Information Diffusion in Multi-Agent Communities

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Understanding the course of events when newly launched products penetrate a market, and how those products supersede existing dominant products, is crucial. Besides potential applications for business purposes the ability to simulate scenarios to model product launches offers a strong instrument for increasing our understanding of marketing theory. The success of such a market entry is highly connected to the behavioural patterns and decision making processes of individual consumers. This behaviour is decisively influenced by information made available through advertising and marketing efforts and its diffusion within consumer communities, a process that can be skewed and biased by information and by news either fake or true. We present a market simulation in which an established product is gradually replaced by a new alternative and how bad, possibly fake news can influence the distribution of market shares depending on factors that include communication patterns and the credulousness of consumers. We compare effects of broadcasting with word of mouth mechanisms that spread news and rumours in a society. We do this by using network models of communities and by modelling decision processes of consumers. The simulation is run in our multi agent platform AGADE with which we can model individual agent behaviour and communication patterns by means of semantic technologies. In this integrated modelling environment, each agent is equipped with a private OWL ontology that describes knowledge and actions of the agents. Basically, the agents are BDI agents as this model is most suitable for modelling human behaviour. Beliefs, desires and intentions are expressed with OWL statements and SWRL rules. OWL and SWRL both are languages that have been standardised by W3C. As proof of concept we finally discuss our findings with respect to published models of information diffusion.

Keywords: Market Mechanisms, Communities, Information Diffusion, OWL Ontologies, BDI Agents