**Collaborative Filtering Based Recommendation of Online Social Voting**

In this paper, proposed Recommender systems (RSs) for voting in online social networks (like facebook, twitter, etc.) have two main concepts.

1. Matrix factorization (MF)
2. Nearest-neighbor (NN)

**Notations:**

|  |  |
| --- | --- |
| U, u | user |
| V | voting |
| G | group |
| V | Target User |
| Qu | User Latent Feature |
| Pi | Voting Latent Feature |
| Ř u , i | User-voting interaction |
| Gu,n | User-group interaction |
| Su,v | User-user interaction |

**Matrix factorization (MF)**

This concept will helps to non-social people. The Voting system requires social relationship in *Nearest-neighbor (NN)* (u 🡪 v). Here *Matrix factorization (MF)* doesn’t require any social relationships. Finding hot voting is main motive of this concept without social relationship.

In MF we rank the voting’s according to user-voting interaction Ř u , i.

Řu,i = rm + QuPiT [Ref algorithm. 1]

*Here:*  Ř u ,i  🡪 User-voting interaction. (Find the hot voting based on user and vote latent features)

rm 🡪 User voting interaction of target vote latent feature

QuPiT 🡪 Score of the voting interaction.

Nearest-Neighbor (NN)

In this paper, the idea of metapath to construct nearest neighborhoods for target users with four formats.

1. U-G-U-V metapath
2. U-U-V metapath
3. U-V-U-V metapath.
4. UNN

**U-G-U-V metapath**

Count of *Pi* Voting Latent Feature of v (target user) of group’s of user u (vote initiator)

**Group**

**Vote**

**(Pi)**

**U-U-V metapath**

Voting count of U’s followers/friends with in m-hops with same latent features. (1-hop Direct friend, 2- hop Indirect friend).

1-hop Direct friend w=1

2-hop Indirect friend w=0.1

Ex:

Sajid (Vote Initiator), Vote LF: Books 🡪 Swamy (1-hop) Pi of books is 2

1\*2=2;

Sajid (Vote Initiator), Vote LF: Books 🡪 Ali (2-hop) Pi of books is 2

0.1\*2=0.2;

**U-V-U-V metapath.**

Find the set of users who have participated, take count of the voting’s participated vote initiator’s previous voting’s.

**UNN**

Set of NNs of user u in the user latent feature space, and the NNs of user u are weighted according to their similarity sim(u, v) with user u. Simply take U’s Latent features and count the voting participated of LF.

**Combined Neighborhoods:**

Hybrid Approach is the combination of UGUV, UUV(m-hop), UVUV, and UNN approaches.

Score u , i = U-G-U-V Score +U-U-V score + U-V-U-V Score +UNN Score;

Based on score we forward the vote to users. ­