Book Reviews

Georeferencing: The Geographic Associations of Information
Edited by Linda L. Hill. Cambridge, MA: The MIT Press, 2006.
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In a broader sense, georeferencing consists of relating information (e.g., events, images, discoveries, specimens) to geographic locations either through informal references, such as placenames, or through formal geospatial references based on longitude and latitude coordinates. Although georeferencing seems to be exclusively related to GIS environments, it is exciting to think about designing systems so that users can find precisely all types of information about a location simply by identifying that location on a map or alternatively by indicating a placename and, therefore, without needing the coordinates for the area. Furthermore, these systems will provide friendly interfaces with interactive maps that will facilitate the manipulation, spatial visualization and analysis of all retrieved information.

This book provides us with the basic aspects of the world of geospatial referencing as well as explores the possibilities of applying these techniques to all types of information by integrating geospatial description, searching, and analysis into general information systems. From an expert point of view, Linda L. Hill depicts the current situation of georeferencing and envisions future developments towards "unified georeferencing where placename and geospatial access work across all types of information resources and in all types of information storage and retrieval systems" (p. 8).

The book is divided into eight chapters; each of them focusing on a different aspect of georeferencing. Chapter 1 ("Laying the Groundwork") describes the environment in which this work is developed. After a brief overview introducing how and why the incorporation of geographic information into general information systems is rapidly increasing, Linda introduces the motivations of the book and justifies her main objectives and challenges regarding it.

Incorporating georeferencing into information systems in an effective and useful way needs a detailed analysis of how humankind deals with geographic information. Chapter 2 ("Spatial Cognition and Information Systems") studies how humankind understands, represents and organizes this kind of information as well as how they compose and communicate about geographic spaces. Using highly descriptive examples, the author emphasizes the great importance of individual characteristics and preferences in all these processes.

Chapter 3 ("Georeferenced Information Object Types and Their Characteristics") reviews the major types of georeferenced information objects. The first part of the chapter is devoted to information objects that are specifically grounded by geospatial referencing, such as maps, remote sensing images, or aerial photography. These objects are analyzed at a level that allows a clear understanding of their main characteristics, contributions, and roles in georeferencing. The final part of the chapter shifts towards indirect georeferenced information objects. That is, any type of information (paintings, inventions, specimens, etc.) that can be related to a geographic location using named geographic features, placenames, or addresses in narrative descriptions. The author analyses a rich variety of informal georeferencing examples chosen from texts in different areas (music, arts, history) and discovers the huge potential that is

hidden behind the current impossibility of accessing and visualizing automatically all these data in a geospatial environment.

The representation of geospatial information relies on mathematical models describing Earth surface and formal methods of representation. Chapter 4 ("Representation of Geospatial Location and Coverage") introduces the fundamental concepts of geospatial referencing. The chapter starts describing the most popular geospatial coding schemes such as longitude and latitude, Universal Transverse Mercator (UTM), state plane coordinate system, and c-squares. The second part examines the principles and methods of projecting Earth surface onto two-dimensional surfaces. Finally, some important issues are analysed and discussed. Among others, the list includes accuracy, precision, uncertainty, and the use of generalized representations. Overall, this chapter introduces the minimum technical concepts and aspects regarding geospatial representation that are considered essential for applying formal georeferencing to information management practices.

Referencing locations by informal names is the most common way of georeferencing. From this point of view, having dictionaries that relate placenames to formal geographic locations is an essential source for georeferenced information systems. These dictionaries are called gazetteers. In chapter 5, ("Gazetteers and Gazetteer Services") the author dives into the world of gazetteer information and its role in georeferenced information systems. The first part of this chapter gives a birds-eye view of the historical evolution of gazetteers and inspects their importance in a variety of tasks related to georeferencing. The second part of the chapter concentrates on describing in detail the main components of gazetteers and how all this information is represented in formal structures (models) that serve as a vehicle for understanding between gazetteer professionals and information system designers. Finally, the use of protocols as well as metadata are introduced as a common channel that allows the integration of information from multiple distributed gazetteers.

Metadata is used to describe information objects at a level that makes it possible using this information for the required purposes. Chapter 6 ("Georeferencing Elements in Metadata Standards") reviews the main metadata standards used for describing information objects that include geospatial references. Employing very helpful diagrams, the author explores the structure of the current main metadata standards and examines in detail their common points and differences. This comparison is then used as a departing point to open the discussion about overall interoperability across standards and the excessive complexity of the Geography Markup Language (GML) standard proposed by the Open Geospatial Consortium's. As a result, this chapter proposes a new generic structure for georeferencing and discusses the basic requirements of a geometry language that tries to meet the needs of general interoperability.

