

Classifying Trust/Distrust Relationships in Online Social Networks

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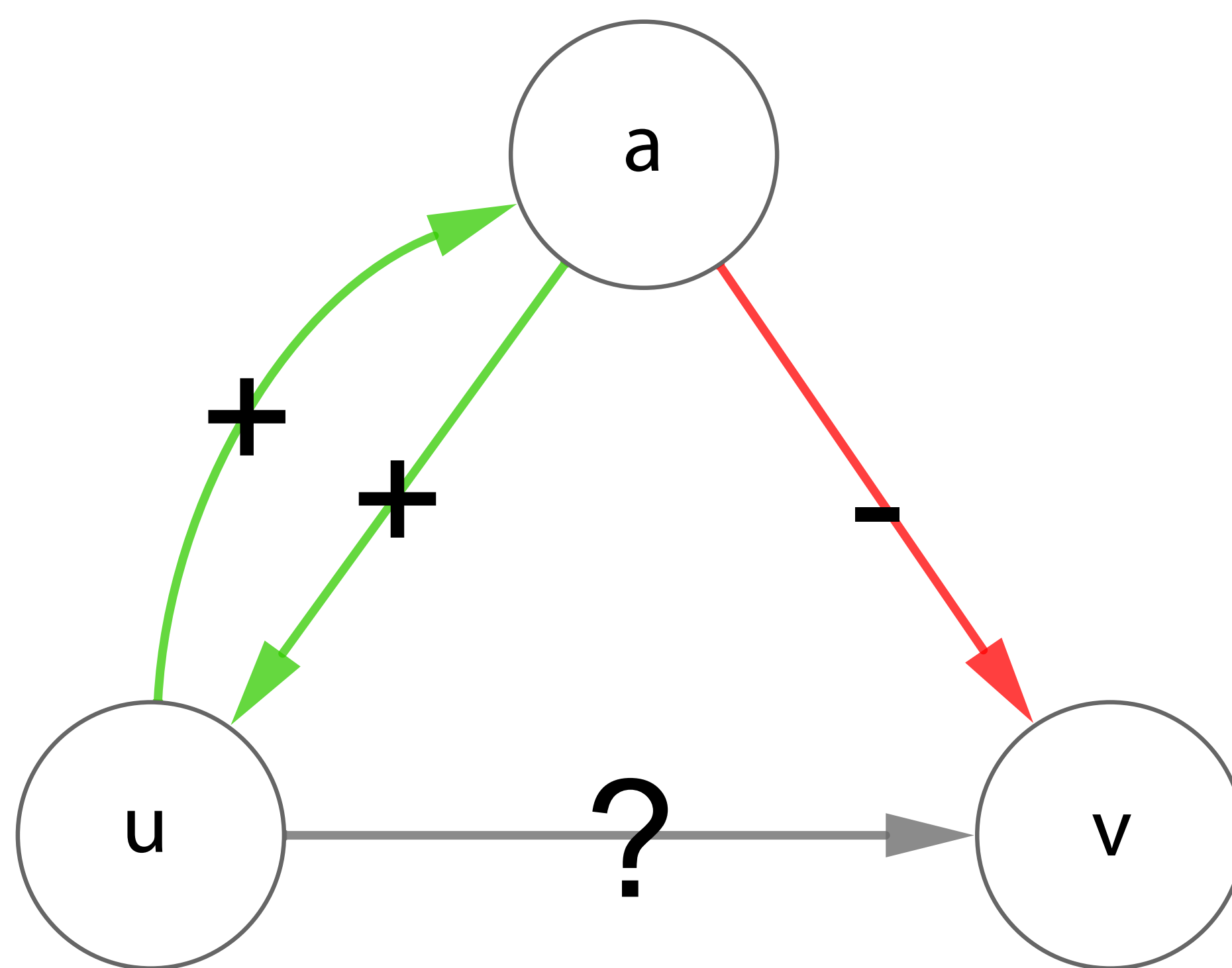
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The Problem: Edge Sign Prediction

Let $G = (V, E, L)$ be a network and $E' \subseteq E$ be a set of edges of G , with no sign.

