Argument Mapping and Content Fusion to Support the Analysis and Synthesis of Information in Online Discussions

Ali Gürkan, MAN Türkiye A. Ş., Ankara, Turkey
Luca Iandoli, Stevens Institute of Technology, Hoboken, NJ, USA

ABSTRACT

While online conversations are very popular, the content generated by participants is very often overwhelming, poorly organized and often of questionable quality. In this article we use two methods, a text analysis technique, Vector Space Modeling (VSM) and clustering to create a methodology to organize and aggregate information generated by users using Online collaborative Argumentation (OA) in an online debate. OA constitutes an alternative to other widely used conversational tools such as online forums. OA is supposed to help users to join their efforts to construct a shared knowledge representation in the form of an argument map where multiple points of view can coexist and be presented in the form of a well-organized knowledge object. To see whether this supposition comes into effect we first apply VSM to summarize argument map content as a document space and then use clustering to transform that into a limited number of higher order semantic categories. We apply the methodology to more than 3000 posts created in an online debate of about 160 participants using an online argumentation platform. We show how this methodology can be used to effectively organize and evaluate content generated by a large number of users in online discussions.

Keywords: Clustering, Online Collaborative Argumentation (OA), Online Discussion, Shared Knowledge, Text Analysis Technique, User Generated Information, Vector Space Modeling (VSM)

1. INTRODUCTION

According to a recent survey, internet users spend about one third of the time they are online, on social media and other web 2.0 tools (Solis, 2011). Various online technologies such as instant messaging, forums, blogging and wikis, and more recently social media, web 2.0 tools enable gathering interested users and information sources in a much easier and cheaper way than ever. The success of web 2.0 technologies has become a source of inspiration for studies aiming at understanding how different bits of information held by geographically dispersed...
people can be integrated to reap the benefits of internet-enabled collective intelligence (Malone et al., 2009).

Online conversation is the dominant interaction means adopted by Internet users. Technologies such as wikis, forums, blogs and other so-called web 2.0 tools allow many geographically dispersed users to engage easily in online debates on a variety of topics. However they offer very limited support to organize and reuse the information generated in online discussions. Thus the diffusion of web 2.0-like interaction gives rise to a growing demand of information fusion aid for tasks such as information filtering, organization, aggregation and summarization.

Here we embrace an alternative approach to support information aggregation and organization in online discussions using online collaborative mapping. Collaborative mapping tools, in particular argumentation technology, have been suggested as an alternative to support the deliberation of a large number of participants (Baldwin & Price, 2011; Compendium Institute, 2011; CoPe_it!, 2010; Debatewise Ltd., 2011; Klein, 2011; Paulus, 2011; Post, 2011; Shum, 2010). In online collaborative mapping, users are required to build a visual concept map to facilitate the convergence towards a shared representation of the debate. As an example we report in Figure 1 a snapshot from the argumentation platform used in our experiment: the map is organized like a tree in which one debate issue is followed by alternative positions that are in turn supported or attacked by pro and con arguments.

Mapping tools are supposed to have a number of advantages (Klein, 2007). First, they improve access to shared knowledge by favoring logic rather than time-based organization of ideas. Second, mapping tools are expected to support evidence-based reasoning and rhetoric confrontation between participants with different points of view. Third, argument maps can summarize large conversations through compact visual representations in which each point appears only once, reducing sheer repetition, redundancy and the dominance of initially submitted ideas.

The collaborative construction of argument maps by distributed participants, however, poses several challenges. In particular, in this paper.

Figure 1. Deliberatorium, a snapshot from the argumentation platform used
Computing Skills in Forecasting for Liquidity Risk Management in the Indian Banking Industry
www.igi-global.com/chapter/computing-skills-in-forecasting-for-liquidity-risk-management-in-the-indian-banking-industry/107905?camid=4v1a

A Knowledge Network and Mobilisation Framework for Lean Supply Chain Decisions in Agri-Food Industry
www.igi-global.com/article/a-knowledge-network-and-mobilisation-framework-for-lean-supply-chain-decisions-in-agri-food-industry/186802?camid=4v1a

Principal-Agent Analysis on How Legal Risks Affect Audit Fees and Quality
www.igi-global.com/article/principal-agent-analysis-on-how-legal-risks-affect-audit-fees-and-quality/208682?camid=4v1a