (within 500 meters)

Step 2: Group Location Cluster Prediction

Location Clusters

Predictors

Individual Preferences

Consensus Function

Location Familiarity

User Mobility

Day of Week

Population Density

	📍	📍	📍	📍	📍
🧑	0.5	0.2	0.2	0.1	0.1
🧑	0.2	0.4	0.1	0.1	0.2
🧑	0.6	0.2	0.1	0.0	0.1

f(x)

Co-location   Trace Similarity

Social Strength

Step 2: Group Decision Strategies

- Least misery (Weak social relationship)

- Average satisfaction (Medium social relationship)

- Most pleasure (Strong social relationship)

Step 3: Event venue recommendation

Location Clusters

Candidate Restaurants

Recommended Restaurants

Cluster 1

Cluster 2

Cluster 3

Cluster 1:

Zuni
China Wok
Starbucks
McDonald's

Cluster 2:

Rincon Argentino
Chili's Grill & Bar
Los Tacos
KFC

Cluster 3:

Tamarac Cafe
India Bazaar
Nomad Pizza
Wendy's

Aggregation,
Ranking

Final List:

Rinco Argentino
Chili's Grill & Bar
Los Tacos
Zuni
China Wok
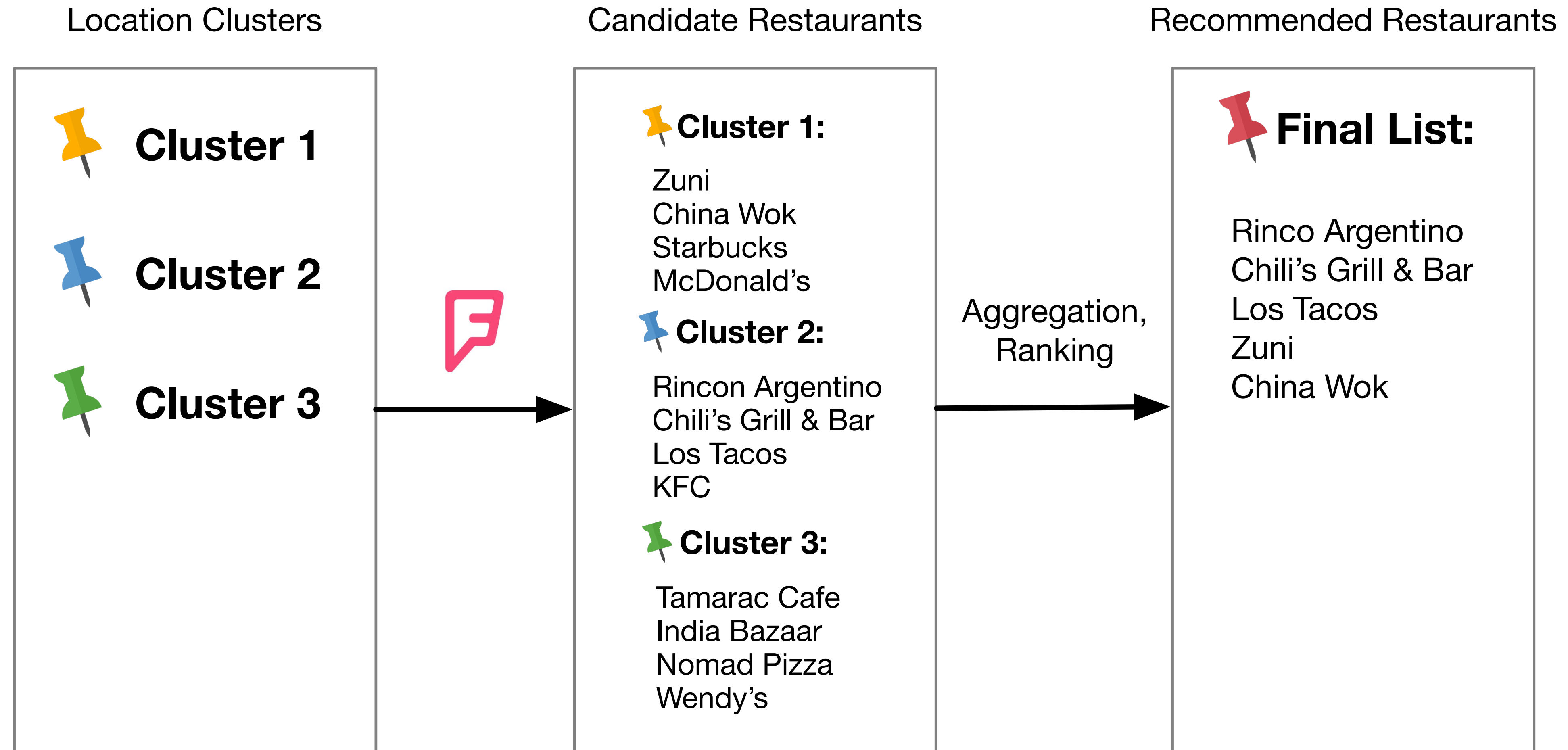
Step 3: Event venue recommendation