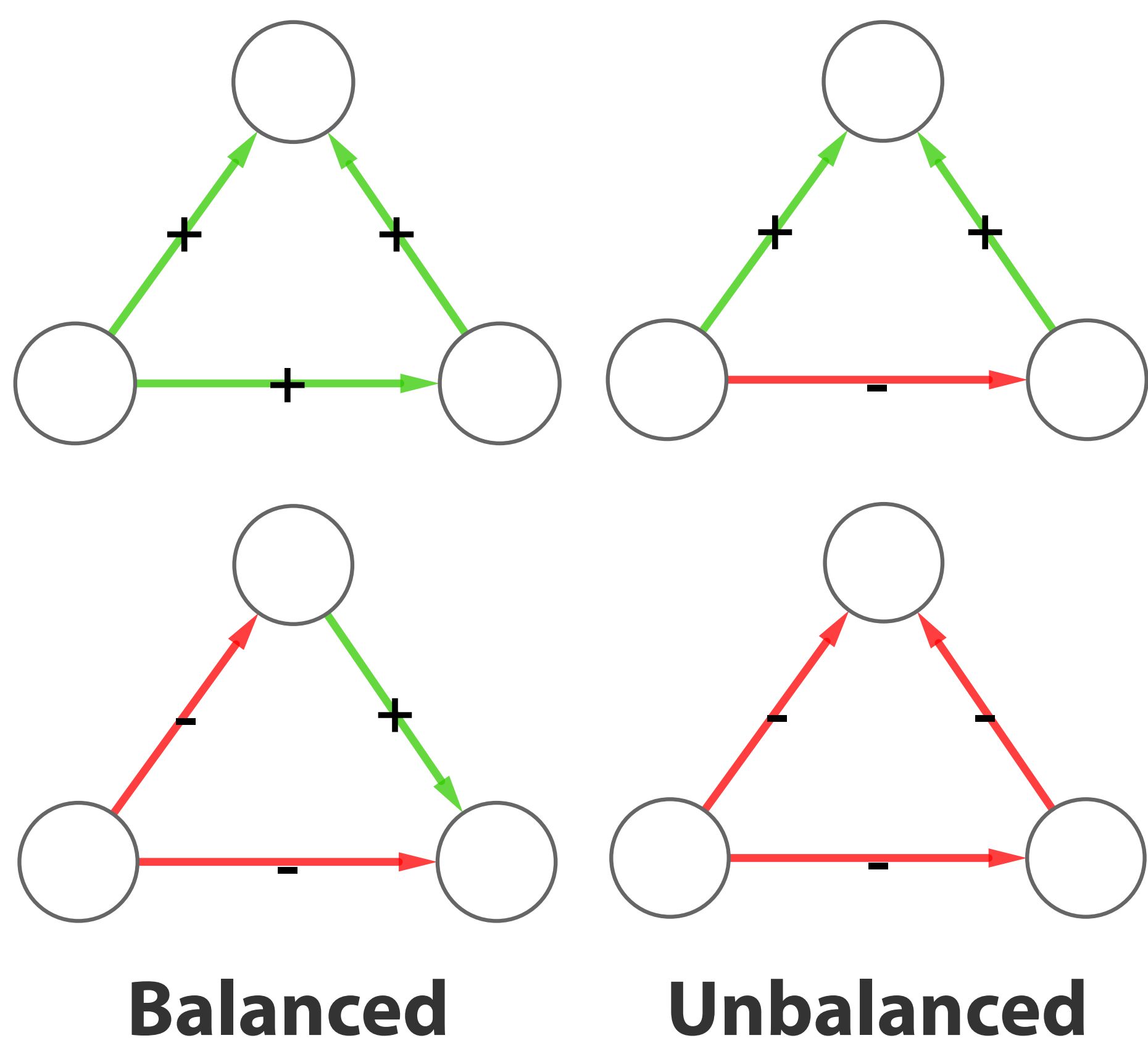
The Edge Sign Prediction Problem consists in inferring the sign of edges $(u; v; ?) \in E'$ given the sign of all other edges $\in E$ [1].



