

# Algorithmic Radicalization

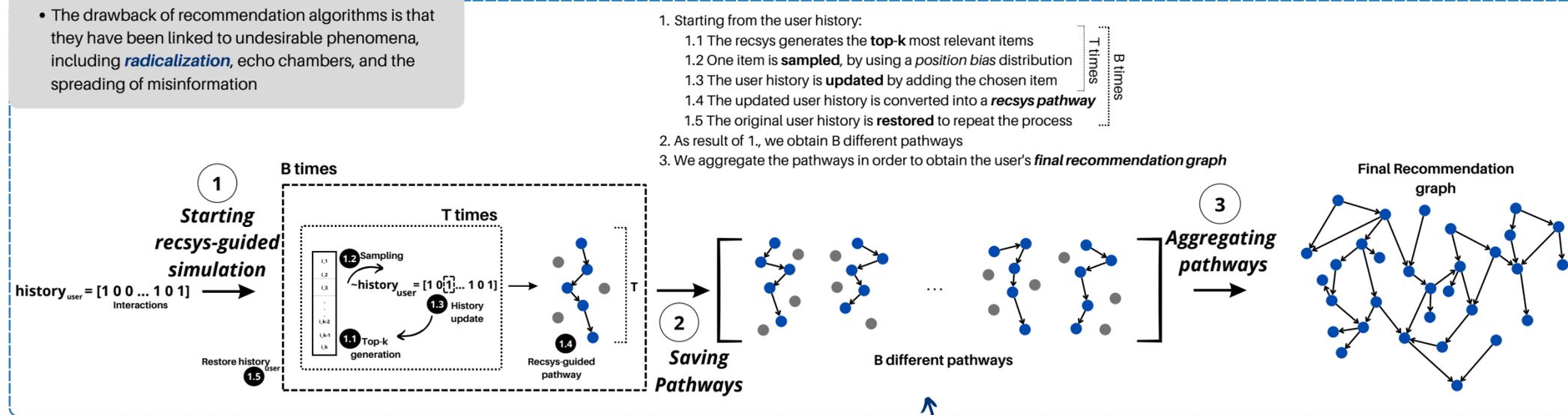
A Simulation Framework to study the effects of Recommender Systems

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**RQ:** Does a recommender system contribute to user *radicalization*?

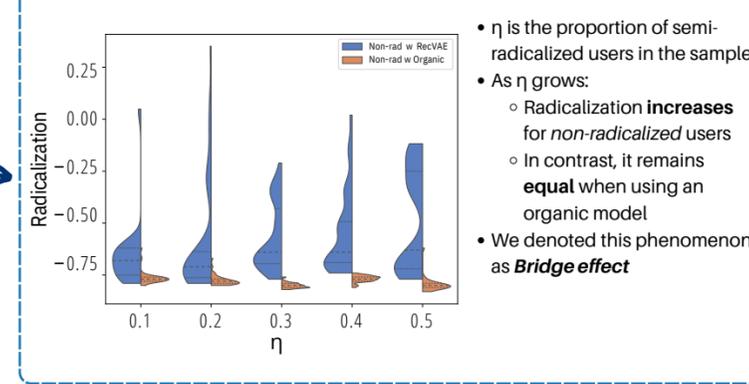
## Context

- Recommender systems offer a practical technique to assist users in navigating vast amounts of information since they propose items that the user may enjoy
- The drawback of recommendation algorithms is that they have been linked to undesirable phenomena, including *radicalization*, echo chambers, and the spreading of misinformation



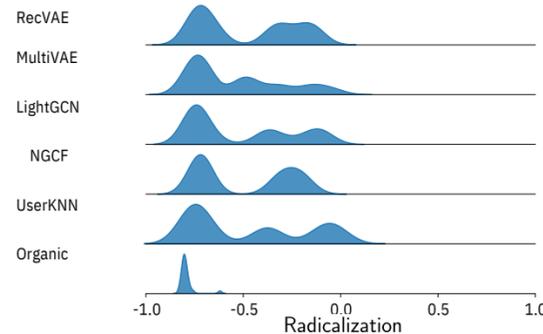
## Contributions

- Implementation of a *novel framework* to simulate users interactions that are totally guided by a recommendation algorithm
- Definition of *Algorithmic Radicalization* as a measure to quantify radicalization
- Identification of "*Bridge effect*" among different users categories
- Comparison among several recommendation algorithms and an *organic model*



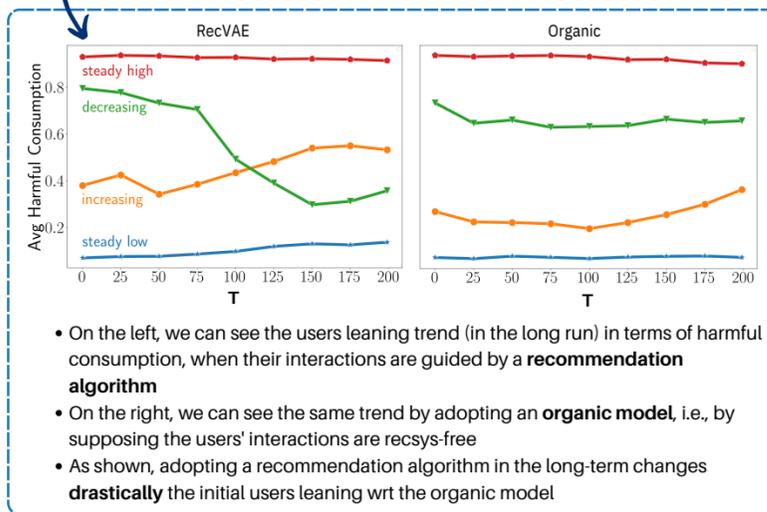
$$R(G_u) = Pr(I_h|I_h) \times Pr(I_h|I_n) - Pr(I_n|I_n) \times Pr(I_n|I_h)$$

- Algorithmic radicalization** has been defined as the probability of entering and remaining in harmful cliques wrt the probability of entering and remaining in neutral cliques
- The **higher** the value, the more harmful content will be absorbed by the user in the long run
- As we can see, all the recommender algorithms adopted **radicalize** users, differently from the organic model



## What we assessed

- Recommenders dramatically **change** the user behaviour, by fostering radicalization more than a counterfactual setup assuming natural (organic) evolution happening
- The "**bridge users**" are able to influence not radicalized users towards harmful items, playing a critical role in this sense



- On the left, we can see the users leaning trend (in the long run) in terms of harmful consumption, when their interactions are guided by a **recommendation algorithm**
- On the right, we can see the same trend by adopting an **organic model**, i.e., by supposing the users' interactions are recsys-free
- As shown, adopting a recommendation algorithm in the long-term changes **drastically** the initial users leaning wrt the organic model