Collaborative Filtering

User-User collaborative filtering:

$$my_score(\text{page}_i, \text{query}_j) = \frac{1}{K} \sum_{k=1}^{K} sim(\text{me}, \underset{\uparrow}{\text{user}_k}) \times score(\text{page}_i, \underset{\uparrow}{\text{query}_j}, \text{user}_k)$$

my similarity to you **your rating of the page**

Fixed single-group membership:

$$my_score(\text{page}_i, \text{query}_j) = \frac{1}{K} \sum_{k=1}^{K} score(\text{page}_i, \text{query}_j, \text{user}_k) \quad \textit{for } \text{user}_k \in \text{my_group}$$

Soft group membership:

$$my_score(\text{page}_i, \text{query}_j) = \frac{1}{G} \sum_{g=1}^{G} sim(\text{me}, \underset{\uparrow}{\text{group}_g}) \times gscore(\text{page}_i, \underset{\uparrow}{\text{query}_j}, \text{group}_g)$$

my similarity to group$_g$ $\times$ collective group$_g$ rating

$$gscore(\text{page}_i, \text{query}_j, \text{group}_g) = \frac{1}{K} \sum_{k=1}^{K} score(\text{page}_i, \text{query}_j, \text{user}_k) \quad \textit{for } \text{user}_k \in \text{group}_g$$