Liquid FM: Recommending Music through Viscous Democracy

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Recommendation by voting

• Recommendation happens usually by some form of collaborative filtering

• LiquidFM is a Facebook application that tries to shift the power to the users

• The basic underlying mechanism is that of a liquid democracy, in which users can take decisions or delegate them
Viscous democracy

- In pure liquid democracy, votes are transferred exactly.

- *Viscous democracy* has been proposed by Boldi *et al.* [CACM 2011] as a way to introduce some friction in vote transmission.

- The idea is that a vote will conserve just a fraction $\alpha$ of its power when it is transferred to a delegate.
Basic setting

- We have a set of user $U$ and a set of songs $S$.
- There is an underlying friendship graph having $U$ as set of nodes, i.e., $F \subseteq U \times U$.
- Every user expresses votes for some song.
- Every user can delegate at most a friend as an expert, giving rise to a delegation graph $D \subseteq F$. 

Computing votes

- In liquid democracy, one assumes that there are no cycles and the “power” of a user is simply the size of its in-tree.

- In viscous democracy, a vote traveling $k$ hops has weight $\alpha^k$.

- The score of a user $u$ is thus $\sum_v \alpha^{-d(v,u)}$.

- Note that this is just Katz’s index (or PageRank); actually, cycles are possible and the formula becomes an infinite path sum.

- The score of a song is the sum of the scores of the users voting it.
Personalised votes

• In the previous setting, votes are global

• We want to consider also a more personal type of recommendation

• We compute the score *only* using votes from user reachable from $u$ following a delegation chain

• The resulting score is used in a convex combination with the global score
Implementation

• Katz’s index computed in Java (periodically)

• MongoDB to store data

• A MusicBrainz local server to provide suggestions and unique references to music

• The resulting score is used in convex combination with the global score
Main problem

- Not surprisingly: *user engagement*

- Chicken-and-egg: if LiquidFM was famous, people would like to have an “expert” label

- Without that, people have no incentive to add delegations and suggestions

- This is particularly bad for the “active” nature of the recommendation
On the positive side

- High privacy: you decide what to make visible of your music taste
- High serendipity: even in our small set of user (a hundred) it is evident that people tend to insert songs that are not “obvious”
- (Actually, there are a few records that entered my listening list from LiquidFM.)
Conclusions

• Moving from implicit to explicit user suggestions is an interesting direction, but user engagement becomes a major problem

• Would you be interested in a recommendation system where you can choose what to recommend?

• As a side note: incredibly complex problem for classical music, where people might choose to vote for a piece or an execution (track)

• http://bit.ly/liquidfm