Liquid FM: Recommending Music through Viscous Democracy

Paolo Boldi, Corrado Monti, Massimo Santini, and Sebastiano Vigna

Dipartimento di Informatica, Università degli Studi di Milano, Italy

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 α 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 $D \subseteq F$*
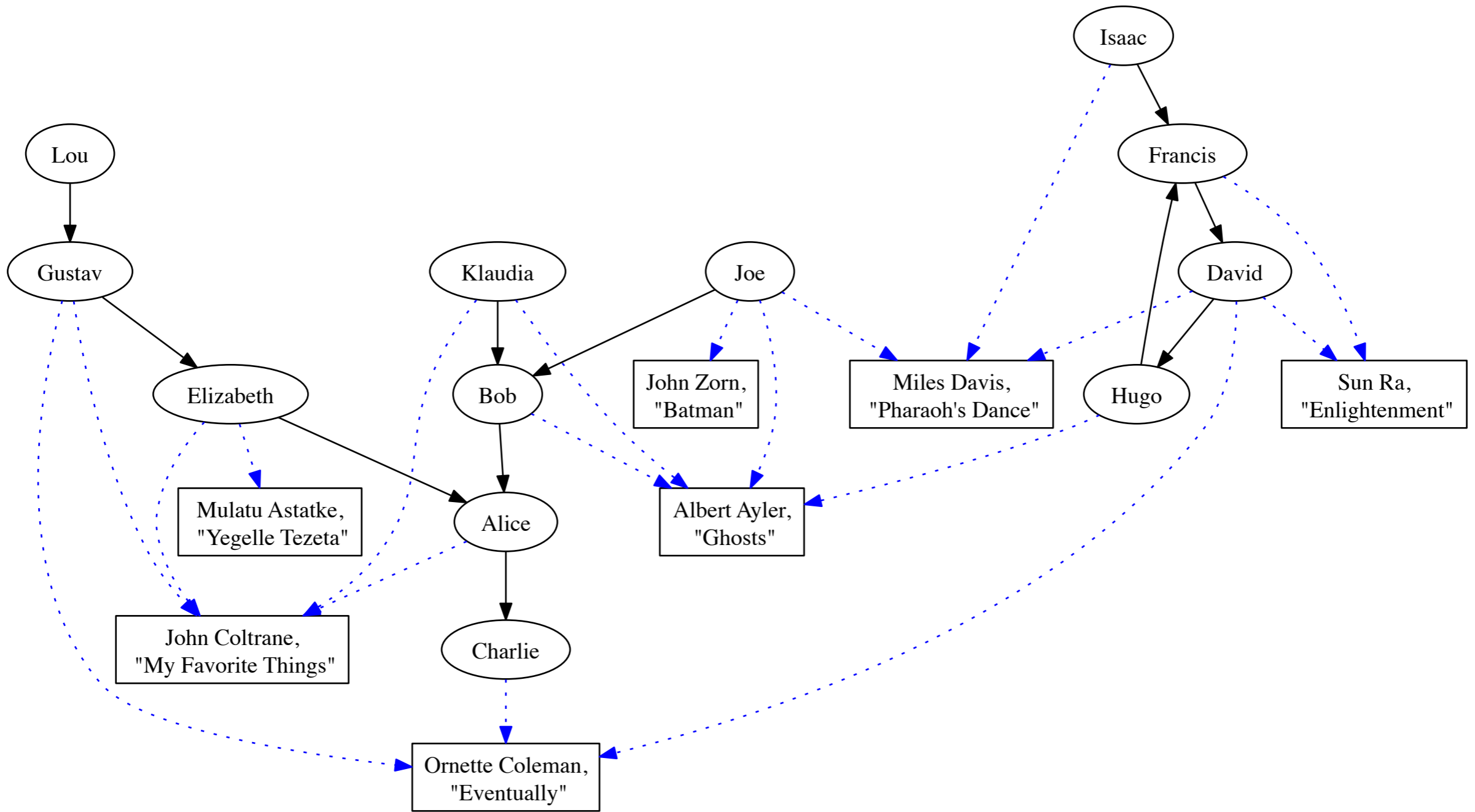
Computing votes

