

Do recommender systems make social media more susceptible to misinformation spreaders?

Antonela Tommasel, Filippo Menczer

Recommender systems play an important role as **mediators of information propagation**.

They have been deemed as **one of the major culprits of misinformation spreading**.

People-recommender systems or **link prediction** techniques are of special interest.

They directly contribute to the **evolution of the social network structure**, affecting the information and the opinions users are exposed to.

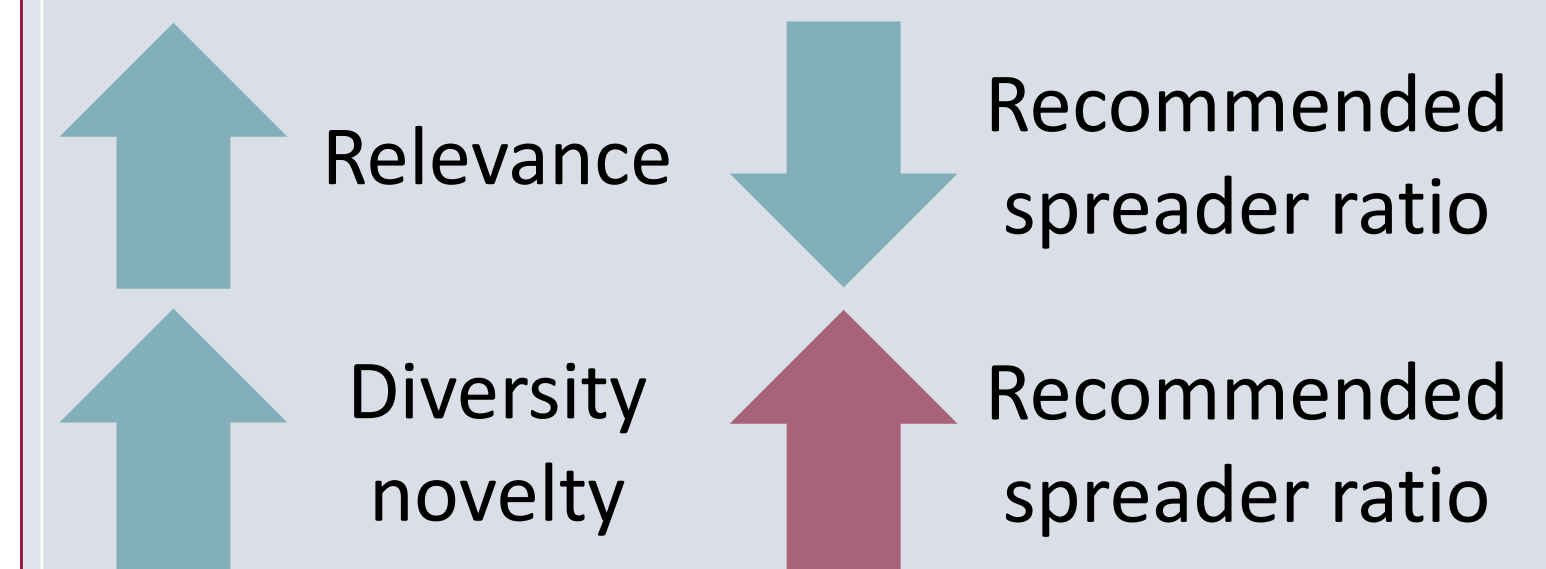
How can we assess the effect of link prediction techniques on misinformation propagation and polarization?

We combine **link prediction techniques** with an **opinion dynamics model** to simulate the behavior of individuals changing their opinions as a consequence of their interactions with their neighborhood, within a social network that is continuously evolving.

Our study shows that recommenders had a differentiated impact on misinformation spreader influence, leading to networks of different propagation characteristics.

Recommenders fostering relevance	Recommenders fostering diversity/novelty
Topology Popularity	Content-based Random

RQ1. How do recommenders contribute to misinformation spreaders recommendations?



RQ2. How do recommenders contribute to amplifying the influence of misinformation spreaders?


- Recommending a **large number of spreaders** does **not directly lead to a high conversion rate**.
- Recommenders **diversifying interactions** seemed to have a **stronger effect on spreaders presence and dynamics**.
- Network topology** and **rewiring** seem to be the **greatest drivers for opinion spreading**.

There is still work to do!

