The Web is a critical global infrastructure. Since its emergence in the mid-1990s, it has exploded into hundreds of billions of pages that touch almost all aspects of modern life. Today the jobs of more and more people depend on the Web. Media, banking, and healthcare are being revolutionized by it, and governments are even considering how to run their countries with it.

Little appreciated, however, is the fact that the Web is more than the sum of its pages, and more than its technical protocols. Vast emergent properties are transforming society. E-mail and instant messaging on the Web have led to social networks such as Facebook and Twitter. The transfer of documents led to file-sharing sites such as Napster, which have led to user-generated portals such as blogs, Flickr, and YouTube. Web 2.0, tagging content with labels, is creating online communities that share everything from concert news to parenting tips. As we seek to understand the Web’s origins, appreciate its current state, and anticipate possible futures, we must address such critical questions as, How secure is the Web? How does trust work on the Web? How are our ideas about privacy changing as a result of the Web? How do we value content on the Web? How is the Web evolving (as both a social and a technical network)? Can we engineer the Web for the future?

The emerging field of understanding these and related questions is becoming known as Web science,¹ for which curricula at all levels are being designed and launched.

The first international Web Science Conference, WebSci 09, held in Athens, Greece, in March 2009, was dedicated to exploring the ramifications of the Web for human society. Contributors addressed questions such as, How do people and organizations behave online—what motivates them to shop, date, make friends, learn, participate in political life, or manage their health or taxes online? Which Web-based designs will they trust? To which online agents will they delegate their authority? How can we understand and keep in check the dark side of the Web—cybercrime, pornography, and terrorist networks, for example—without compromising freedom of speech? How do varying characteristics of Web-based technologies—such as security, privacy, network structure, and data linking—affect online behavior, both criminal and noncriminal?

The articles in this special issue are some of the best contributions to the conference. From more than 150 papers and posters, we ultimately selected 11 articles that not only have interesting implications for intelligent systems but also portray the field’s diversity and the conference’s interdisciplinary nature. Six articles appear in this issue; the others will continue the theme in future issues (see the sidebar for authors and titles).

In this issue, our first article, by Barbie Clarke, explores how young adolescents, the quintessential digital natives, use
social-networking sites. Whereas many of the publications computer scientists read focus primarily on the mathematics of social networks, Clarke uses ethnographic techniques to explore how our children are using these sites to create friendships and explore their identities.

Next, Harry Halpin and Henry Thomas explore how the technical, AI-based terminologies of the Semantic Web relate to the social meanings that people impart to the terms. Halpin and Thomas outline an analysis of Semantic Web search engines, and show how relevance feedback could improve their results. To old-timers in the AI community, some of the discussion will be reminiscent of arguments from the early days of knowledge representation (we were reminded of Drew McDermott’s famous 1976 article, “Artificial Intelligence meets Natural Stupidity”), updated for the modern world of the World Wide Web.

Sadie Creese and Koen Lamberts explore whether the principles of cognitive science can help users better assess the risks of their online behaviors. With increasing fraudulent e-mail, phishing, social-engineered attacks, and malicious software making life online difficult, better awareness and assessment becomes critical to the success of online systems. This article discusses how the way risk is presented to users can affect their understanding of it, and suggests that new interfaces for online systems must take these sorts of things into account.

Kieron O’Hara and David Stevens tackle the very timely topic of extremist information online. They explore how the long-tailed economics of the Web interacts with the presence of extremist religious views, and discuss policy implications thereof. This article is an excellent example of the ways that the technical, social, and policy aspects of the Web interact, and it points out some interesting directions for future work.

Alexandre Passant, Matthias Samwald, John Breslin, and Stefan Decker explore the relationship between the Semantic Web and social media. They explore how semantically enriched social data can be linked to provide an “interlinked information society.” The article presents a new take on the popular Semantic Web slogan, “a little semantics goes a long way” (see www.cs.rpi.edu/~hendler/LittleSemanticsWeb.html).

Finally, an article by Thanassis Tiropanis, Hugh Davis, David Millard, and Mark Weal presents a short survey of semantic technologies available for use in educational settings. To those not yet convinced that AI is having an impact on the Web, the large number of projects and tools they describe may come as a surprise.

We hope that readers of IEEE Intelligent Systems will find these articles, and those that appear in later issues, not only informative, but also indicative of the important social issues that arise around the Web, and the need for an interdisciplinary research area to address them.

References

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