References

[1] Leskovec, Huttenlocher & Kleinberg. Predicting positive and negative links in online social networks. WWW, 2010.

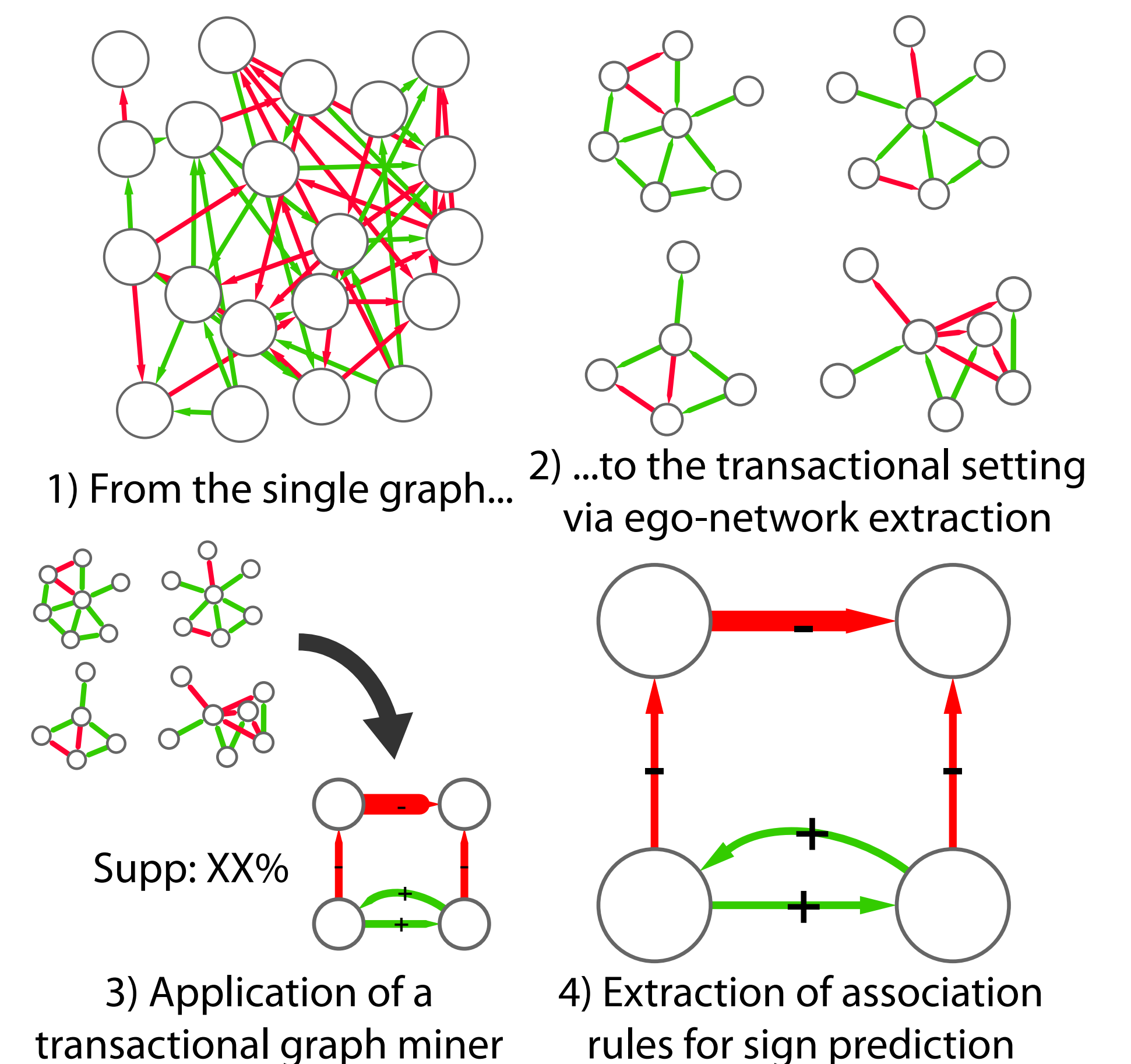
[2] Szell, Lambiotte & Thurner. Multirelational organization of large-scale social networks. PNAS, 2010.