The final objective of all the concepts, structures, and techniques introduced in the previous chapters is the development of systems that enable an effective retrieval of information objects related to specific geographic areas of interest. Chapter 7 ("Geographic Information Retrieval" [GIR]) presents the foundations of information retrieval based on geographic relationships. Unless GIR and text-based information retrieval can be used in combination, this chapter only explores the use of spatial characteristics for retrieval purposes. After presenting topological and geometric relations, the author introduces the main spatial operations that enable the matching of georeferenced information objects against users' spatial queries and analyses several currently running GIR systems. The final part of the chapter reviews current

issues regarding the evaluation and effectiveness of GIR for both placename and footprint searching.

Chapter 8 ("Future of Georeferencing") closes the book with very interesting reflections about the possibilities that advances in georeferencing will open in future information systems. From her privileged position, Linda L Hill summarizes the key topics in georeferencing, depicts the major trends and discovers the key issues that need to be addressed to achieve the recognition of georeferencing as a key element of any kind of information system.

Georeferencing: The Geographic Associations of Information is a comprehensive introduction to georeferencing. Well-structured and written, each chapter ends with an interesting summary and a valuable list of references to sources for further information. Moreover, the volume provides us with a useful glossary of terms, which helps readers understand the terms and concepts employed along the text. To summarize, the book introduces the fundamental concepts, terminology, and standards that interested information system designers would need to integrate georeferencing practices into their systems. Departing from an introductory but up-to-date description of the different aspects and issues concerning georeferencing, Linda succeeds in identifying the current trends, sketches the main lines of development, and justifies her idea of "unified georeferencing" as the main way towards a fruitful future in this area. Overall, this is a highly recommended work for students and nonexpert readers interested in the application of new georeferencing practices. In particular, professionals related to information management like librarians, archivists, or information system designers will find it a very valuable resource.

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Exploring Information Systems Research Approaches: Readings and Reflections. Robert D. Galliers, M. Lynne Markus, & Sue Newell (Eds.). London, UK: Routledge; 2007. 453 pp. $53.95. (ISBN: 978–0–415–77197–9)

Much has been published in and about the field of information systems, which deals primarily with how information technologies are developed, used, and applied in everyday life and workplace settings. However, a criticism levied by the editors of this volume is that past contributions have focused on a particular topic (e.g., management information systems) or methodology (e.g., qualitative). This work is the product of discussions at conferences of the International Federation of Information Processing over the past 20 years, which brought researchers together to "discuss the growing range of approaches to, and underlying philosophy of" the burgeoning field of information systems. The purpose of this book is to educate readers about different types of methodologies used in information systems research and to demonstrate the appropriateness of these approaches with respect to the research question and the varying contextual or situational constraints of the research environment.

The book contains five distinct sections, beginning with groups and moving outward to organizations, markets, and the broader global and social contexts; this structure is intended to guide the reader more deeply into the field of information systems. While this configuration is easy for the reader to follow, it does not encourage comparison (i.e., how the group operates within organizational or global frameworks). The text represents the topics as concentric circles, with groups being the innermost and global and societal issues being the outermost orb. As we know, however, the lines between these units often blur, and there also is no discussion of the role of the individual within these parameters.

Each of the five sections contain four articles, which have been selected from research published in respected journals, including the *Journal of Management Information Systems* and *MIS Quarterly*, and date from the mid-1990s to 2004. The research articles were selected for their subject matter and their range of theoretical (i.e., interpretivism to positivism) and methodological approaches: from qualitative, subjective, and descriptive approaches (e.g., case studies, simulations, reviews, action research) to more quantifiable surveys and field or laboratory experiments. Collectively, these articles demonstrate the breadth of information systems research. Introductions to each section organize the articles according to their research method, perspective or focus, use of or implication for technology, and their findings and contributions; these are displayed in table format to facilitate readers' ability to compare and interpret the articles and tie them into the section's overall theme.

