

Open Problems in a Logic of Gossips

Krzysztof R. Apt
CWI, Amsterdam, The Netherlands
and University of Warsaw, Poland

Abstract:

Gossip protocols aim at arriving, by means of point-to-point or group communications, at a situation in which all the agents know each other secrets. In [ADGH14] a dynamic epistemic logic was introduced in which distributed epistemic gossip protocols could be expressed as formulas.

In [AGH16] a simpler modal logic was proposed that is sufficient for reasoning about correctness of such protocols. This logic was subsequently studied in a number of papers. In particular, in [AW18] decidability of its semantics and truth for a limited fragment was established and in [AW17] its extension with the common knowledge operator was considered, for which the analogous decidability results were established.

However, several, often deceptively simple, questions about this logic remain open. The purpose of this talk is to present and elucidate these questions and provide for them an appropriate background information in the form of partial or related results.

References

[AGH16]

K. R. Apt, D. Grossi, and W. Van der Hoek. Epistemic protocols for distributed gossiping. In Proc. of the 15th Conference on Theoretical Aspects of Rationality and Knowledge (TARK 2015), volume 215 of EPTCS, pages 51-66, 2016. <https://arxiv.org/abs/1606.07516>

[AW17]

K. R. Apt and D. Wojtczak. Common knowledge in a logic of gossips. In Proc. of the 16th Conference on Theoretical Aspects of Rationality and Knowledge (TARK 2017), volume 251 of EPTCS, pages 10-27, 2017. <https://arxiv.org/abs/1707.08734>

[AW18]

K. R. Apt and D. Wojtczak. Verification of distributed epistemic gossip protocols. J. Artif. Intell. Res. (JAIR), 62:101-132, 2018.

<https://www.jair.org/index.php/jair/article/view/11204>

[ADGH14]

M. Attamah, H. van Ditmarsch, D. Grossi, and W. Van der Hoek. Knowledge and gossip. In Proc. of the 21st European Conference on Artificial Intelligence (ECAI'14), volume 263 of Frontiers in Artificial Intelligence and Applications, pages 21-26. IOS Press, 2014.

https://www.researchgate.net/publication/287950891_Knowledge_and_gossip