$$\text{rankscore}(v_{ij}) = \frac{m - (j - 1)}{m} \cdot \mathbf{P}(G, c_i)$$

The rank weight
by Foursquare

The prediction
score of cluster

Performance: Predicting Final Location Cluster

Model	Final Location Cluster
Least Misery	0.668
Average Satisfaction	0.753
Most Pleasure	0.739
Logistic regression-based	0.741
Rule-based	0.657
Expertise-based	0.729
Social-based	**0.801**

Recommendation Performance on Hitting the Final Venue
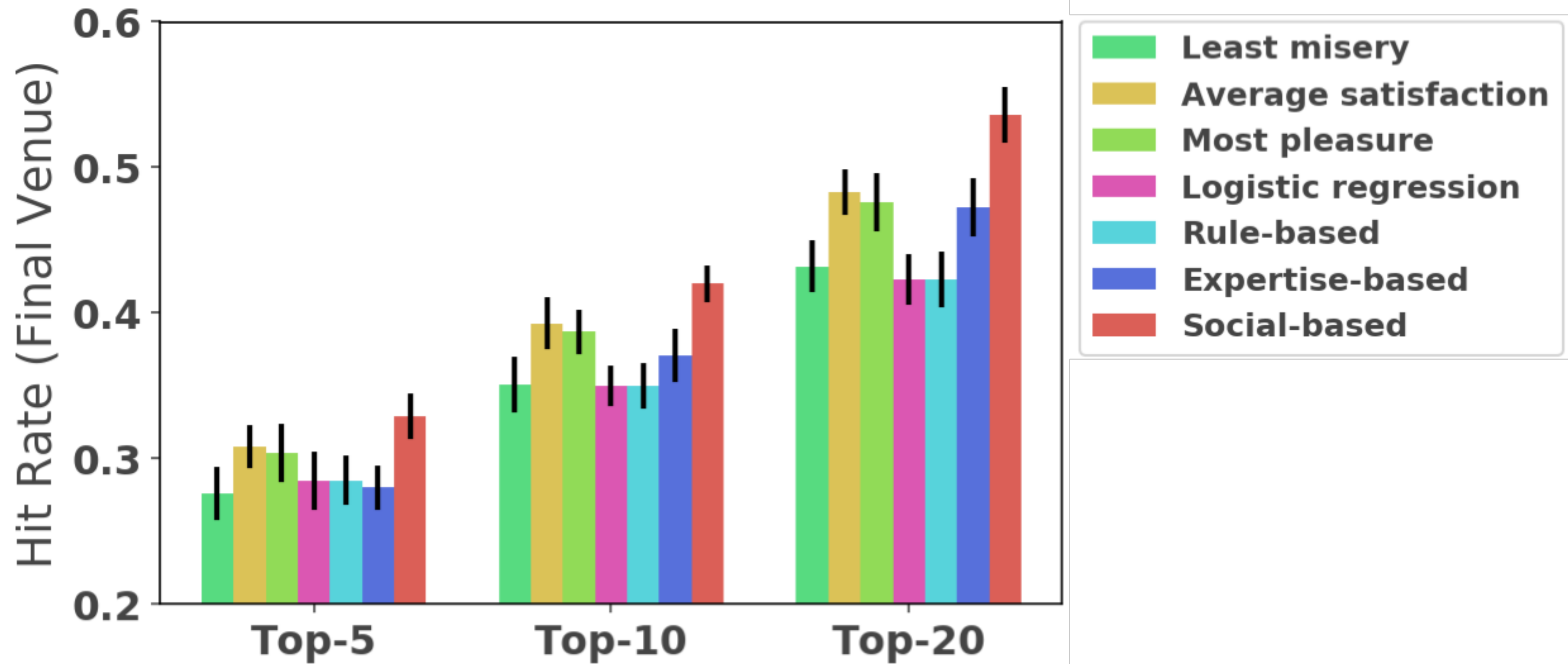
Future Work

