LRMF (ALS) EXPLAINED - ADVANCED 1

Setting

`u` – user, `v` another user

`i` – item, `j` another item

r_{ui} – observations, e.g. hits, time spent, $r_{ui} = 0$ means missing observation

Preference:

$$P_{ui} = \begin{cases} 1, & r_{ui} > 0 \\ 0, & r_{ui} = 0 \end{cases}$$

Confidence:

$$C_{ui} = \begin{cases} 1 + \alpha \times r_{ui}, & r_{ui} > 0 \\ 1, & r_{ui} = 0 \end{cases}$$

Research Paper: Y. Hu, Y.Koren, and C.Volinsky. Collaborative Filtering for Implicit Feedback Datasets in IEEE International Conference on Data Mining (ICDM 2008), pages 263-272, 2008

LRMF (ALS) EXPLAINED - ADVANCED 2

Goal

Find a vector $x_u \in \mathbb{R}^f$ for each user u, and a vector $y_i \in \mathbb{R}^f$ for each item i, thus $p_{ui} = x_u^T y_i$

Plain Text

The vectors strive to map users and items into a common latent factor space where they can be directly compared.

Cost Function

$$\min_{x_*, y_*} \sum_{u,i} c_{ui}(p_{ui} - x_u^T y_i)^2 + \lambda(\sum_u |x_u|^2 + \sum_i |y_i|^2)$$

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