- Explore relaxed spreader definitions to evaluate continuous opinion models.
- Perform a more extensive evaluation with other data collections, recommenders and opinion models.
- Consider different follow/unfollow dynamics and densification scenarios.



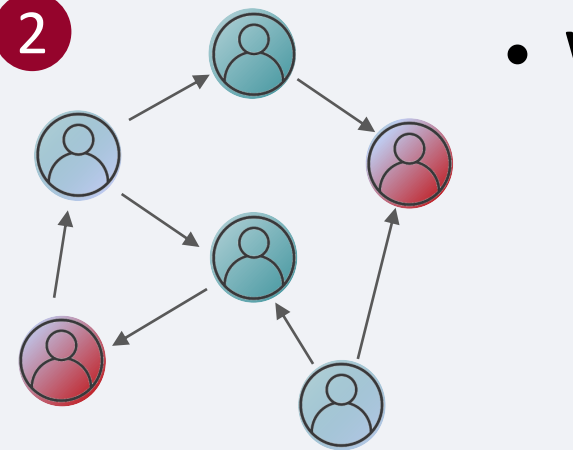
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Data collection

- FibVid** data collection.
- 772 COVID19, 112k Twitter, 24k users, 2020
- Tweet labels were used to determine whether users are fake news spreaders.

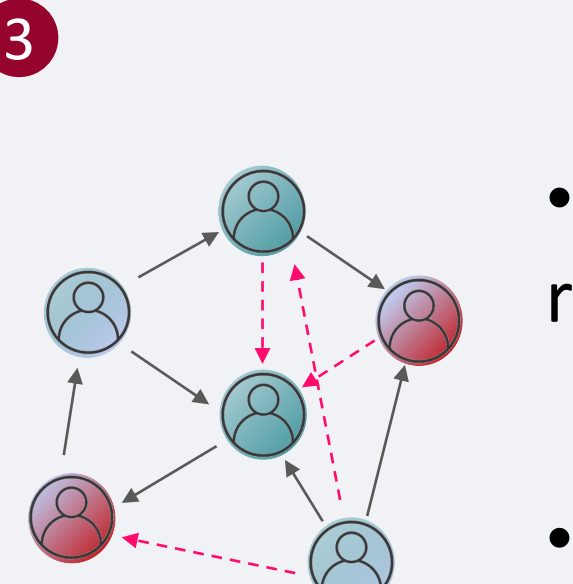
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Network derivation

- We build a **user network** based on **tweet interaction**.
- Spreaders share > **50%** of fake content.
- 41% spreaders, 49% non-spreaders, 10% neutral
- Homophily in interactions: 27% spreaders to spreaders, 16% non-spreaders to non-spreaders

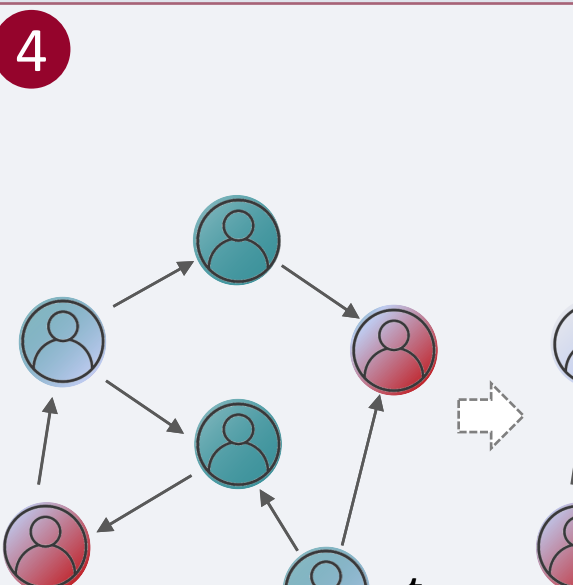
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Making recommendations

- Multiple recommenders.
- Popularity, Random, Topological, Content, Friend of Friends, Implicit MF
- Evaluation did not endorse recommendations but check their closeness to the actual user interactions.
- Relevance, Diversity novelty, Misinformation exposure

4



Opinion diffusion

- Extension of **voter model**.
- Recommendations are added to the graph one at a time during simulation.
- For each added edge, one is removed.
- Evaluation compares the induced network with the original one.
- % final spreaders, Centrality metrics, Polarization metrics