The Human Semantic Web
Shifting from Knowledge Push to Knowledge Pull

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ABSTRACT

This paper introduces the Human Semantic Web (HSW) as a conceptual interface, providing human-understandable semantics in addition to the ordinary (machine) Semantic Web, which provides machine-processable semantics based on RDF. The HSW is structured in the form of a Knowledge Manifold and makes use of Unified Language Modeling (based on the Unified Modeling Language) combined with conceptual browsing to present its information to the user in a way that creates substantial benefits in terms of overview, clarity, and flexibility. The HSW browser Conzilla combines the semantics of RDF with the human-understandable semantics of UML in order to enable more powerful forms of human-computer interaction, such as querying the Semantic Web through Edutella and supporting the concept-in-context methodology. The Semantic Web is discussed in terms of three levels of semantic interoperability: isolation, coexistence, and collaboration. Collaboration, as the highest goal, can be achieved by conceptual calibration, which builds bridges between different ontologies in a bottom-up way, describing their similarities as well as their differences. An example is presented in Conzilla of conceptual calibration between systems for e-commerce. In the closing section, the Nonaka-Takeuchi theory of knowledge creation is discussed, and the HSW is described as a “space for interaction,” where the SECI spiral of knowledge creation can be elevated to the global level. Three possible scenarios are presented: open research, enriching the economy by expanding the value ontology, and negotiating a sustainable future for all.

Keywords: conceptual calibration; human semantic web; knowledge pull; knowledge push; knowledge manifold; ontological engineering; SECI spiral of knowledge creation; semantic collaboration; Semantic Web; Unified Language Modeling; value ontology

INTRODUCTION

The Globally Annotated Information Age

Recording, transmission, and annotation of information are three fundamentally important human activities that have exerted a strong influence on social and cultural development. The invention of persistent recordings (e.g., Cuneiform writing) initiated the recorded information age, and Gutenberg’s invention of the printing press globalized the recording process and initiated the globally recorded information age.
A few hundred years later, the emergence of electronic media globalized the transmission process and initiated the globally transmitted information age. Now, the emergence of the Semantic Web is globalizing the annotation process, thereby initiating the globally annotated information age.

**New Demands on Management of Knowledge and Learning**

Due to the rapidly increasing use of information and communications technology, the amount of information that we have to deal with in our everyday lives has become much greater than only a few years ago, a fact which has led to new ways of structuring information. Knowledge management is a rapidly growing field of research that studies these issues in order to create efficient methods and tools to help us filter the overwhelming flow of information and extract the parts that we need. Of course, the most complex information structure that we are dealing with today is the Internet with its linked anarchy, where anyone can connect anything with anything else. It is a well known fact that, unless these anarchical powers are balanced by careful design, they easily result in web sites that are difficult to navigate and to conceptualize as a whole, which, in turn, makes it hard for the human recipient to organize and integrate the separate components of information that are presented into a coherent pattern of knowledge.

In Naeve et al. (2002) we define (mental) knowledge as consisting of efficient fantasies and describe (mental) learning as based on inspiring fantasies. Each fantasy has a context, a purpose, and a target group, and it is only when we have described how we are going to measure the efficiency of our fantasies (within the given context, with the given purpose, and towards the given target group) that we can speak of knowledge in a way that can be validated.

With this definition, learning management is concerned with exposing the learner to inspiring fantasies and assisting in transforming them into efficient fantasies (Figure 2). Within a learning organization, this is complementary to knowledge management, which is concerned with creating, collecting, maintaining, and presenting knowledge in a way that makes it available within the organization wherever and whenever it is needed.

Lifelong, flexible, collaborative, personalized learning are words that are in-

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