Part 1, *Impact of Group Support Systems on Decision Making and Group Creativity*, uses the group as its unity of analysis. The central questions of this section revolve around the ways in which technology has influenced the overall quality of group decision making as well as how individual team members contribute to the decision making process. The four articles pertain to how groups in both university and business communities have adopted and used communication software (Davison & Vogel, 2000; Trauth & Jessup, 2000), the role of groupware in knowledge work (Hayes & Walshman, 2001), and the relationship between computer-mediated communication and group polarization (Sia, Tan, & Wei, 2001); studies range from the experimental to case studies and first-person accounts. The introduction to the section prompts the reader to consider how much control the researcher is able to achieve given the type of methodology used and how all of this impacts the development of both theory and practice. Of particular interest in this section is the article by Trauth and Jessup (2000), who performed both a positivist (i.e., a priori content coding) and interpretive (i.e., grounded theory approach) analysis of the same data. They explored how group system software could enable people to communicate about a sensitive issue—gender equity—in a university setting, keeping in mind that such a topic may make face-to-face communication intimidating. By examining the transcripts of four groups of 10 participants each, they demonstrate that *how* we analyze our findings influences the outcomes that we reach. However, qualitative analysis has been criticized in the past for being too subjective, and the difficulty with this study is that the comparison of two qualitative methods reinforces this perception somewhat instead of highlighting the validity of using qualitative methods to, say, corroborate quantitative findings. Hayes and Walsham's (2001) research into communities of practice stresses multiple forms of data collection rather than multiple interpretations. They used longitudinal data collection to follow pharmaceutical company employees' behavioral and attitude changes toward Lotus Notes. Their conclusion that it is important to consider "both computer mediated and noncomputer mediated communication" reminds us that system use is not indicative of system adoption or success.

The second section examines the *Impact of Information Technology on Organizations* and, more specifically, the question of whether the benefits of IT outweigh its costs and impact on worker productivity. Overall, the articles within Part 2 highlight the pros and cons of the methods used in studying the organizational impact of IT using meta-analyses (cf. Chan's comparative review of IT value research) and aggregate data (cf. Brynjolfsson & Hitt, 1996). Pinsonneault and Rivard (1998) noted the detriment of such global assessments in their interview study with 59 middle managers from three large firms. They suggested that the organizational context is often not considered in aggregate measures and that work processes rather than work outputs should be investigated. This section is rounded out with a case study that examines IT investment, noting that it is detrimental not to separate the different types of technology investments when considering IT use and productivity (Cline & Guynes, 2001).

The "bottom line" is the focus of Part 3, *Inter-Organizational Systems and Process Improvements*, with its emphasis on company performance

(Palmer & Markus, 2000), competitive advantage (Jelassi & Figon, 1994), and information exchange between corporations and their suppliers (Kraut, Steinfield, Chan, Butler, & Hoag, 1999; Mukhopadhyay, Kekre, & Kalathur, 1995). This section introduces, for the first time, studies that utilize survey methodology (Palmer & Markus, 2000; Kraut et al., 1999); other techniques include longitudinal research (Jelassi & Figon, 1994); Mukhopadhay et al., 1995) and data modeling (Mukhopadhay et al., 1995). Palmer and Markus (2000) demonstrate the value of combining subjective and objective approaches in their study of the implementation of Quick Response software in the retail industry. While some of the studies profiled highlight the benefits of information technology in the interorganizational context, Kraut et al. (1999) noted the importance of not losing sight of "personal linkages" in ensuring customers' satisfaction and perceptions of quality and efficiency.

Part 4, *The Impact of Information Technology on Markets*, literally spans the globe with its articles' research scope (e.g., The Netherlands, United States, Japan, and Italy) and its range of markets (e.g., flowers to used cars). Unlike previous sections, the articles in Part 5 are limited to case studies (Kambil & van Heck, 1998; Kumar, van Dissel, & Bielli, 1998; Lee, 1998) and simulations (Weber, 1999). Although the selections may have been based on the availability of quality articles on this topic area, this is disappointing given the breadth of other chapters. Collectively, the articles demonstrate the ways in which electronic marketplaces are changing the traditional "buyer/seller/middle man" hierarchies to interorganizational networks of buyers, sellers, and an IT-supported intermediary. Kambil and van Heck's (1998) chapter is particularly effective at highlighting the high and lows of the electronic marketplace. They go beyond the single-case-study format used by Lee (1998) and Kumar et al. (1998) by examining two successful and two unsuccessful initiatives in the Dutch flower markets. The authors synthesize the four cases and compare the strengths and weaknesses of the exchange-process features of traditional and electronic flower markets. Their framework of comparison is original and investigates the impact of IT on the market and the stakeholders. Not only can this framework be used to explore other markets but it also is useful for IT designers in learning about effective transactional and communication mechanisms.

