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Guest Editorial: Special Issue on Human-Centered Web Science

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In the last five years, service orientation and social computing have radically changed the nature of the World Wide Web. With today's Service-Oriented Architectures (SOA), no strict division of labor should or can exist between the tasks for which software services are responsible and those that are delegated to people. Rather, human actors and software process engines cooperate closely to enact business processes at a previously unheard-of scale and complexity level. In turn, large scale social interaction on the Web has fostered the generation of an enormous amount of User-Generated Content (UCG), whose semantics and pragmatics tend to gradually emerge as the result of large-scale human iteration rather than be conceived a priori by normative design.

Large-scale cooperation, however, has introduced new weaknesses; in inter-organizational distributed environments, software services and process engines can be even more brittle than their predecessors, mainframes and leased line transfers. Also, careless adoption of social computing can expose organizations to unexpected loss of performance, due to lack of integration between activities delegated to humans and tasks performed via IT-based processes and services.

The Human-System Interaction (HSI) research community has been working on this issue since the early days of the Web: in the last few years, however, the importance of the human factor in shaping Web data semantics and defining the usage of Web application has come to the attention of a much wider, interdisciplinary group of researchers under the new perspective of Web Science introduced by, among others, Tim Berners-Lee, Wendy Hall and Jim Hendler.

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A number of challenges—including time and knowledge sharing control—are still to be met before Web-based processes with intensive human involvement can be fully understood. To quote but a few, open research issues exist in supporting cross-platform and cross-language human-delegated activities, as well as in providing a consistent and computationally not-too-burdensome notion of Web trust including human actors.

The current trend toward empowering users to decide collectively on the usage of Web-based information and services is fostering an evolutionary step of Web systems representation and metrics whose key issues include (i) analyzing and representing emergent, human-driven features of Web-based systems (ii) representing and enforcing high-level governance policies (iii) dealing with trust and identity in large-scale cooperations (iv) defining a consistent set of efficiency and sustainability metrics that take human involvement into account.

This special issue of the *World Wide Web* journal on "Human-Centered Web Science" was launched to explore new research trends and recent solutions to these challenges. There were 19 submissions for this Special Issue, and 8 papers were accepted for publication.

The paper "Emergent Semantics and Cooperation in Multi-Knowledge Communities: the ESTEEM approach," by Devis Bianchini, et al., explores the notion of emergent semantics in heterogeneous communities, while the paper "Human Intelligence in the Process of Semantic Content Creation", by Katharina Siorpaes, et al., provides some valuable insight on the cognitive aspects of content semantics.

Other papers take a service-oriented perspective, dealing with the role of human behavior in defining the semantics of services.

For instance in the paper "A Query Routing Approach based on User Satisfaction for Resource Discovery in Service-Oriented Networks", by Mohamed Bakhouya, et al., the authors propose an extension of classical random walks algorithms with a reinforcement learning mechanism centered on users' satisfaction. In the paper "A Human-Centered Semantic Service Platform for the Digital Ecosystems Environment," by Hai Dong, et al., traditional knowledge management techniques like metadata publishing are used to manage the heterogeneity of SMEs environments. In the paper "Accessibility and Usability of User-centric Web Interaction with a Unified-Ubiquitous Name-based Directory Service," by Yung Bok Kim, et al., empirical results on the usability and accessibility of a unified-ubiquitous name-based directory service are proposed. In the paper "Finding Related Search Engine Queries by Web Community based Query Enrichment," by Lin Li, a model based on Web community feature space is proposed to find the related search engine, showing that this approach provides better results than URL feature space. In the paper "Building a Usable and Accessible Semantic Web Interaction Platform," by Roberto García, et al., the authors show that object-action interaction paradigm can provide effective usability indicators for Semantic Web applications. The paper "Semantic-based Merging of RSS Items," by Fekade Getahun Taddesse, et al., proposes novel techniques to merge XML documents adapting algorithms to human needs.

We gratefully acknowledge the strong research community that gathered around the research problems related to human-centered Web science and the high quality of their research work, which is hopefully reflected in the papers of this special issue. We also would like to express our deep appreciation for the referees' hard work and dedication. Above all, thanks are due the authors for submitting the best results of their work to the WWWJ Special Issue on Human-Centered Web Science.