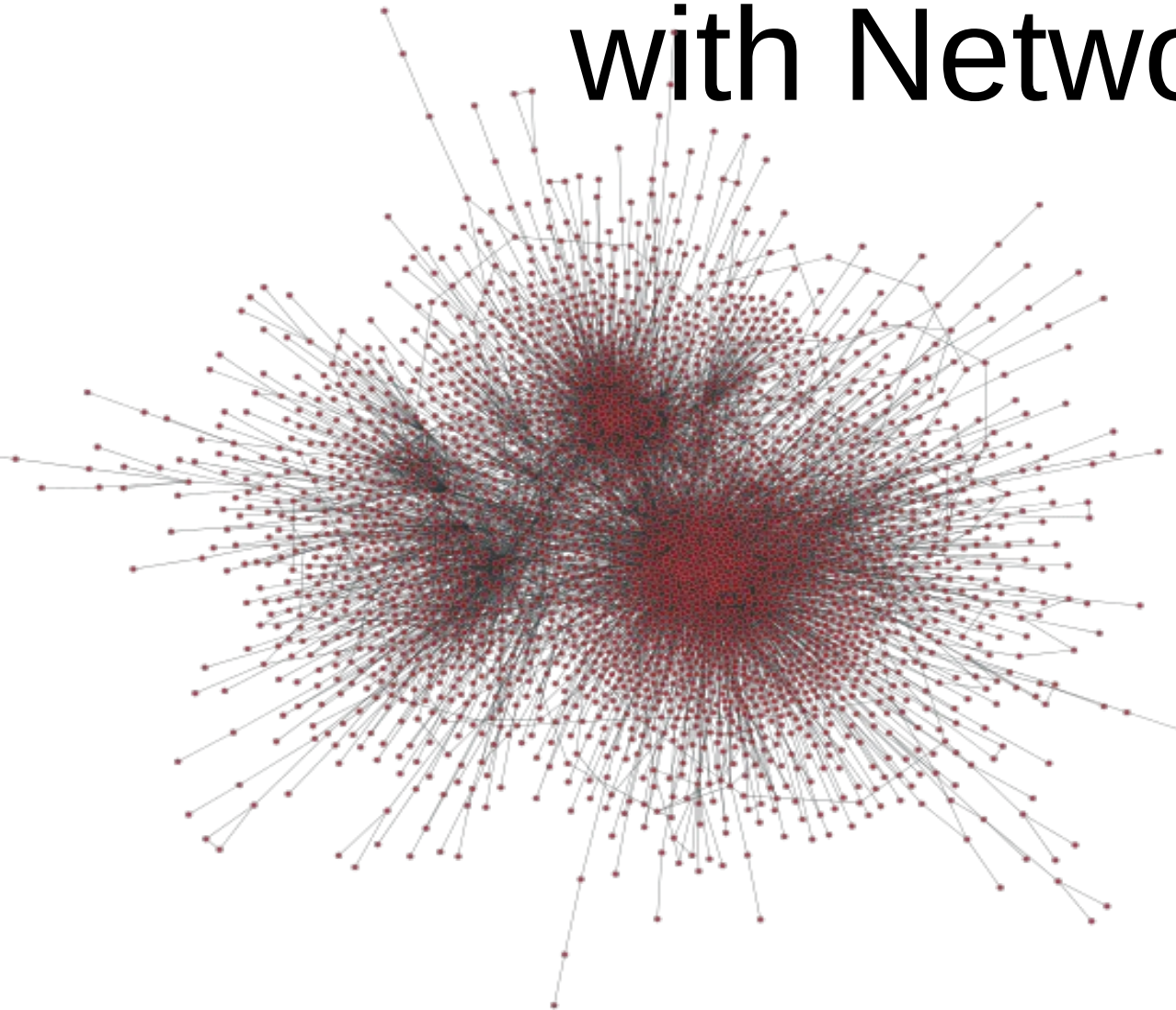# Exploring Recommenders with Networks

By Suhan Ree

At Galvanize

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If we know friend relationships between users, can it improve recommendation systems?

Maybe Yes, but how?