The final section of this book, *Global and Social Issues*, emphasizes the "unpacking of cross-cultural issues" in our thinking about cross-country comparisons and globalization. A number of chapters (i.e., Walsham, 2002; Watson, Kelly, Galliers, & Brancheau, 1997) make reference to Hofstede's (1991) cross-cultural theory and the characteristic of uncertainty. Of course, uncertainty also has been a central tenet in information science research (e.g., Kuhlthau, 1991; Wilson, 1999). The digital divide also is discussed in this section (Drori & Jang, 2003). Disappointing, however, is that this article uses secondary data (i.e., Net Sophistication Scores and computer connectivity statistics) from different sources, including UNESCO and the United Nations Development Program for the Years 1991–1999. One has to wonder about the validity of correlating these measures and the timeliness of this work for current discussions on the digital divide.

Overall, the strength of this book is that it integrates a wide range of methodologies and approaches into one cohesive volume. It challenges the reader to look at the research questions when selecting methodologies—rather than basing this decision on his or her comfort level with a particular approach—and to understand the merits and limitations of all research methodologies. The editors encourage the reader to look beyond the results of the studies presented and to understand *how* conclusions were reached about the implementation and impact of various information technologies and what they mean in the context of groups, organizations, interorganization, markets, and/or the global community. A drawback of the text is that the index is not as comprehensive as it could be given the emphasis on both topics and methodologies. For instance, "case study" and "qualitative" do not appear; this limits the use of this book as a reference for students who may want to specifically look at examples of a given method. Another missing element is a discussion of collaboration (though it could warrant its own separate text, to be sure), which plays a pivotal role in information systems and

which is very much related to communication (which *is* discussed) and impacted greatly by IT.

The intended audiences of this text are supervisors and research students in information systems and related disciplines. Certainly, it is a good "teaching" text since it was designed to bring together a coherent reading list of previously published articles and organize them in a format that facilitates making connections. Each section contains questions for discussion in, one would imagine, a seminar setting. At times, though, the introductions seem to do the reader's work by summarizing the articles and tabling the main points, methods, and conclusions of each research study. However, the discussion questions are quite effective in asking students to think critically about the methodological approaches and outcomes of the articles contained in each section. Since all of the articles contained in this book are available elsewhere, an individual wishing to use this book for a course will have to justify the cost of the text with the value inherent in the introductions.

A conclusion to this book would have been useful. While the preface is strong, the reader needs to unite the distinct sections. It also would have been useful to discuss the interdisciplinary nature of the topics and methodological theories and approaches, which are not unique to information systems, and to suggest future directions for measuring and evaluating research in the five areas covered in the book: groups, intra- and interorganizations, markets, and society. Thus, while the book succeeds in pulling together the relevant readings, it does not fully achieve the "reflection" as promised in its title. But it should encourage students/researchers to reflect on their own ways of conducting research and hopefully think more about the actual question to be answered rather than conforming solely to past practices.

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Human–Machine Reconfigurations: Plans and Situated Actions, 2nd ed. Lucy Suchman. Cambridge, United Kingdom: Cambridge University Press, 2007. 314 pp. $29.99. (ISBN 0–521–67588-X)

Human–Machine Reconfigurations: Plans and Situated Actions (*HMR*) is a second edition of Suchman's (1987) *Plans and Situated Actions: The Problem of Human–Machine Communication* (*P&SA*), and this edition extends her analysis of human–machine interactions to account for recent developments in technology and theories surrounding our interactions with them. *P&SA* had pronounced influences in human–computer interaction, artificial intelligence (AI), anthropology, and social studies of science and technology by introducing new methods for examining human–machine interaction. The original text makes up chaps. 2 to 12 of this second edition; Suchman's updates are provided as footnotes throughout these chapters. In *P&SA*, Suchman argues that plans, a fundamental concept in AI and associated computer science research, are best understood not as determinates of action but

as rhetorical devices for explaining action. She recommends the methods of ethnomethodology and conversation analysis for studying the relationships among humans and their machines. Her work in both editions is significant in its ability to use theories and methods from multiple disciplines to inform the problems of human–machine interaction research by using accessible real-world examples of problematic interaction and thorough theoretical explanations of those situations.

