

First Insight into Social Media User Sentiment Spreading Potential to Enhance the Conceptual Model for Disinformation Detection

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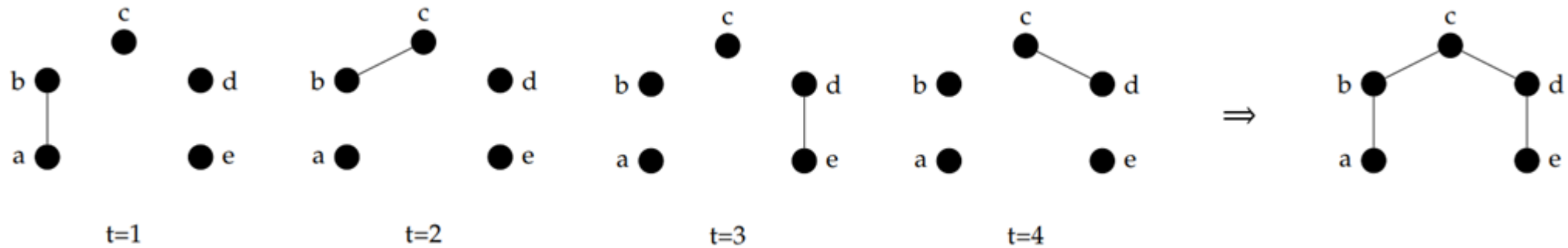


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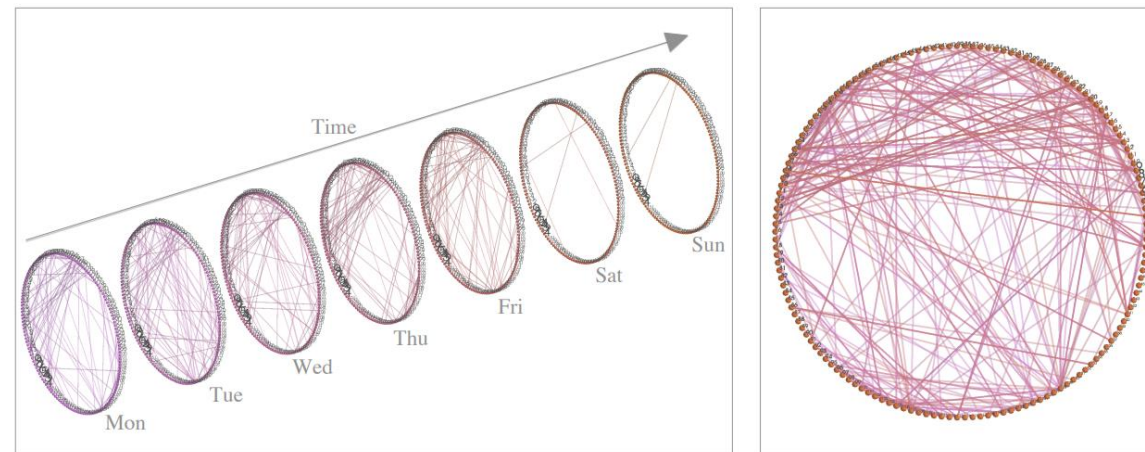
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Motivation (I)

Methodological advances in NS; circumvent bias in calculation of indicators that stems from a simplified (static) network abstraction;