Data from Yelp Dataset Challenge

- Ratings: 1.6 M (10/12/2004 ~ 01/08/2015)

- Businesses: 61K (on 10 cities)

- Users: 366K with social network (2.9M edges)

U.K.: Edinburgh
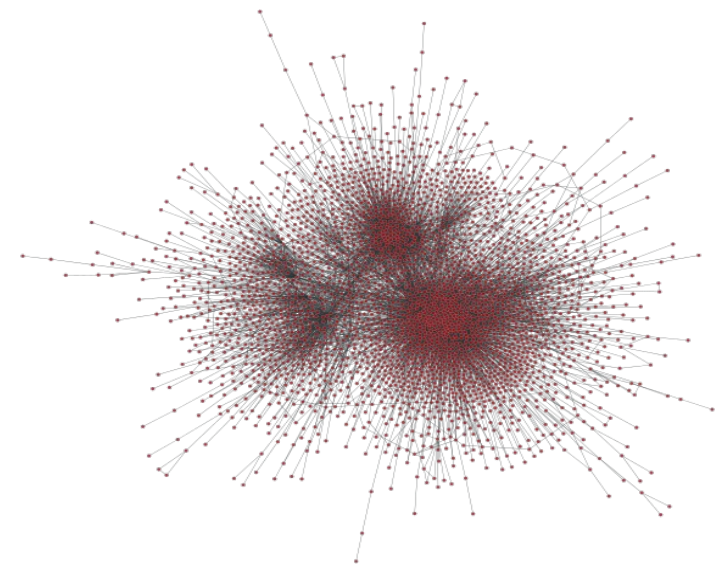
Germany: Karlsruhe
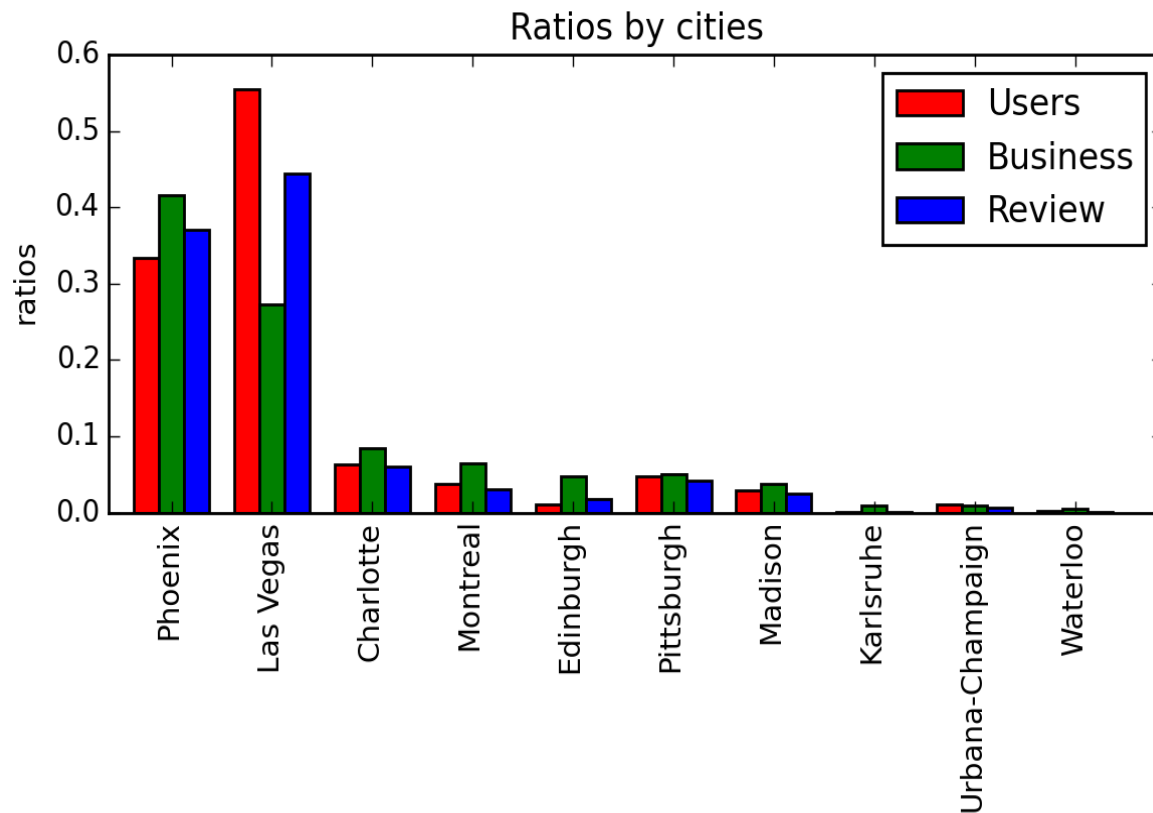
Canada: Montreal and Waterloo

