Sequential Group Recommandations: Our Proposal

Antti Pham, Sophie Tötterström

Kendall Tau

- Metric that counts the pairwise disagreements of two rankings.

- $\tau(A, B)$ is the Kendall tau distance between rankings A and B.

- Example
  - A: 1, 2, 3, 4
  - B: 3, 2, 1, 4
  - $\tau(A, B) = 3$

Satisfaction

- Based on Kendall tau distance
- Normalized to range [0, 1]
  - Divide by the max value $\binom{n}{2} = \frac{1}{2}n(n-1)$
- Adjusted such that 1 is good and 0 is bad
  - Subtract from 1

$$sat(R_u, R_g) = 1 - \frac{\tau(R_u, R_g)}{\frac{1}{2}n(n-1)}$$

Hybrid Group Recommendation Aggregation

- Group Recommendation Aggregation
  - Average: majority wins, outliers veto
  - Least Misery: nobody hates or loves
- Sequential
  - New recommendations for each iterations
  - Next iteration satisfies different users
- Weighted combination exploits advantages!

$$r_G(i,j) = \left(1 - \alpha_j\right) * r_{average,G}(i,j) + \alpha_j * r_{least\_misery,G}(i,j)$$
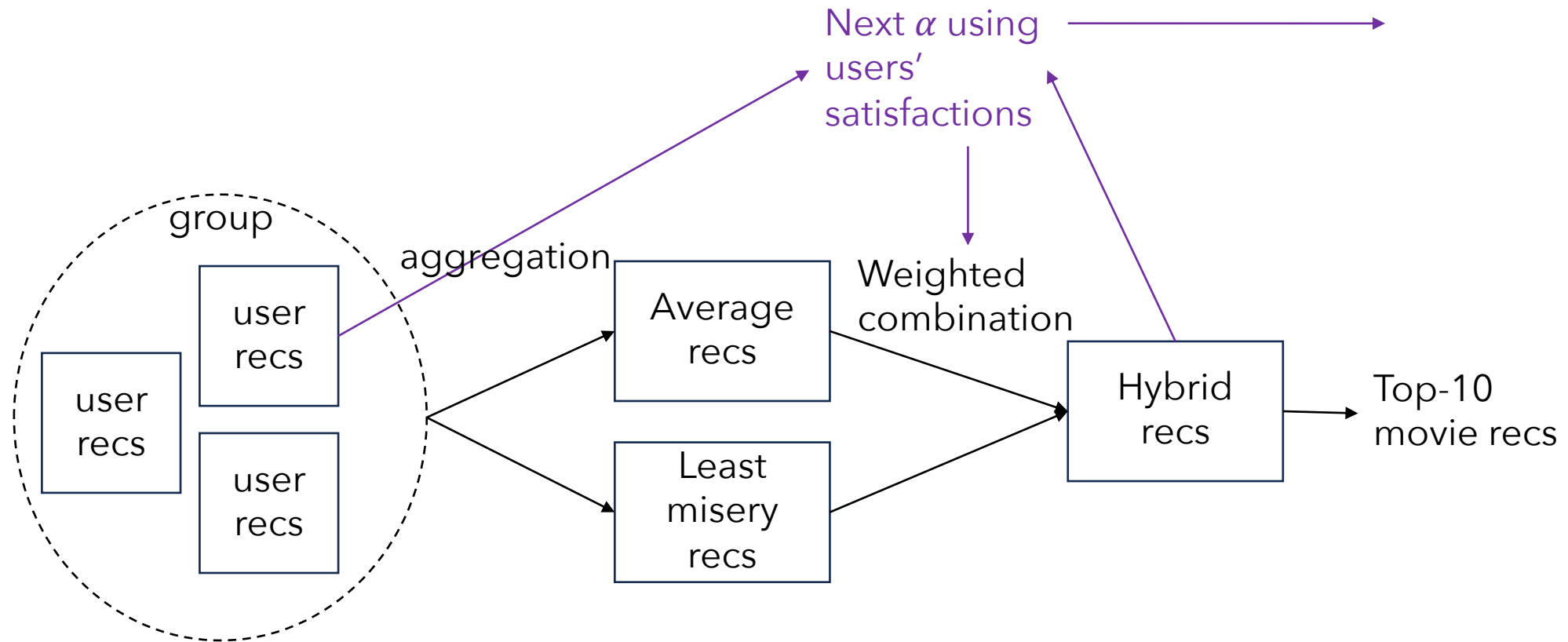
Sequential Hybrid Aggregation Model I

- Weight $\alpha_j \in [0,1]$
  - For iteration j
  - Considers user satisfaction from previous iteration
  - And balances the aggregation methods
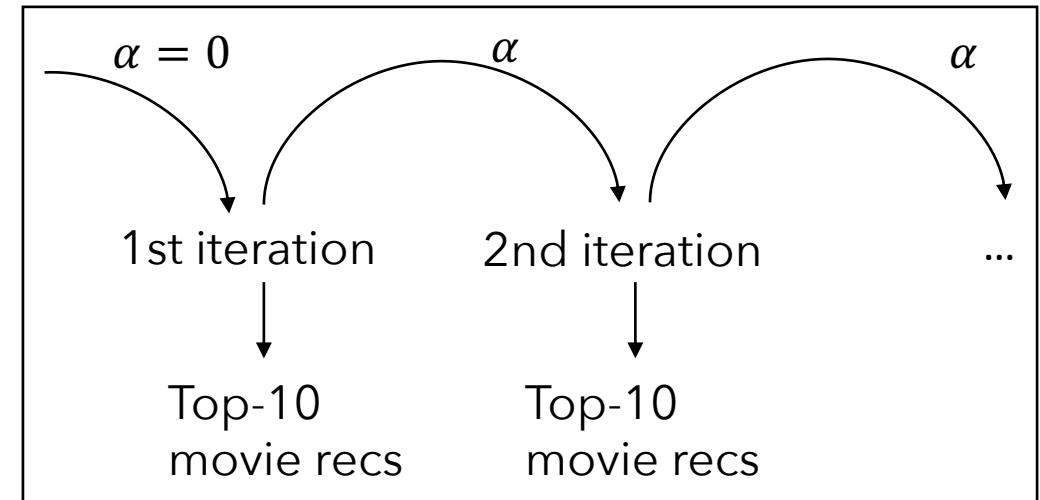
$$\alpha_j = \underset{u \in g}{\max} sat(R_u, R_{g,j-1}) - \underset{u \in g}{\min} sat(R_u, R_{g,j-1})$$

Sequential Hybrid Aggregation Model II

Please see our repository and README.md for further details.