from Ghanem, Magnien, and Tarissan (2019);
10.1109/TNSE.2018.2880344



from Tang et al. (2010);
10.1145/1852658.1852661

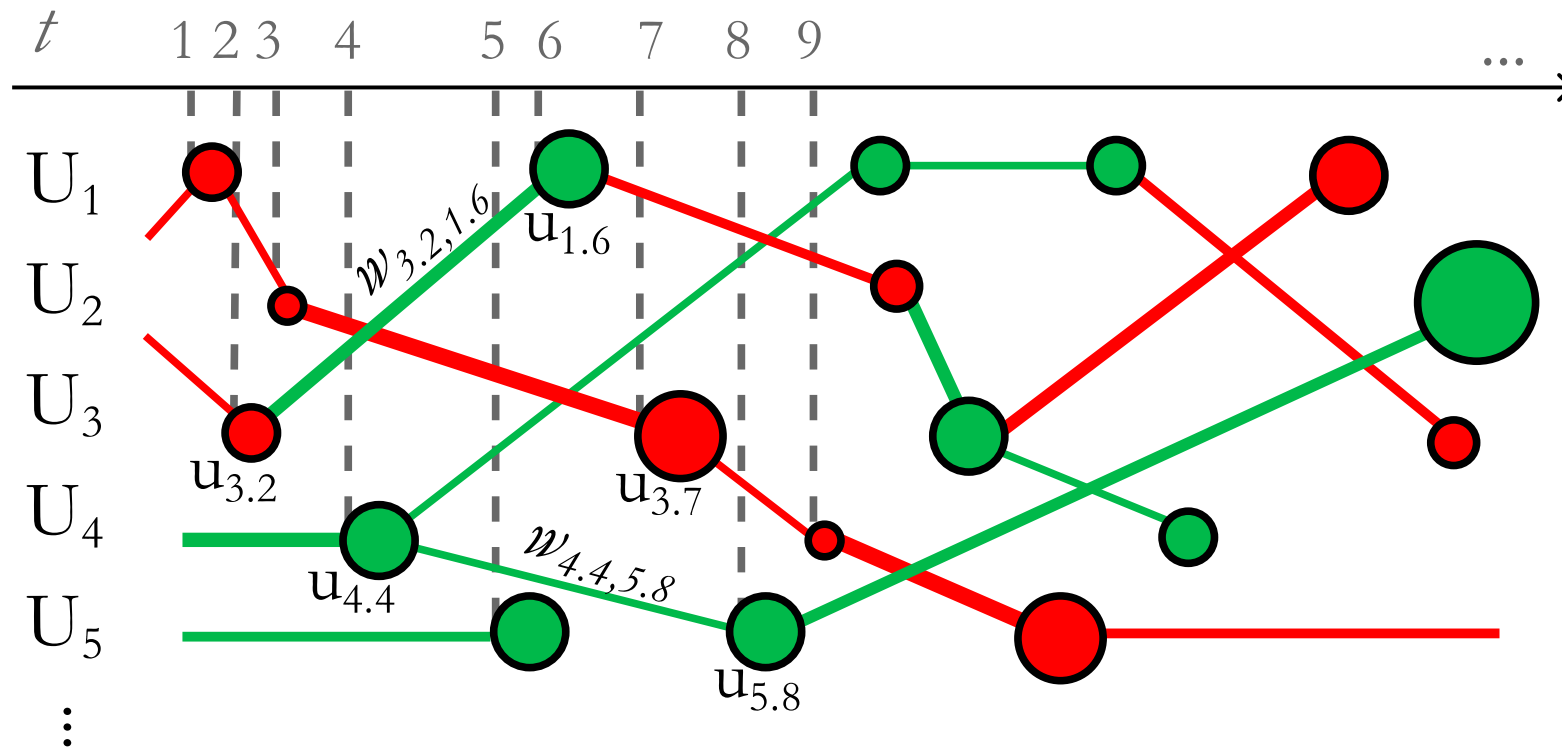
Motivation (II)

- promoting commitment or belonging to a specific group with regards to group polarization via „implanting” sentiment at unique time points (e.g. electioneering)
- clickbaits – excitement – sensationalism – sentiment
- posing allegations against someone, or when giving a false statement about someone, the sentiment of the statements is generally negative(?)
- the applications of sentiment analysis in detecting fake news still relatively underrepresented in research (prejudice and multilingualism)
- analysis of source (profiling of the users) in digital communication is inherently an NS task;

Who spreads, how fast, how deep, the positive or negative information?

Sentiment Spread Potential algorithm (I)

- temporal network abstraction of digital communication among digital communication network(s) users;

