PRACTICAL DATA SCIENCE WITH PYTHON
COSC 2670/2738 RMIT
ASSIGNMENT 3

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TASK 2 : PRESENTATION

OVERVIEW

- How Slope One Scheme works
- Why the Weighted Slope One Scheme works
- How the parameter λ affects the personalised weighted Slope One method

Slope One Scheme

- Memory Based Scheme
  - *Uses similarity measure for pairs of users*
  - *Not fit for fast online queries*
  - *Requires minimum number of users who has a minimum number of ratings*

- Popularity Differential
  - *Determining how much different an item from another item.*
  - *Uses 3 different approaches to select differentials*
    1. Slope One
    2. Weighted Slope One
    3. Bi-Polar Slope One

Slope One Scheme

- Deviation of pair of items
  - *To calculate the average difference between an item with respect to another item*
  - *This is to measure a relationship between items.*

$$\mathrm{dev}_{j,i} = \sum_{u \in S_{j,i}(\chi)} \left(\frac{u_j - u_i}{\mathrm{card}(S_{j,i}(\chi))} \right)$$

$$P^{S1}(u)_j = \overline{u} + \frac{1}{\mathrm{card}(R_j)} \sum_{i \in R_j} (\mathrm{dev}_{j,i})$$

Weighted Slope One Scheme

- Considers the number of ratings observed
  - *Imagine we are predicting a rating for item J and using items K and L as predictors.*
  - *If 5000 users have rated items J and K and only 100 users have rated items J and L.*
  - *This means K is a better predictor than L to predict item J*

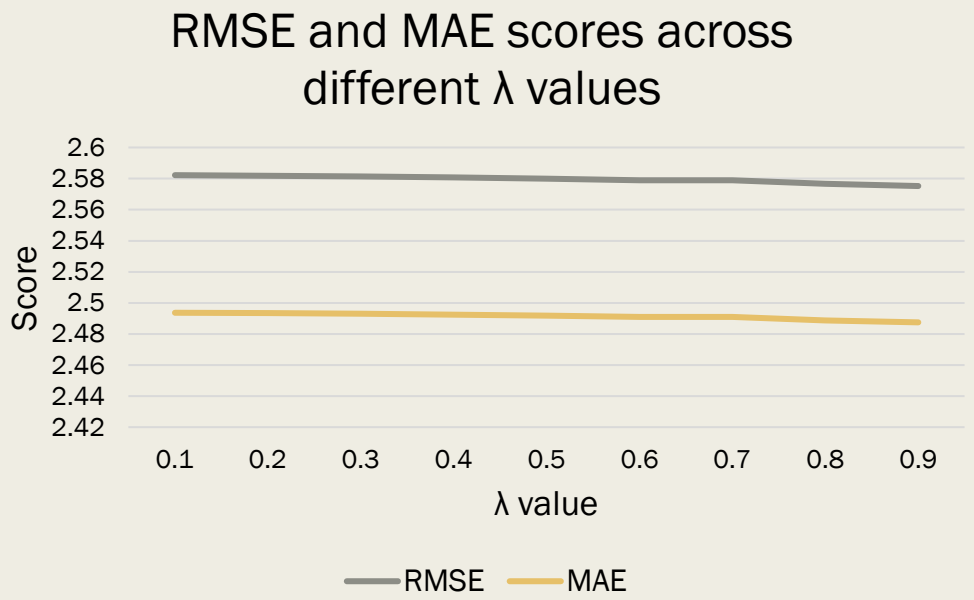
$$P^{wS1}(u)_j = \frac{\sum_{i \in S(u)-\{j\}} (\mathrm{dev}_{j,i} + u_i)\, c_{j,i}}{\sum_{i \in S(u)-\{j\}} c_{j,i}}$$

$c_{j,i}$: number of users who have rated items j and i

Parameter λ

- It is proportional to the weight of the deviations calculated
- But is inversely proportional to the weight of the similar users taken into consideration

$$\mathrm{dev}_{j,i} = \lambda \sum_{u \in S_{j,i}(\chi)} \frac{u_j - u_i}{\mathrm{card}(S_{j,i}(\chi))} + (1-\lambda) \frac{\sum_{u \in S_{j,i}(\chi)} ((u_j - u_i) \cdot \exp(\mathrm{sim}(u, u')))}{\sum_{u \in S_{j,i}(\chi)} (\exp(\mathrm{sim}(u, u')) \cdot \mathrm{card}(S_{j,i}(\chi)))}$$



THANK YOU!

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