

SDL Project

Geospatial Analysis in Recommender Algorithms

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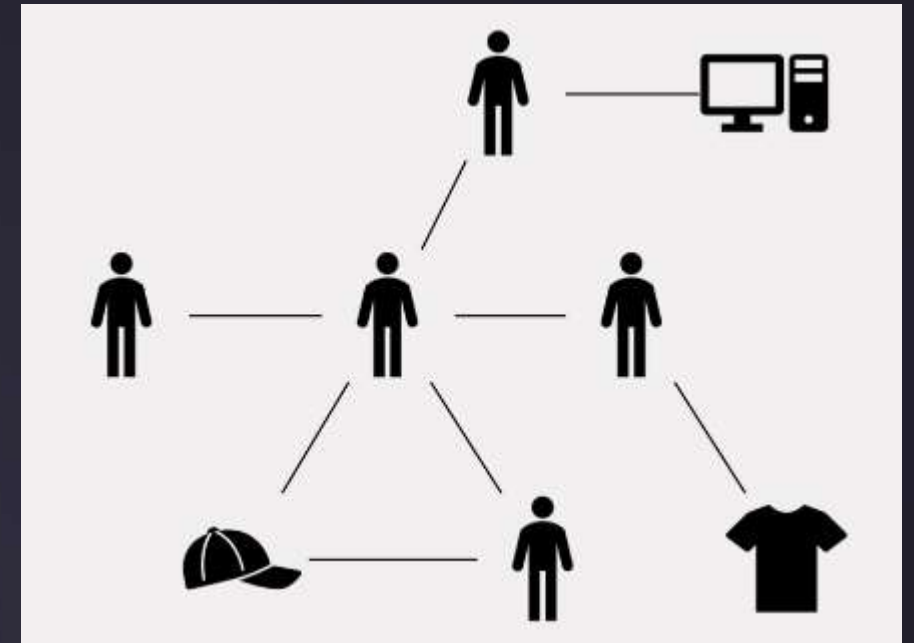
Research background

Previous Research

In our previous research, we had already implemented the recommendation algorithm based on Graph convolutional neural networks(a.k.a. GCN) and collaborative filtering and made modified to it in order to perform better on small-scaled datasets.

In this Spatial Data Lab internships program, we are introduced with the advanced workflow data analytic platform - KNIME.

There is still a need of analyzing the combination of geographical information with advanced recommendation algorithm based on GCN. This research mainly focus on this topic and utilize practical analytic skills with KNIME platform.