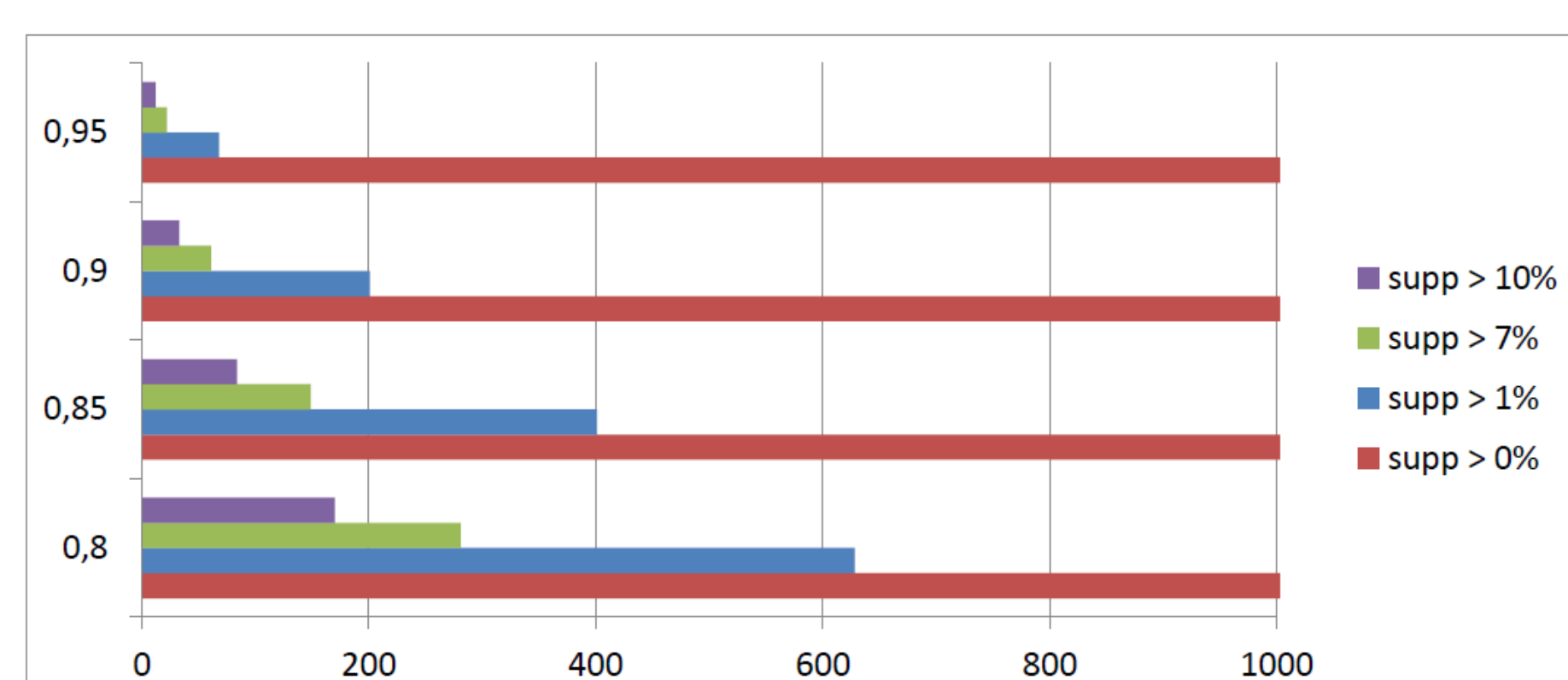
Two Competing Approaches

Social Balance [2] (left): we know that some triangles are balanced and others unbalanced and we use these structures to predict the sign.

Graph Mining (right): in our proposal we count the frequent substructures of ≥ 3 nodes and parallel edges and we generate association rules to predict the sign.



