

# Exposing Twitter Users to Contrarian News

Kiran Garimella\*, Gianmarco De Francisci Morales#, Aristides Gionis\*, Michael Mathioudakis\*  
 \*Aalto University/HIIT, #Qatar Computing Research Institute

{kiran.garimella, aristides.gionis, michael.mathioudakis}@aalto.fi, gdfm@acm.org

Visit the demo at: <https://users.ics.aalto.fi/kiran/reducingControversy/homepage/>



## 1. Motivation

- Polarization on social media
- Echo chambers
- Can we visualize the echo chambers?
- Can we reduce the polarization?

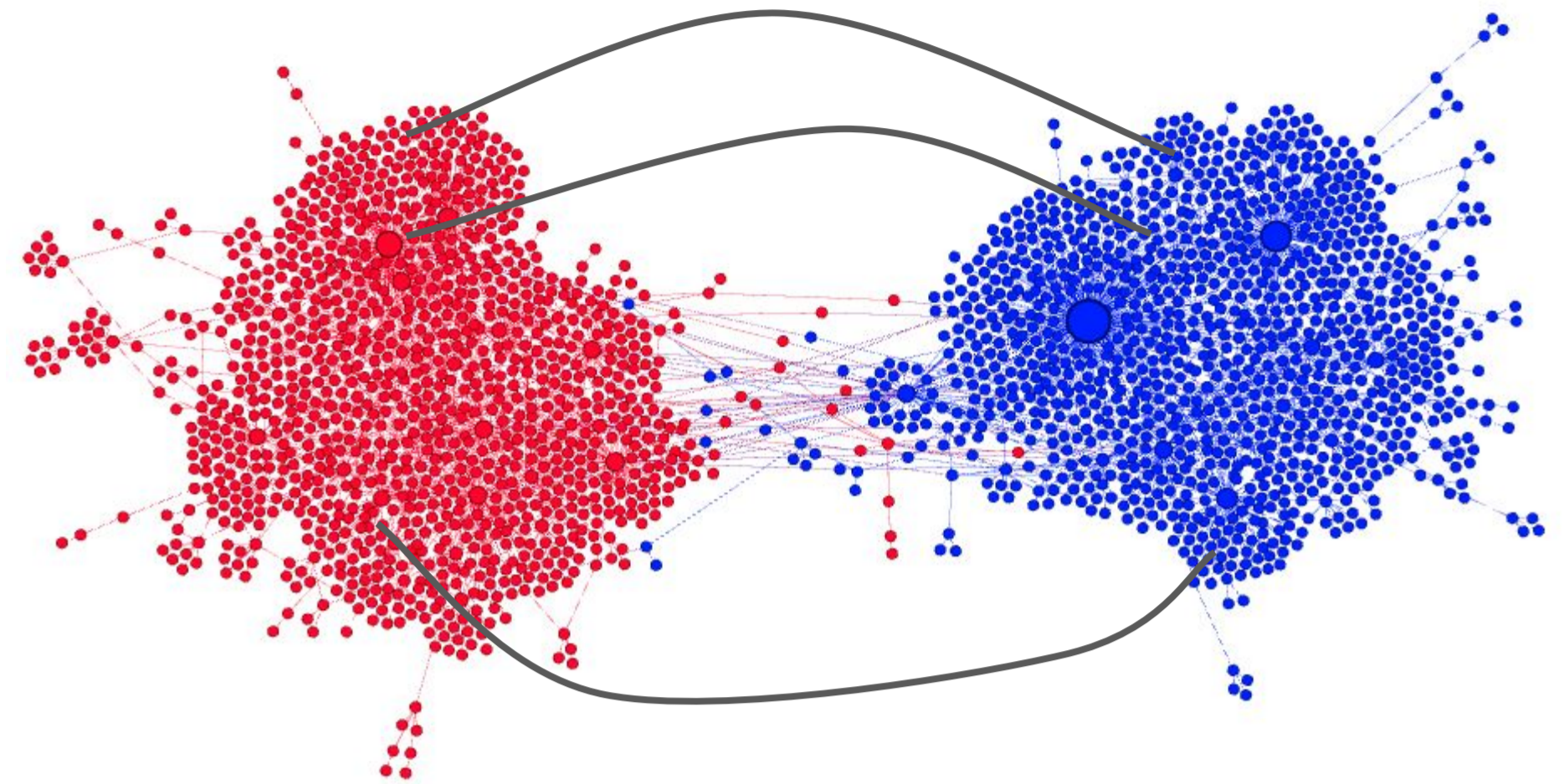


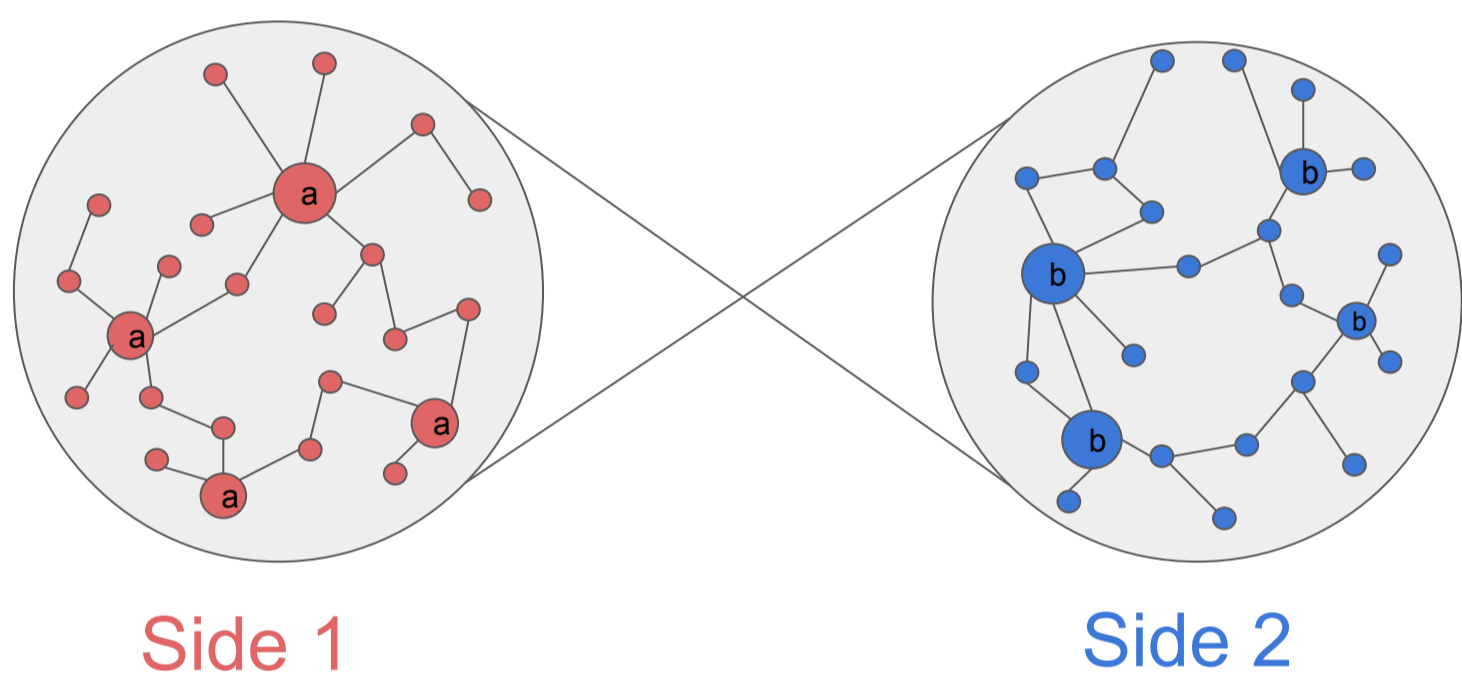
Fig: Polarized retweet network for the topic #russia\_march, with sample edges added

## 2. Setting

- Twitter
- Retweets
- Endorsement graph
- Directed, topic-specific

## 3. Background

### a. User Polarity score



- How probable is the user to get information only from one side?
- Value between -1 and 1.