Designers interested in changing the way humans and machines interact will benefit from reading Suchman's second edition. Her relational approach emphasizes the impacts designed objects can have and provides us with methods for exploring those impacts. Researchers looking for examples of how to employ conversation analysis and ethnography in novel environments also will benefit from the book. Suchman explains the procedures of conversation analysis and ethnography while providing examples of her own work using both methods. She anticipates and addresses some of the challenges researchers unfamiliar with them will encounter (e.g., determining what is a conversation). Her overviews of plans, situated action, agency, and figuration are brief but useful. For readers interested in theories beyond their current purview, Suchman's overviews can provide introductions, and her footnotes provide helpful pointers to fundamental work using those paradigms. In the first edition, Suchman provided chapter-length overviews of the central concepts: plans and situated action. The second edition spends less time explaining its central concepts of figuration and agency. This change benefits readers who have some familiarity with the recent feminist and sociological theories from which she borrows those concepts.

The shared, broad aim of both editions is to rethink interaction between humans and machines. Suchman's original edition focused on arguing against the planning view of action then popular in AI. The planning view suggests that plans are series of steps to be executed, and that such steps (and their sequence) are determined prior to action. Suchman's situated action approach suggests that instead, plans are representations of action and that actions themselves result not from rules or plans but from situations. Suchman argues that plans are resources that can be employed in service of action, not that they actually determine action. At the time of its publication, the first edition broke ground with this new approach to understanding plans and action, and Suchman's research demonstrated that such a view could not account for phenomena surrounding human–machine interactions.

Suchman trained as an anthropologist, and her first edition resulted from her dissertation work at Xerox PARC. There, she employed ethnomethodology and conversation analysis to explore interaction between Xerox employees and a photocopier with an AI help system. The copier's interface designers assumed its users would arrive at the copier with a goal, and that their primary problem was in determining how to accomplish that goal. Suchman's videos and analyses of interactions between users and the system illustrate that AI's assumptions about conversation led to inadequate interface designs. AI's problem, she claims, was that it assumed a message-passing model of interaction in which conversation partners, whether humans or machines, simply moved information back and forth. Instead, she argues, understanding conversations and interactions as dynamic co-constructions could prove more useful for designers of human–machine interactions. Under this dynamic model, conversational partners co-construct meaning using embodied competencies and situational circumstances (p. 10). The co-construction approach enables us to explore situational effects on interaction and helps account for complications (i.e., unexpected behavior) that the planning view cannot explain.

This second edition pushes us to explore how social understandings of agency and figuration impact the human–machine interface. Multiple readings will be rewarded, and readers should not be put off by the density of Suchman's material. *HMR* relies heavily on theories from a variety of disciplines, including philosophy, Actor-Network theory, AI, robotics, anthropology, and sociology. A reader who is unfamiliar with any of these fields is likely to get lost easily in Suchman's prose. Readers who have expertise in at least one area will find enough familiar territory to ground themselves in Suchman's discussion, but are likely to find themselves needing to read some of the work she references to better understand her arguments. This edition builds on the original situated action view, and expands the support and explanation of this view to include concepts from a variety of areas, including feminist theory (e.g., embodiment, figuration), AI (e.g., agency), and Actor-Network theory (e.g., relational networks including nonhuman agents).

Agre's review of *P&SA* provides a readable overview of the impact of that first edition (Agre, 1990). Agre (1990) noted that Suchman's first edition bridged anthropology and AI by comparing how each tradition thinks about action. He credited Suchman's work with introducing him to the idea that cognition could be something in the world rather than just in the head, and expected that research on the "nature of the social world" to influence AI (p. 379). Readers who tackled *P&SA* when it was first published may find reading Agre's review a helpful way to review before reading material new to the second edition.

Figuration and agency are central concepts for Suchman, and she borrows these concepts from Haraway and Latour. Figuration refers to our representations of the world, and Suchman borrows this concept from Haraway (1997). Figures are sticky and require effort to adjust to new representations of the world. Latour (2004, 2005), and other Actor-Network theorists (e.g., Law, 1992), provide Suchman with ideas of agency that allow her to uncouple humanness and agency. She wants us to explore how humans and machines are intertwined, and uncoupling humanness and agency enables us to think of machines as active agents rather than as programmatic respondents. Allowing machines agency enables them to participate in the co-construction of situations central to Suchman's analysis.

