Ontologies are us:
A unified model of social networks and semantics

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Abstract. On the Semantic Web ontologies are most commonly treated as artifacts created by knowledge engineers for a particular community. The task of the engineers is to forge a common understanding within the community and to formalize the agreements, prerequisites of reusing domain knowledge in information systems. However, the process of objectifying ontologies results in ontological drift over time (as the community and its understanding evolves independently of the agreement) and results in the loss of local views over the domain.

Several authors have suggested *emergent semantics* as a solution [1]. The idea of emergent semantics is to define the ontology as an emergent feature of a system of autonomous agents acting in dynamic, open environments. Besides an agreement over the kind of environment in which emergence could be observed, there is little common ground in what emergence would constitute.

We have proposed elsewhere that the first step towards emergent semantics is a representation of ontologies that incorporates the social context of concepts and their use [2]. In this work, we propose an abstract model that extends the traditional conceptualization of ontologies with the social dimension, leading to a tripartite model of actors, concepts and instances. We show how simple graph transformations can be applied to such a semantic social network for obtaining two different kinds of ontologies (semantic networks): one ontology based on overlap in the sets of instances of concepts and another based on the overlap of communities who have applied those concepts.

We demonstrate the significant differences between these networks by applying our model in two separate case studies. First, we investigate a large scale semantic social network, the del.icio.us social bookmarking tool. We analyze the network properties of the two ontologies and show how clusters of related concepts and taxonomical relationships can be extracted to enrich the representation. Second, we apply our ideas toward extracting community ontologies from the Web, i.e. semantic networks that reflect the understanding of a particular community on the Web. We evaluate this method against the results of traditional web mining using co-occurrence analysis. The results show that the emergent semantic network is more accepted by the members of the community, especially those closer to the core of the community.

References

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