Social Network and Recommender System

User Preference

Distance Calculate: steps/hops
One-hop Neighbor

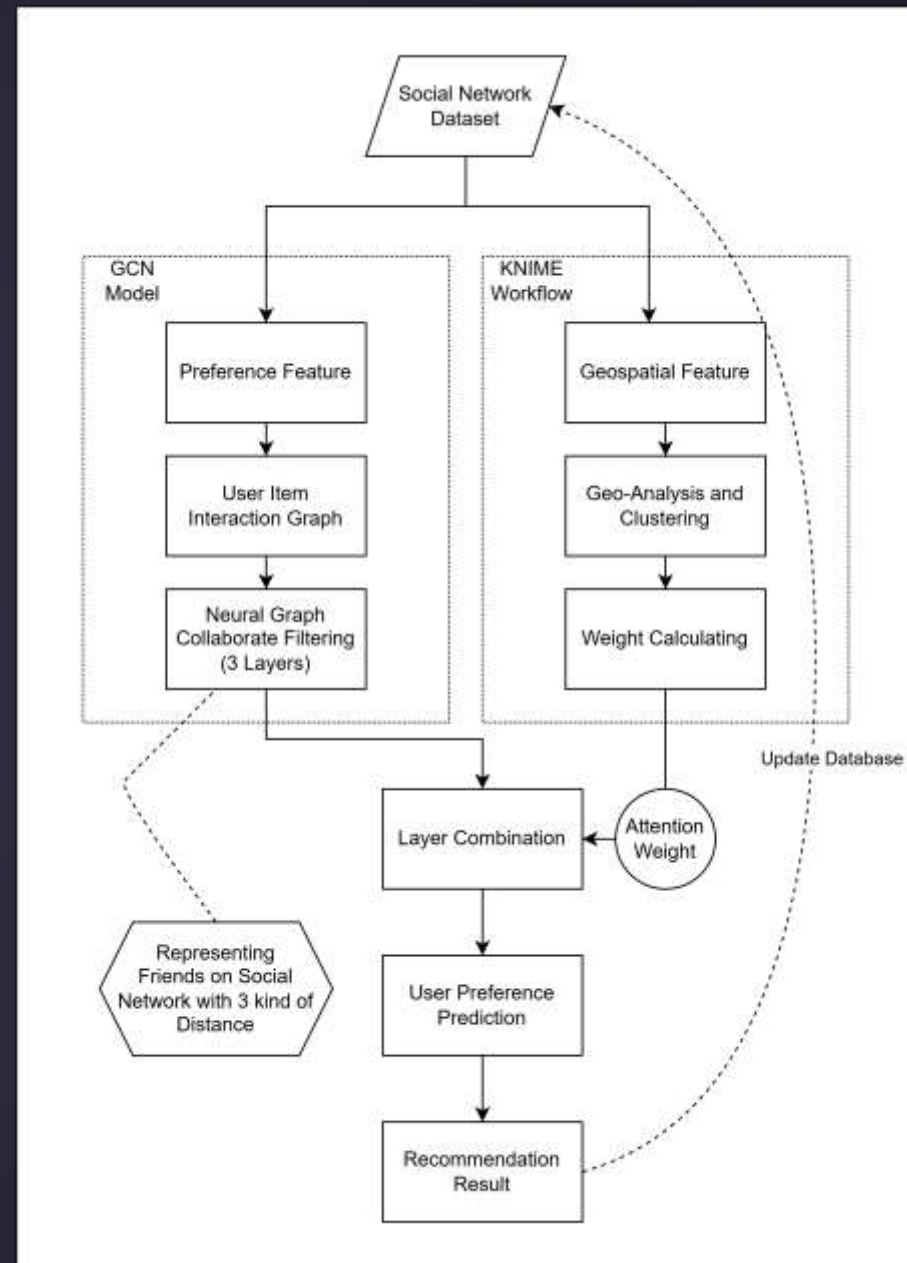
Dataset

Gowalla:

<https://www.kaggle.com/datasets/bqlearner/gowalla-checkins>

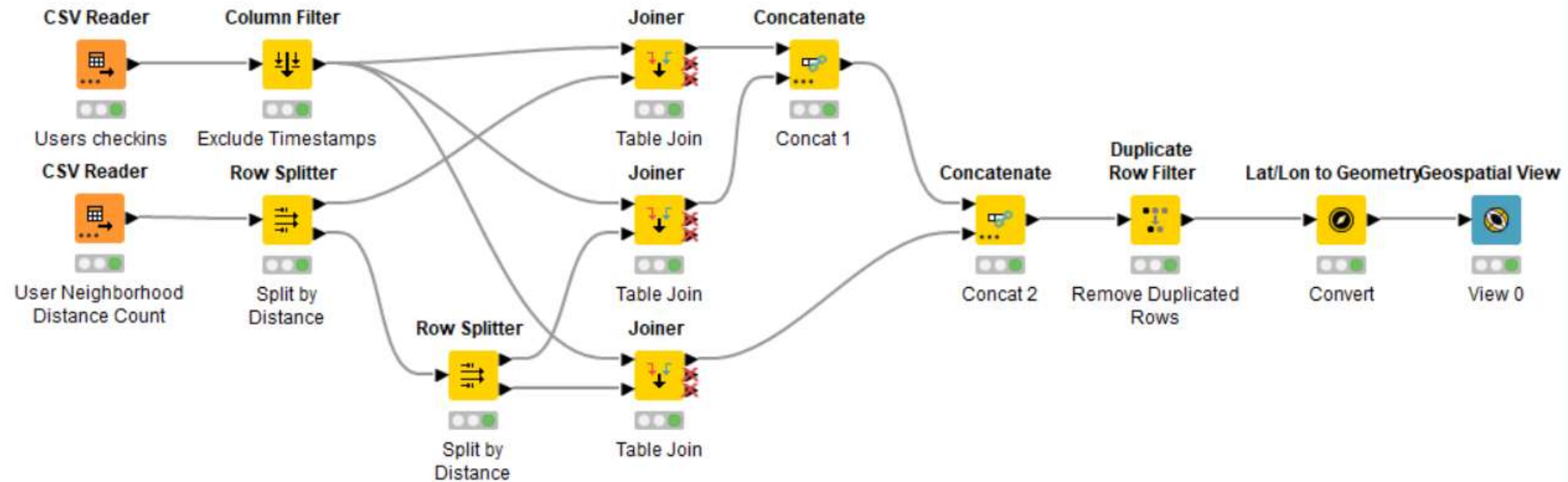
Gowalla was a location-based social networking platform that allowed users to share their check-ins and experiences at different places. Users could check-in at various locations, including restaurants, parks, landmarks, and more, and share their activities with their friends and followers.





KNIME Workflow

Gowalla dataset in Recommendation According to Social Network Distance



- Focus on the user's one-hop, two-hop and three-hop neighborhood.
- Collect their user preference for recommending similar item to test user

KNIME Workflow



- Three colors represent the preference of three kind of people based on social network distance
- Dark->one-hop neighbor
- Violet->two-hop neighbor
- Yellow->three-hop neighbor
- Contribute different weight to the recommendation

Project gaining

Processing Geospatial Data

Basic Graph Network
Model Training
Preference Prediction



Python



KNIME

With Geospatial
Analysis Extension

Processing Geospatial
Data.
SQL operations
Distance calculating
Weights and Biases
Data Visualization

Thanks

Tiancheng He

Appendix

Link to the work

Project and Code:

[Y4maxanadu/SDL-KNIME-workshop: for SDL internship and related work with KNIME \(github.com\)](https://github.com/Y4maxanadu/SDL-KNIME-workshop)

Python



KNIME

With Geospatial
Analysis Extension

KNIME community hub:

<https://hub.knime.com/-/spaces/-/~kpqGBQUdAJMmXMyU/current-state/>