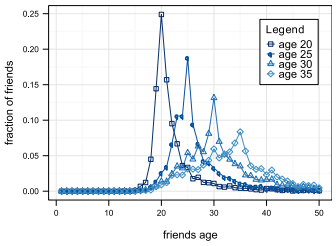
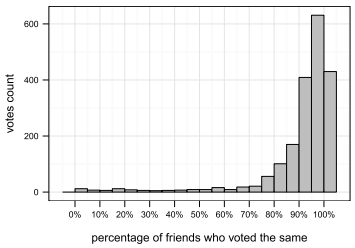
Modeling peer and external influence in online social network

Matija Piškorec [1], Nino Antulov-Fantulin [1], Iva Miholić [2], Tomislav Šmuc [1], Mile Šikić [2,3]

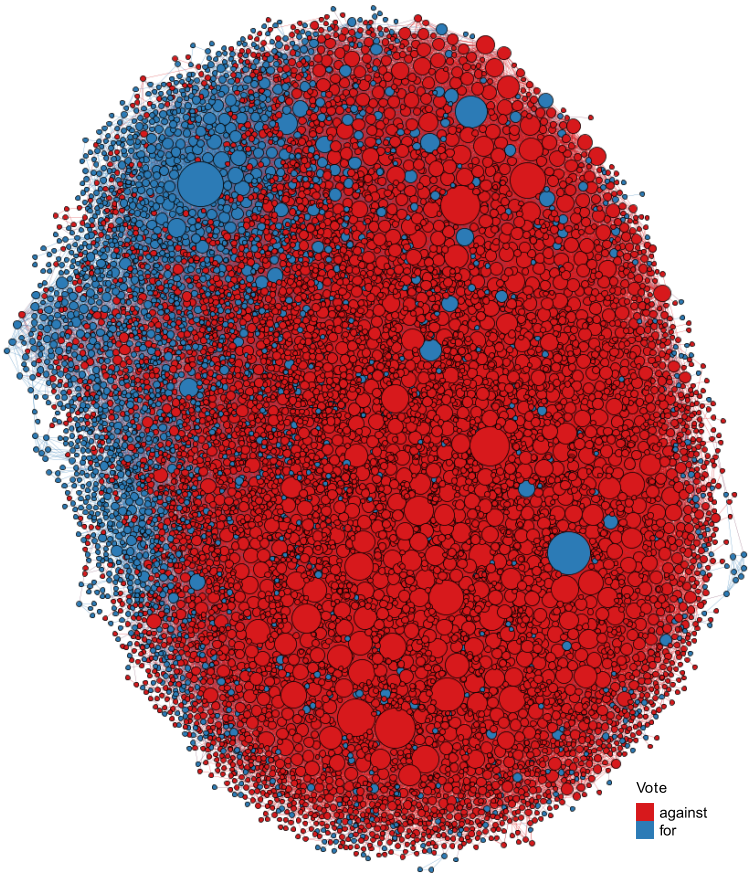
[1] Laboratory for Information Systems, Division of Electronics, Ruđer Bošković Institute, Croatia
[2] Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia
[3] Bioinformatics Institute, A*STAR, Singapore, Republic of Singapore

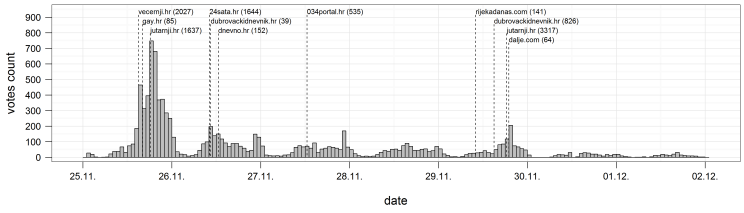
Introduction. Using a Facebook application we collected demographics data and votes of 10175 Facebook users on the referendum on the definition of marriage in Croatia held on 1st of December 2013. Application was active during a week prior to the referendum and it allowed users to express their voting preference for the upcoming referendum, to see global statistics for all users who voted, and to see statistics for their friends who voted. In addition, they could also share the link to the application through Facebook. For all these users we have their friendship relationships and various demographics data like age, gender and geographic location.Due to the politically charged topic, the referendum attracted a lot of media attention, with the opposing sides trying to engage voters through both classical news media and social media.



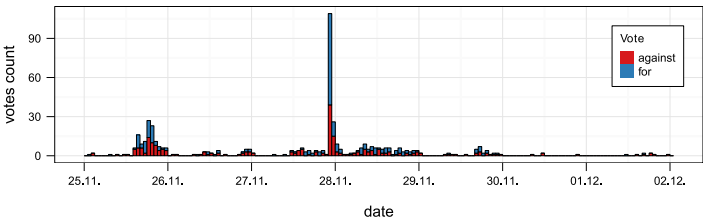


Homophily analysis. Simple exploratory analysis of friendship network immediately reveals large homophily with respect to votes, with majority of users having 80% or more friends who voted the same as they did. This gives us confidence that there is a strong peer-mediated influence that is crucial in spreading the information on our application. Also, there is also strong homophily with respect to age - users are more likely to friend users that are closer their age.

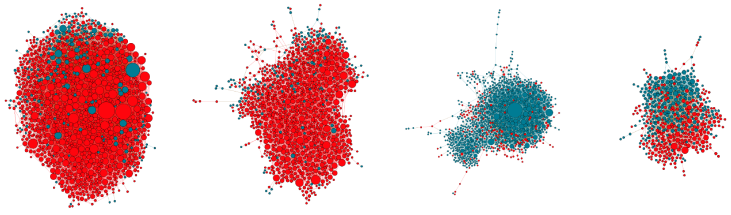




Number of registered voters per hour. Voting application opened for public at 25th of November after 1 AM. We stopped collecting votes at midnight 2nd of December (the day of actual referendum). Plots are annotated with times and domains of online news articles that reported on our application, along with the number of visitors that visited our web page through referral from these domains through the whole period.



Communities of voters have distinct voting dynamics. For example, this community of users has a strong peak in activity during one particular hour in the evening of 27th of November. This peak in activity is not present in other communities, and does not follow immediately after publication of any online news articles, which makes it highly likely that it originated exclusively because of the peer-driven influence.



Communities of voters. Voters form friendship communities that are extremly homogeneous with respect to the votes. Also, their voting dynamics are all very similar to the global voting dynamics, and they usually contain few strongly connected users. Notable exception is the community to the far right - it has almost equal number of votes for either side and has no strongly connected users, and it has a strong peak in activity during one particular hour in the evening of 27th of November.

Are you a researcher interested in the above dataset, the upcoming paper, or collaboration in general? We would like to hear from you.

Contact us on:
matija.piskorec@irb.hr

For more information, visit:
http://lis.irb.hr/referendum2013/