Talk, Cheap Talk, and States of Knowledge

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Applications of Epistemic Logic have by now become a major industry and an area once dominated by philosophers has now attracted large followings among both AI people and economists. We will discuss some of our own work in this area, including applications to various social issues, like consensus, common knowledge, elections, the sorts of things which candidates running for office are apt to say, and why.

Very important issues in conversation and in the working of other interactions are the ways in which states of knowledge and belief change when things happen or when someone says something. There is a great deal of material on this topic where issues like Kripke structure tranformation [3], and history based models [10] enter. In sophisticated applications, Gricean implicature [5], or cheap talk [2, 11] may also enter.

Gricean implicature assumes a co-operative stance, whereas cheap talk is a notion which also makes sense when the interests of the speaker and listener are only partially aligned. Game theoretic considerations become relevant.

States of knowledge and changes in them have social and economic consequences, and there have been developments starting with Aumann's seminal paper [1], followed by work by [4, 9] and others. Milgrom and Stokey's no trade theorem [6] is also an important consequence.

We will give an overview of representations of states of knowledge, of changes in them, and the social consequences.

References

[1] R. Aumann, Agreeing to Disagree, *Annals of Statistics*, **4** (1976), 1236-1239.

[2] Crawford, V. and J. Sobel (1982): Strategic Information Transmission, *Econometrica*, **50**, 1431–1452.

[3] Hans van Ditmarsch, Wiebe van der Hoek, and Barteld Kooi *Dynamic Epistemic Logic* (Synthese Library) (2007)

[4] J. Geanakoplos and H. Polemarchakis, We Can't Disagree Forever, *J. Economic Theory*, **28** (1982), 192-200.

[5] Paul Grice, *Studies in the Way of Words*, Harvard U. Press (1989).

[6] Paul Milgrom and Nancy Stokey, Information, Trade and Common Knowledge. *Journal of Economic Theory* **26** (1982) 17–27

[7] R. Parikh, Sentences, Propositions and Logical Omniscience, to appear in *The Review of Symbolic Logic*.

[8] R. Parikh Knowledge and Structure in Social Algorithms, presented at the 3rd International Game Theory Conference, July 2008.

[9] R. Parikh and P. Krasucki, Communication, Consensus and Knowledge, *J. Economic Theory* **52** (1990) pp. 178-189.

[10] R. Parikh and R. Ramanujam, A Knowledge based Semantics of Messages, *J. Logic, Language and Information* **12** 2003, 453-467

[11] Robert Stalnaker Saying and Meaning, Cheap Talk and Credibility in *Game Theory and Pragmatics* Editors: Anton Benz, Gerhard Jager and Robert van Rooij Palgrave Macmillan, (2005) pp. 83–100

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