

# Improving sequential recommendation model with MSE

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# Basic idea

We want to improve the calculation of  $\alpha_j$  by taking all the users satisfactions in to account while giving more weight to the least satisfied users. We can achieve this with MSE.

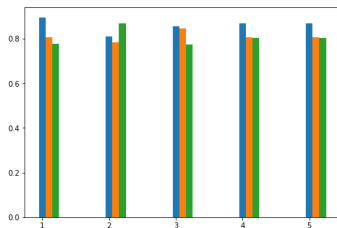
## Improved $\alpha_j$

$\alpha_j$  is calculated with MSE (mean squared error) but instead of using a square we take cube root of the square to allow  $\alpha_j$  to increase in value when dissatisfaction is high.

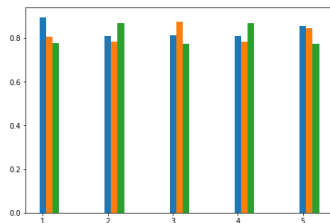
$$\alpha_j = \frac{1}{|G|} \sum_{u \in G} \sqrt[3]{(\max_{u' \in G} \text{sat}(u', Gr_{j-1}) - \text{sat}(u, Gr_{j-1}))^2}$$

MSE exaturates the error when distance between values is high, so the algorithm will put more weight for the iterations when lots of disagreement is present.

# Comparison



(a) original



(b) with MSE

Figure: Comparison between original  $\alpha_j$  and  $\alpha_j$  calculated with MSE