Material new to the second edition expands the argument that we should think of effective human–machine interactions in relational terms. Suchman argues against the notion that humans and machines must be thought of as individual, autonomous entities, and suggests instead that humans and machines are "assemblages of stuff" (p. 227) and that those assemblages necessarily change the nature of both humans and machine. She uses discussions of MIT robots and interactive performance art to illustrate her argument. For example, she describes interactions with Kismet, a robot that is part of the sociable computing project at MIT, to illustrate the co-constructive nature of interactions between humans and machines.

Kismet is designed to have natural, intuitive interactions from humans and to learn from those interactions.[1] Suchman and her colleagues were unable to interact successfully with Kismet. To them, his behavior appeared random rather than intuitive. Suchman takes this failure as evidence for the mutual constitution of the relationship between Kismet and his developer, Cynthia Breazeal. Just as Kismet supposedly learns from his interactions with humans, so do humans learn from interacting with him. Breazeal's success in interacting with Kismet indicates that she has adapted more to Kismet's responses than have other, less familiar humans. Together, Kismet and Breazeal create a situation in which they successfully interact with one another.

Suchman's explanation of the story argues that Kismet's agency is a result of the specific sociomaterial arrangement. Unlike previous understandings of agency—the capacity for action—that required only autonomy and rationality, Suchman understands agency to result from a history of interactions and social arrangements. Kismet's capacity for action depends on the humans with whom he interacts. This notion of agency echoes Actor-Network theory's (ANT) approach.[2] Suchman introduces ANT briefly (pp. 260–261) to gain support for relational approaches to human–machine interactions, but she also implicitly references ANT's understanding of agency as a set of competencies rather than intentions. Under ANT, nonhuman entities possess agency because

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[1]See http://www.ai.mit.edu/projects/sociable/overview.html; Retrieved June 15, 2007.

[2]For a brief introduction to Actor-Network theory, see Felix Stadler's *Actor-Network-Theory and Communication Networks: Toward Convergence*; http://felix.openflows.org/html/Network_Theory.html; Retrieved June 18, 2007.

they do things. This "doing" is all that is necessary for agency, according to Latour (2005). Suchman wants us to think about agency as a set of "possibilities generated . . . through specific sociomaterial assemblages" (p. 242). The rational view of agency limits its reach to humans and therefore cannot account for the effects objects and machines have on interactions. Thinking of agency in relational terms emphasizes the importance of understanding each component, including nonhuman components, of an interaction. Agency, as Latour defines it, extends to objects such as the AI help system in Suchman's case study; Latour's and Suchman's broader view of agency allows us to think of the help system as an actor with abilities to influence and change situations.

Suchman also relies on Haraway's conceptions of *material figurations* [italics original] to discuss human–machine configurations. Figurations, for Haraway and Suchman, are something like conceptions or schemas—mental images that embody our understanding. Buying into a figuration, such as the autonomous, rational agency figuration against which Suchman argues, perpetuates and empowers the figuration. Reconfiguring, then, requires additional effort to unpack the original figuration and to challenge it. The exercise of challenging figures is important in itself, for Suchman, because doing so allows us to know our world better. She wants us to think about science as culture and a set of practices rather than exercises in uncovering universal truths. Suchman's argument is that "humans and artifacts are *mutually constituted*" [italics original] (p. 268). Rethinking the interface of machines and humans as a dynamic one requires changes in the designs of systems that include humans and machines. Using the language of agency and figure that she introduces emphasizes the situated nature of our research and enables us to imagine how a change in situation may have influenced the research differently.

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The Internet Imaginaire. Patrice Flichy. Cambridge, MA: MIT Press. 2007. 255 pp. $29.95. (ISBN-13: 978–0–262–06261–9)

Originally published in French by Patrice Flichy, and translated into English by Liz Carey-Libbrecht, *The Internet Imaginaire* tracks the history of the development of the Internet. Flichy, Professor of Sociology at the University of Marne de la Valleé in France, conceives of the development of the Internet as a series of utopian "imaginaires." From French to English, the term "imaginaire" roughly translates to

"imaginary," but Flichy's use of the term might better be fit by the English term "imagination." A definition provided by the author, "collective vision" also provides some insight into the direction of his thesis, that "what we need to look at are the social actors' justifications for their engagement in the Internet project and the frame of representation of the new technique that has enabled designers and users to coordinate their actions."

