SOE 7: Social Systems, Opinion and Group Dynamics I

Time: Monday 16:00–16:45 Location: GÖR 226

SOE 7.1 Mon 16:00 GÖR 226

An Agent-Based Model of Collective Emotions in Online Communities — •Frank Schweitzer and David Garcia — Chair of Systems Design, ETH Zurich, Kreuzplatz 5, 8032 Zurich, Switzerland

We develop a agent-based framework to model the emergence of collective emotions, which is applied to online communities. Agents individual emotions are described by their valence and arousal. Using the concept of Brownian agents, these variables change according to a stochastic dynamics, which also considers the feedback from online communication. Agents generate emotional information, which is stored and distributed in a field modeling the online medium. This field affects the emotional states of agents in a non-linear manner. We derive conditions for the emergence of collective emotions, observable in a bimodal valence distribution. Dependent on a saturated or a superlinear feedback between the information field and the agent's arousal, we further identify scenarios where collective emotions only appear once or in a repeated manner. The analytical results are illustrated by agent-based computer simulations. Our framework provides testable hypotheses about the emergence of collective emotions, which can be verified by data from online communities. (Eur. Phys. J. B 77, 533-545 (2010), http://arxiv.org/abs/1006.5305)

SOE 7.2 Mon 16:15 GÖR 226

Negative emotions as a fuel for discussion in cyber communities — •Anna Chmiel[1], Julian Sienkiewicz[1], Georgios Paltoglou[2], Kevan Buckley[2], Mike Thelwall[2], and Janusz A. Hołyst[1] — [1]Faculty of Physics, Warsaw University of Technology, Warsaw, Poland — [2]School of Computing and IT, University of Wolverhampton, Wolverhampton, UK

We focus on the influence of emotion on the behavior of Internet forum users and the vitality of online debates. We collected a large set of records describing comments expressed in diverse cyber communities such as blogs, fora and the Digg community. The text was then evaluated using classifiers that were able to estimate emotional valence values. We show that affective interactions do exist in Internet communities and they lead to attractive forces. As a result of collective behaviour there are clusters of comments possessing a similar level of emotional valence that are much longer than they would be if they were created by a random process. The presence of longer clusters of coherent emotional expressions therefore increases the possibility of attaching to this cluster a comment with the same emotion. At BBC Forum the majority of comments possess a negative emotional valence and threads starting from a larger number of negative comments last longer so negative emotions can be treated as a kind of discussion fuel. Users can take part in many threads, thus their local and global activities and corresponding emotions can be very different. We show that an increase in activity in the discussion of a particular thread is connected with more negative emotions from the user in the thread.

SOE 7.3 Mon 16:30 GÖR 226

Dissemination of words in online discussion groups — •Eduardo G. Altmann — Max-Planck-Institut für Physik komplexer Systeme, Dresden

Statistics of word usage provide quantifiable measures that can lead to a deeper understanding of different social systems. For instance, when analyzing large-scale databases of human interactions (mobile phone calls, e-mails, etc.) the content of the messages is a key element (often neglected) to understand the underlying social network. Furthermore, vocabulary change is itself a fascinating complex system that can nowadays be analyzed with an unprecedent precision. Here I will report on our investigation of word usage in Usenet groups, a database spanning decades that has detailed user information and interesting historical data (e.g., of the exogenously-driven rise of products and of the endogenously-driven rise of Internet slangs). To deal with the strong fluctuations in word frequency, we introduce a measure of word dissemination in respect to users and topics. We observe that most words are less disseminated than a random marker with same frequency and that dissemination is positively correlated with frequency change, meaning that words concentrated in a small "niche" are more probable to decay in frequency or get "extinct". Finally, we show that users are more important than topics in determining the usage of words, suggesting that the heterogeneity of people is the single strongest factor in lexical diversity.

[1] E. G. Altmann, J. B. Pierrehumbert, and A. E. Motter, "Niche as a determinant of word fate in online groups", arXiv:1009.3321 (2010).