### b. Acceptance Probability

- An edge won't always get accepted we model probability of acceptance based on user **polarity**
  - $p(u, v) = p(\text{edge is present} \mid \text{polarity of } u, \text{polarity of } v)$
  - Estimated using:  $N_{\text{endorsed}}(R_u, R_v) / N_{\text{exposed}}(R_u, R_v)$
- Based on retweets
Based on connections

## 4. Recommendation factors

- L1. Reduction in user polarity (best recommendations to reduce user polarity)
- L2. Acceptance probability (probability that a user likes a recommendation)
- L3. Exclusivity on either side (articles that are exclusively shared by one side)
- L4. Topic diversity (present diverse topics than what a user has already read)
- L5. Popularity (present popular content to the user)

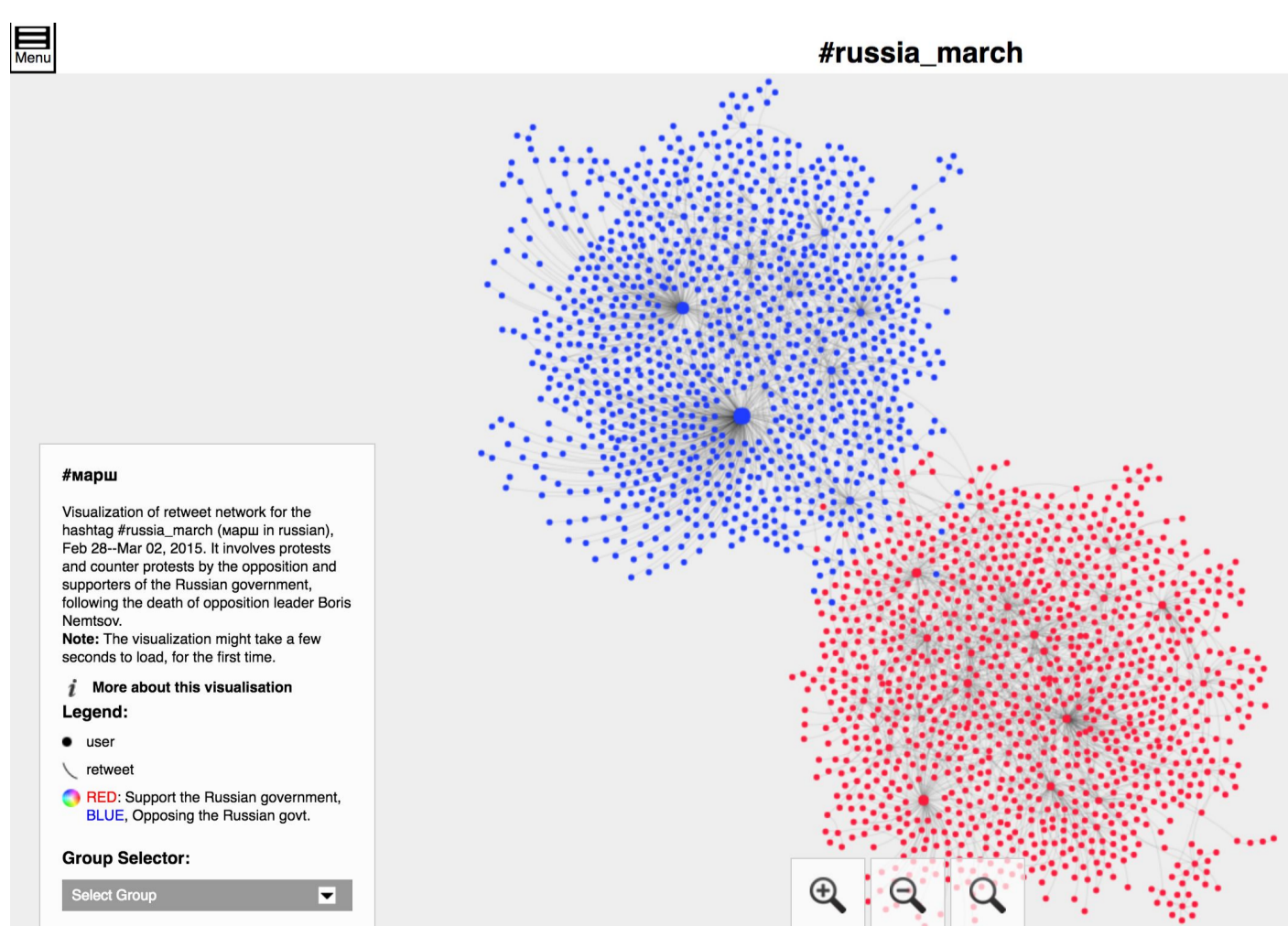
## 5. Combining the factors

- Merge the 5 ranked lists
- Weighted Rank aggregation

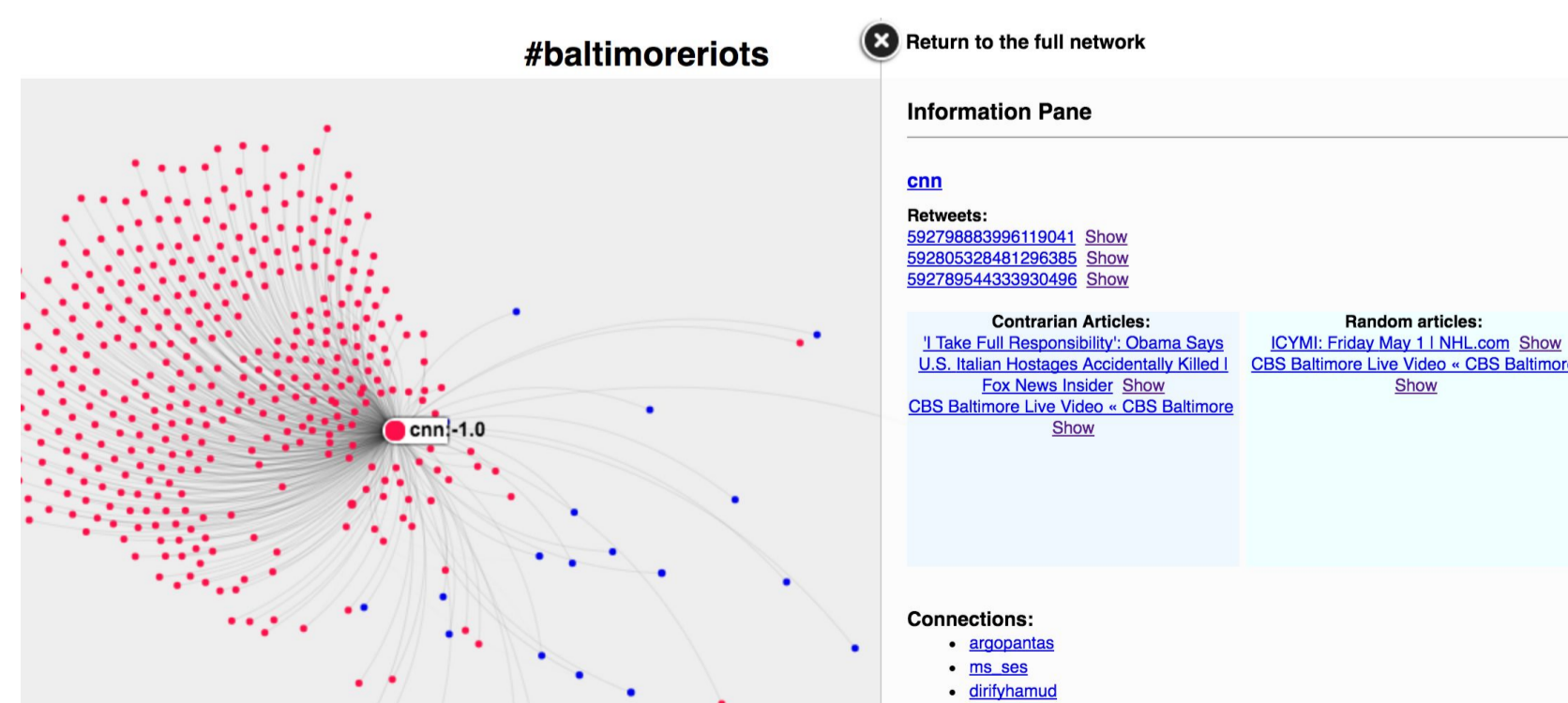
$$\phi(\delta) = \sum_{i=1}^5 w_i d(\delta, L_i)$$