U.S.: Pittsburgh, Charlotte, Urbana-Champaign, Phoenix, Las Vegas, Madison
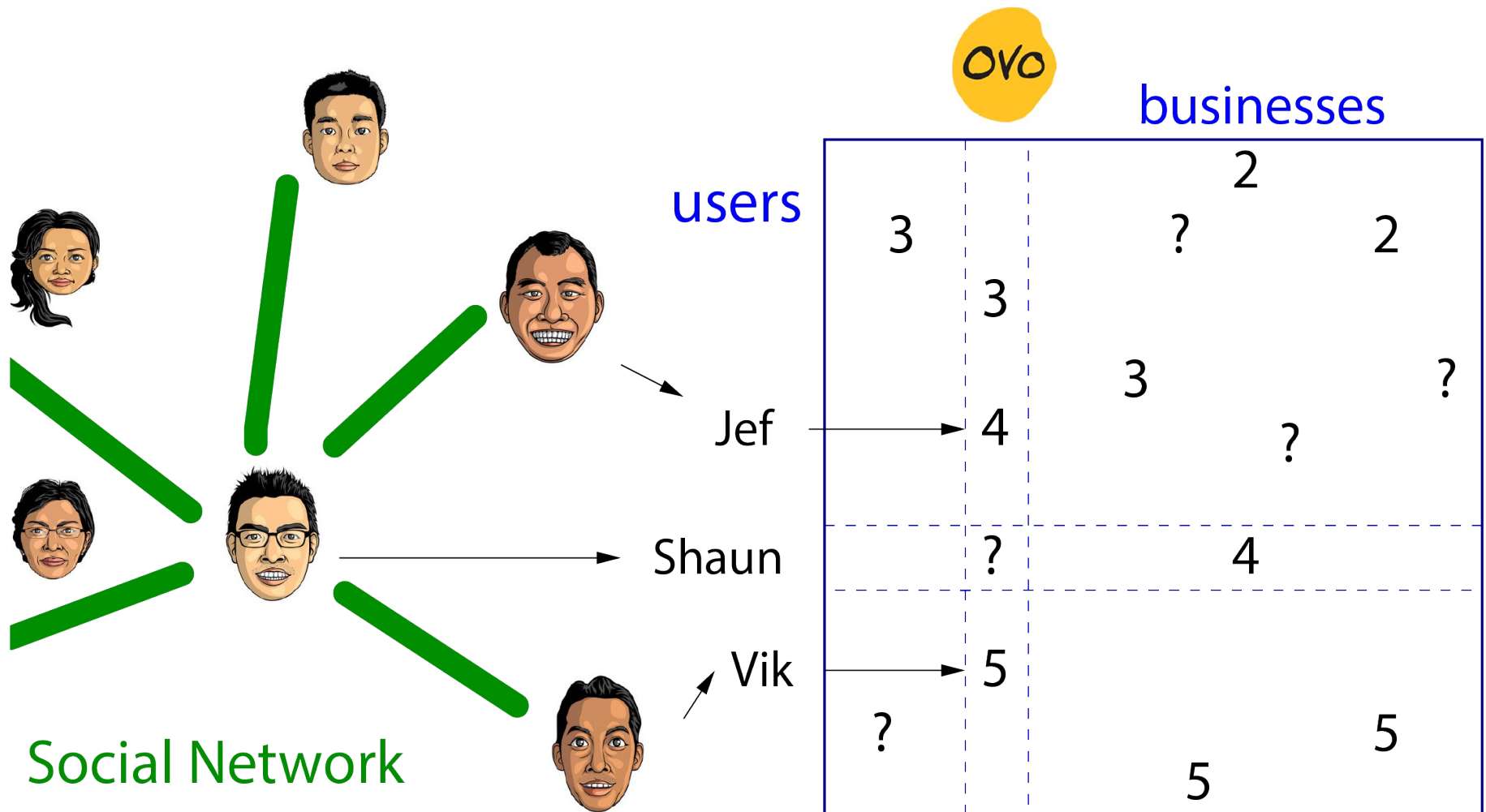
(Image from Yelp)