Our Results

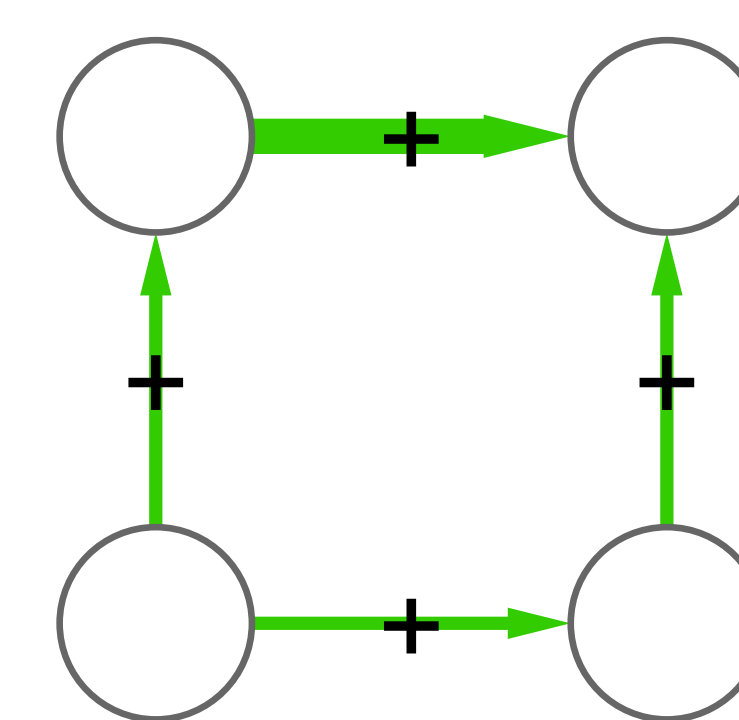


Rule extraction through graph mining is **feasible**, as different thresholds of support and confidence generate manageable sets of rules.

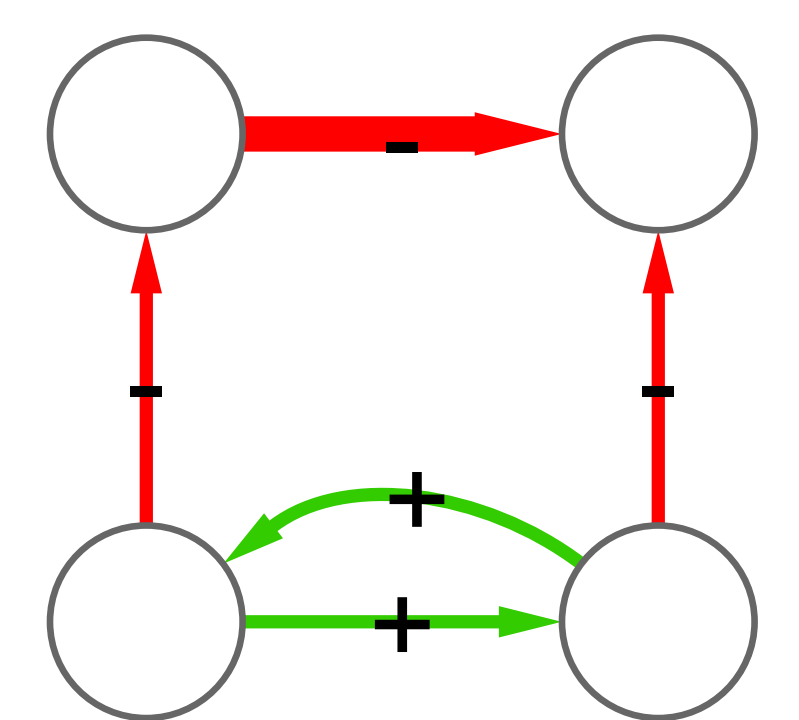


Rule extraction through graph mining is **performant**, as the average accuracy is higher than the one obtained with social balance triangle classification.

Slashdot



Wikipedia



Rule extraction through graph mining is **informative**, as it goes beyond a three-user interaction and it yields different trust dynamics for different datasets.