- 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 α^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
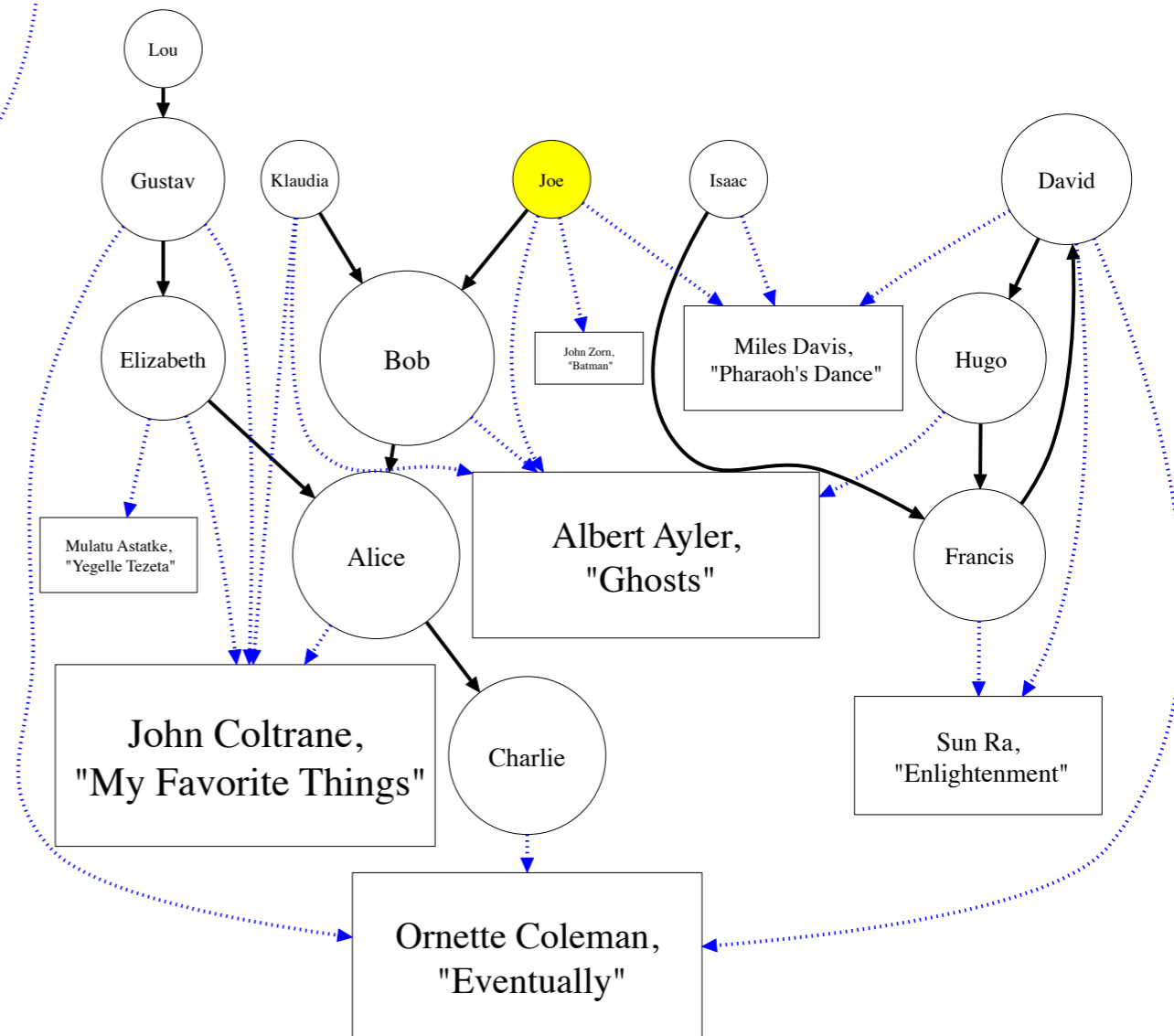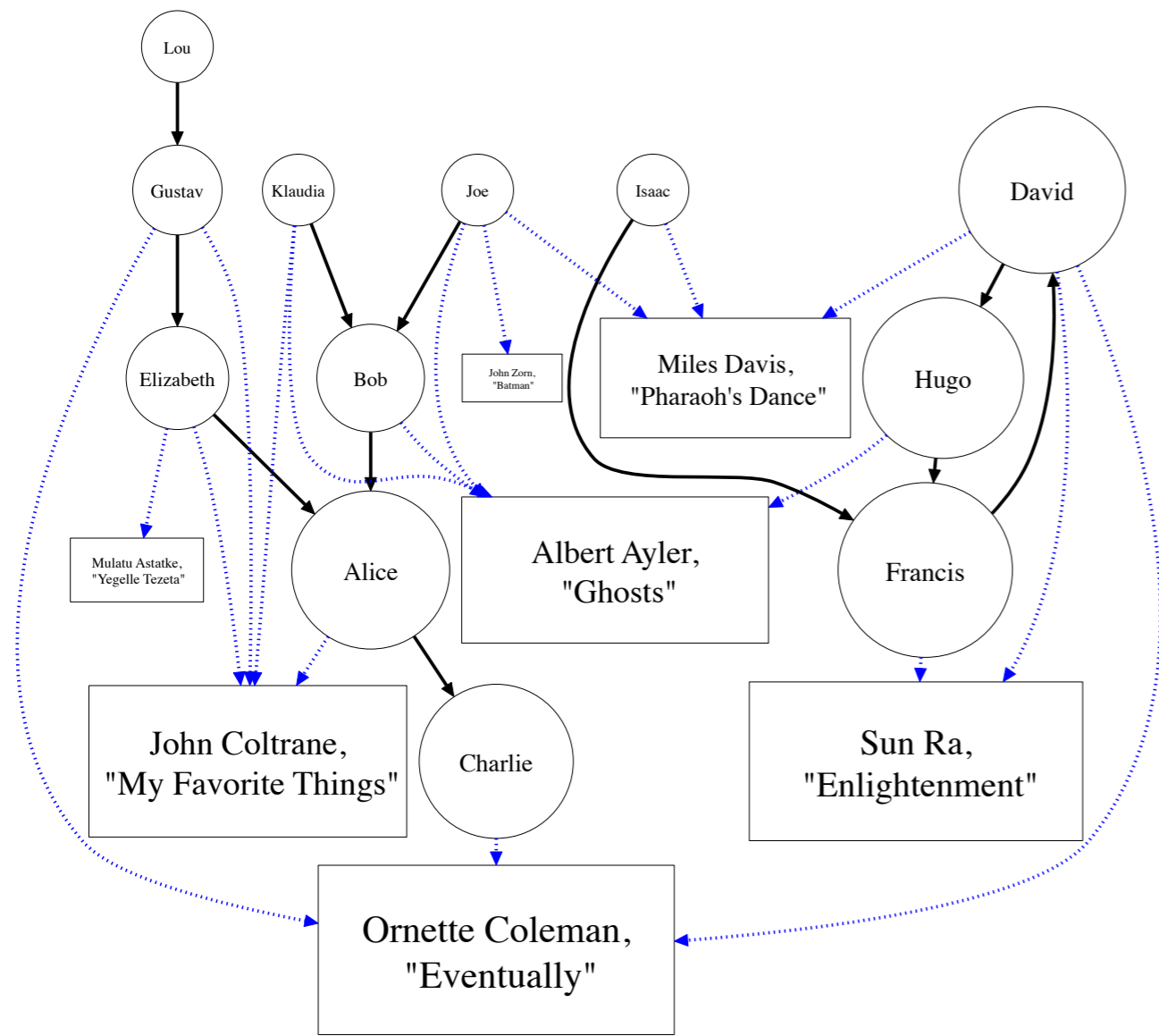
Implementation

- 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