Data preprocessing

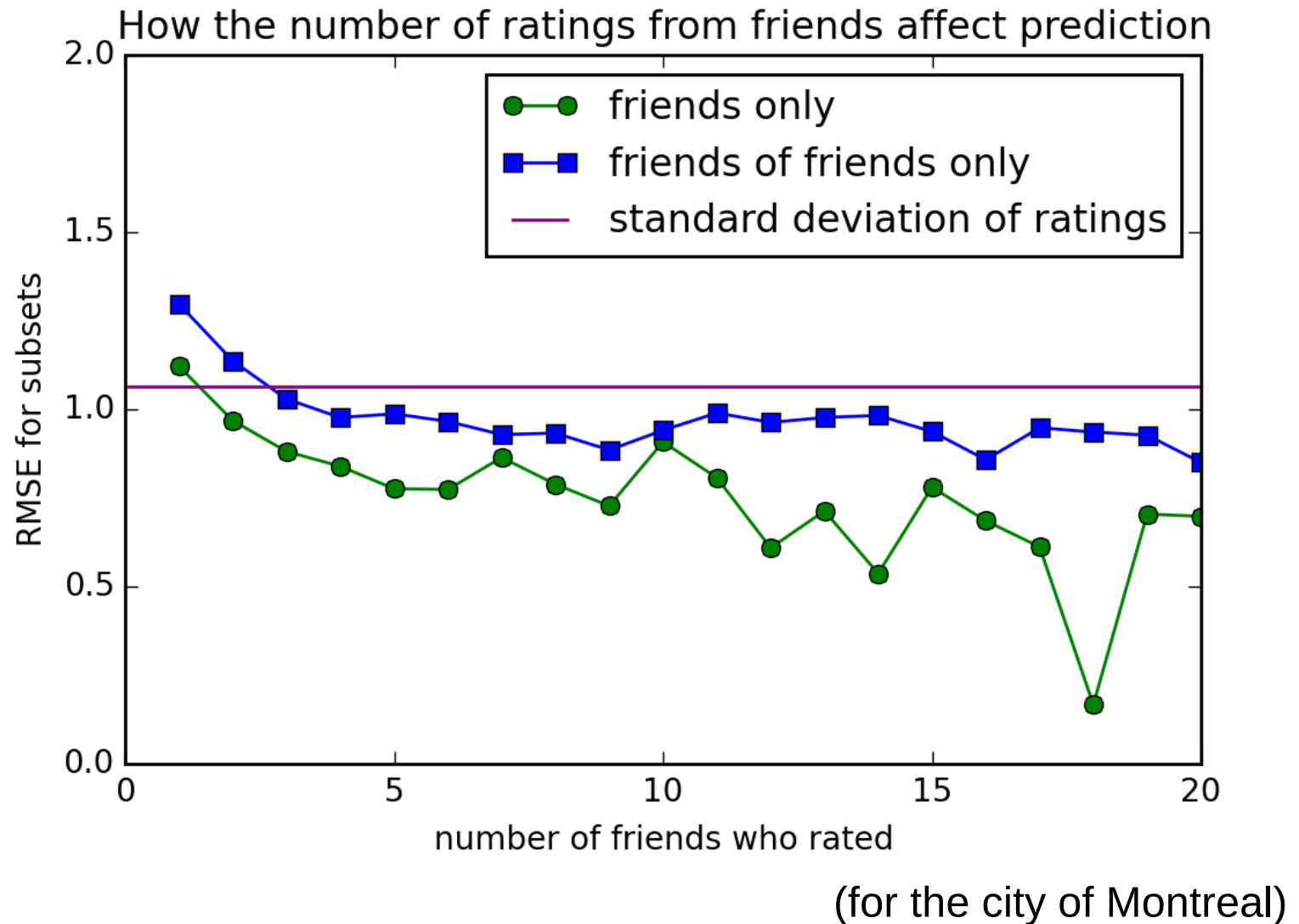10 subsets of data, one for each city, are prepared.

Ratios by cities

social network for the city of Montreal.

How it works.

Why it might work.

How the number of ratings from friends affect prediction

Legend:
- friends only
- friends of friends only
- standard deviation of ratings

Y-axis: RMSE for subsets (0.0 to 2.0)
X-axis: number of friends who rated (0 to 20)

(for the city of Montreal)

Comparing models

Computed average RMSE using K-fold cross validation at k=10 for each city.