- More effective group recommendation

- More types of group events

- Privacy protection in group events

Takeaway

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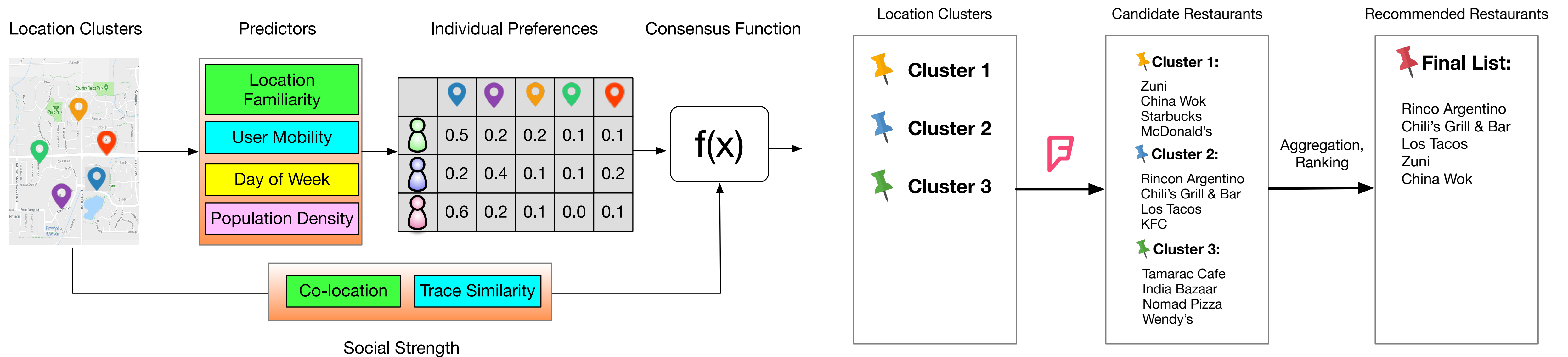Location Clusters

Predictors
- Location Familiarity
- User Mobility
- Day of Week
- Population Density

Individual Preferences

👤	0.5	0.2	0.2	0.1	0.1
👤	0.2	0.4	0.1	0.1	0.2
👤	0.6	0.2	0.1	0.0	0.1

Consensus Function

f(x)

Social Strength
- Co-location
- Trace Similarity

Location Clusters
- Cluster 1
- Cluster 2
- Cluster 3

Candidate Restaurants

Cluster 1:
Zuni
China Wok
Starbucks
McDonald's

Cluster 2:
Rincon Argentino
Chili's Grill & Bar
Los Tacos
KFC

Cluster 3:
Tamarac Cafe
India Bazaar
Nomad Pizza
Wendy's

Aggregation, Ranking

Recommended Restaurants

Final List:
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Joint work with Mike Gartrell, Richard Han, Qin Lv, and Shivakant Mishra