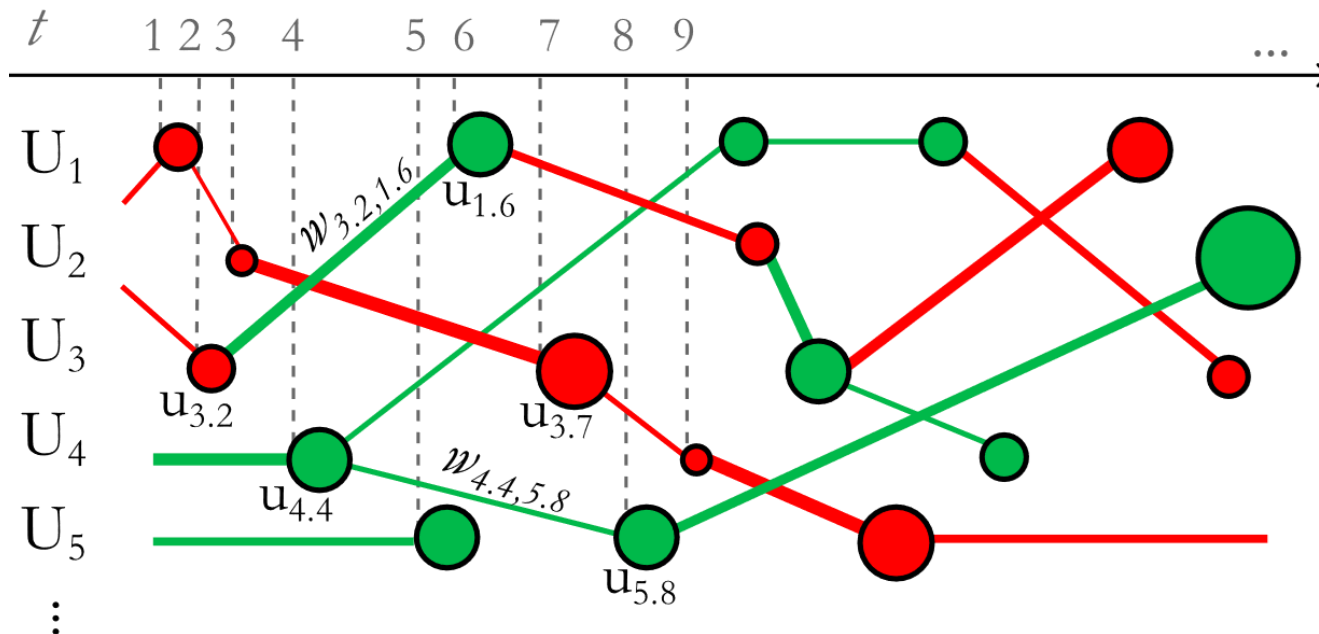


Sentiment Spread Potential algorithm (II)

- U – the set of nodes $u_{k,i}$, where k represents a user and i represents a time stamp of action of sending out a communicated content
- node $u_{k,i}$ – an aggregation of user account denoted as U_k , and the communicated content posted in time i , and $U = \cup_{k=1}^x U_k$, where x is the total number of users in the network
- L is a set of links $l_{k,i,l,j}$ that connect sending and receiving nodes of the transmitted content between user accounts U_k and U_l , and
- W is a set of link weights $w_{k,i,l,j}$ assigned to the respective $l_{k,i,l,j}$, which weights are the calculated valences of the sentiment of the message content, ranging from -1 to 1 (as by e.g. EmoCNet)

Sentiment Spread Potential algorithm (III)

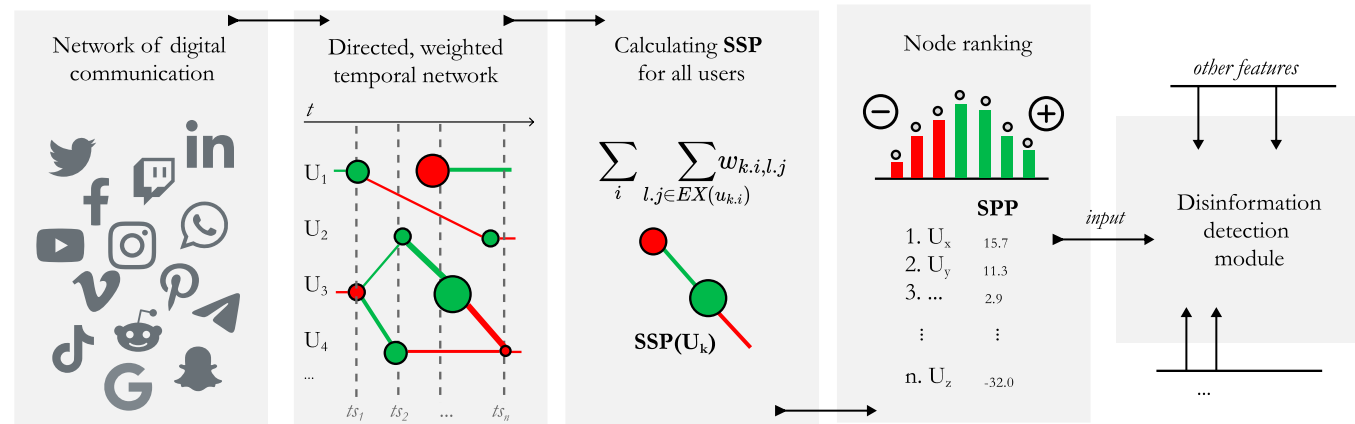
- $EX(u_{k,i})$ is the set of all paths outgoing from an evaluated node $u_{k,i}$ to all other $u_{k,j}$, where each $ex_m(u_{k,i}) \in EX(u_{k,i})$ may not include the $l_{k,i,l,j}$ touching the same user account U_k as the one pertaining to node being evaluated, or to a node already traversed in the path



$$SSP(U_k) = \sum_i \sum_{l,j \in EX(u_{k,i})} w_{k,i,l,j}$$

<https://bit.ly/spreadpotential>

Recap, uses and benefits



- SSP accounts for neighbour-of-neighbours connectedness → it comprises the sentiment influentialiation of an individual user (account) on all other users in the network
- SSP is executed on an interval network abstraction → it incorporates diversity of users touched as well as the speed of dissemination
- idea similar to HITS algorithm but on a realistic space-time network → probability that the message inserted in the system via a specific user will have the highest contagion
- ranking for users identified as influential for their effectiveness in spreading positive or negative sentiment (at the top and at the bottom of the rank list)

Limitations

- empirical validations lacking
- indicator inclusive of „everything” may result in „nothing”
- polarity valencing: ongoing critique
- diversity of semantic dictionaries
- attracting data for the temporal network graph extremely complex
- human hand needed for the abstraction and for coding
- ...

THANK YOU FOR YOUR ATTENTION

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