Comparison of models for each city
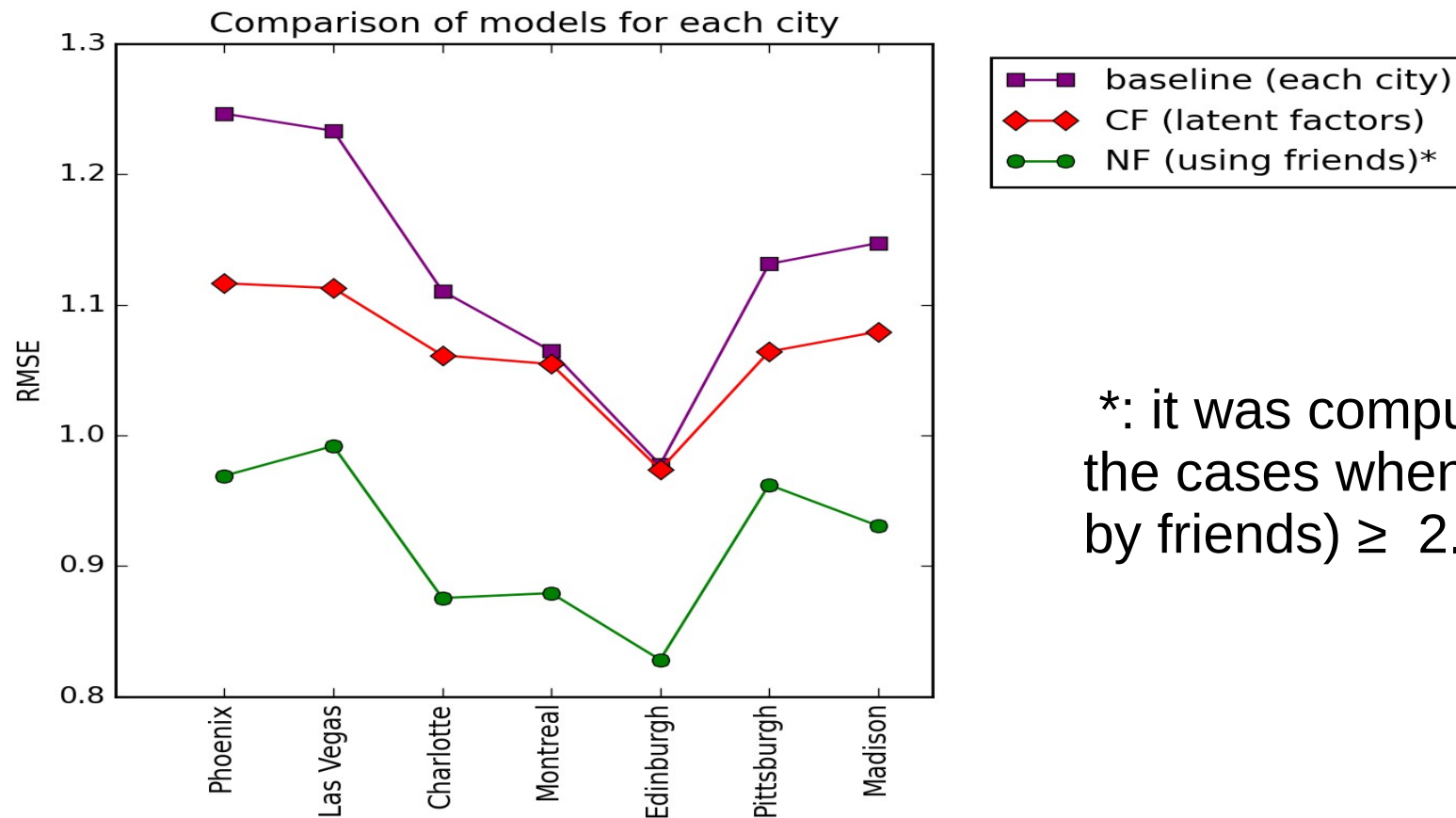
*: it was computed for the cases when (ratings by friends) ≥ 2.

What we learned.

- Social networks can be useful for recommenders.
- There are many ways to incorporate them. More to explore, and many attempts are being made.

    Ref) "A social network-based recommender system,"

    by Chu and He, Dissertation, UCLA (2010), and so on.

- Hybrid models should be considered.
- Many possible applications.