7-4: FunkSVD Training Algorithm

Introduction to Recommender Systems

Introduction

- Last lecture discussed learning SVDs with gradient descent
- This video: more details on the training process
  - Walk through pseudocode

Algorithm Structure

```
initialize matrices
for f in features:
    until feature has converged:
        for (u,i,r) in ratings:
            predict r
            update user, item values for f
```

Prediction/Scoring

- Dot product of user, item vectors
  - All items: multiply user vector by item matrix

7-4: FunkSVD Training Algorithm

Introduction to Recommender Systems

m users
n items
k features

Train-FunkSVD

$U \leftarrow m \times k$ matrix
$V \leftarrow n \times k$ matrix
} Fill w/ 0.1

$R \approx U V^T$

for $f \leftarrow 1 \ldots k$:
  until convergence:
    for $r_{ai} \leftarrow$ ratings:
      $p_{ai} \leftarrow$ predict r_{ai}
      $\varepsilon_{ai} = r_{ai} - p_{ai}$
      $u_{af} \leftarrow$ update
      $v_{if} \leftarrow$ update

$p_{ai} = \mu + b_a + b_i + \vec{u}_a \cdot \vec{v}_i$

learning rate
reg. term

$\Delta u_{af} = \lambda (\varepsilon_{ai} v_{if} + \gamma u_{af})$
$\Delta v_{if} = \lambda (\varepsilon_{ai} u_{af} - \gamma v_{if})$