## 8. Demo functionality

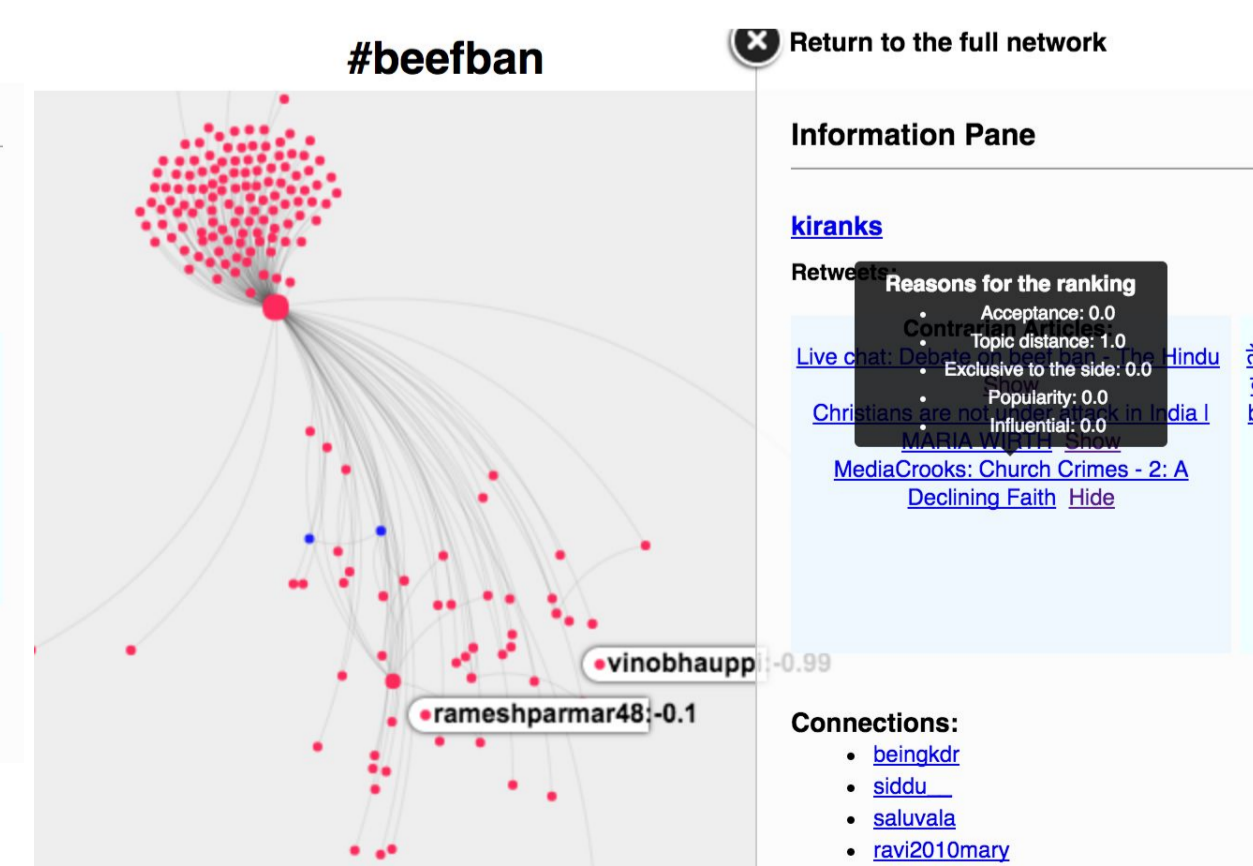
1. Visualising polarized networks



2. Click on a node to see contrarian news recommendations



3. Get reasons for the recommendations



## 9. Acknowledgements

This work has been supported by the Academy of Finland project "Nestor" (286211) and the EC H2020 RIA project "SoBigData" (654024).