According to Flichy in his introduction, "The Internet imaginaire is closely related to the role of this new technology in Western societies, especially in North America. The purpose of this book is to show how the entire society is tilting into a new technological era" (p. 2) Working in roughly chronological order, the book begins with a discussion of the concepts of myth, utopia, and ideology. Defining utopia and ideology as "the two poles of the social imaginaire, one trying to maintain social order and the other trying to disrupt it" (p. 8) the author attempts to place the development of the Internet into a framework in which there is constant tension between stability and change.

The first half of the book, "Designers' and Promoters' Imaginaire," concerns the actual history of the Internet. Beginning with a discussion of the designer's imaginaire, Flichy considers the early 1970s' concept of networked communications as an "information superhighway." Comparing it to the U.S. national highway system, this new system was conceived as a system that could link universities, libraries, research centers, and industrial organizations, allowing for the transportation of information between points versus the transportation of manufactured goods. The author describes this vision for the future as the "Information Highway Utopia."

In the late 1980s, the National Research and Education Network was proposed, and at the initiative of Senator Al Gore, the High Performance Computing Act was passed in 1991. This act was intended to provide computer resources to researchers and educators, and to demonstrate how advanced computers, high-speed networks, and electronic databases could be used to improve the national information infrastructure. This network was conceived not as a physical entity but as a network of networks. As the project moved forward, the idea was to design an interactive network for both entertainment and work. At the time (1992), it was thought that to achieve this goal, it would be necessary to build a fiber optic network to connect the various nodes.

By 1994, the Internet was no longer a potentially new technology: It was a system that had been in operation for over 20 years, but its use was very limited. The three main user groups at this time were computer science researchers, academic faculty, and members of the counterculture. Essentially, the user group was the same as the design group, so there was not the usual tension between designers' imaginaire and users' imaginaire; they were one and the same. In the second chapter, Flichy describes early work and innovation that led to the eventual development of the Internet. Beginning with a discussion of Arpanet in 1969, he follows the increased user communities and their tools through Usenet, Csnet, and Nsfnet to the Internet and World Wide Web, culminating in the development of the Mosaic navigator at the University of Illinois in 1993.

Calling this period of development the "University Utopia," the author makes clear the overlap between designer and user communities. Because of this, he claims, there was no need to "sell" the Internet to its user community or the outside world—the majority of its development was funded through a variety of government and academic sources. As the Internet developed, the social organization of its designer/ user community had the following characteristics: Interaction and cooperation were among people with similar interests; this was a community of equals in which status was based on merit, cooperation was an essential element, and it remained separate from the rest of society.

Because the society of users was a somewhat closed community, a specific "Internet culture" began to develop. Beginning in the 1970s and 1980s, a small group that operated on the fringe of the academic community began to develop an interest in computing. Comprised of people who believed in community on a higher level and saw the Internet

more as a tool for communication than anything else, these countercultural activists began to create Internet communities of their own, outside of those within academic circles. Using information technology as a community-building tool, these users began to build communities through networked computing. These communities included The Well, a community developed by former hippies, a number of Bulletin Board Systems including Fidonet and Free-Net, and Big Sky Telegraphic, a rurally centered regional cooperative. Finally, in Santa Monica, California, the Public Electronic Network was launched in 1989. The system was envisioned as a way to provide access to public information and services, allowing alternative forms of communications between citizens and their government at the local level.

All of these experiments, taken together, comprise what Flichy calls the "Community Utopia." The Community Utopia differs from the University Utopia in several key ways. Geography was more important, with the majority of these electronic communities being local in nature. Rather than using large mainframe computers and having access to significant technical support resources, these new users were self-taught and used less expensive technologies such as the personal computer and public telephone systems to connect. Finally, a divide between "broadcasters" and "receivers" began to become apparent, with a minority of members actually participating in the community beyond reading posts or asking questions.

Completing the history of the development of the Internet, Flichy considers the diffusion of the network into the public as a whole. This diffusion was a clear shift from the designers' and users' imaginaires to an imaginaire of the masses, which he calls the "cyber imaginaire." This concept of the Internet as a tool for everyone began with its popularization in the early 1990s. Books written for the noncomputer specialist began to be published, and mainstream media began to take notice of this new phenomenon, the "World Wide Web." By 1994, with the advent of PC compatible browsers, access providers such as AOL and CompuServe began providing access to the general public and claimed to have over 5 million subscribers.

The influx of these new users into the formerly closed community of the Internet often created conflict. Questions about the role of advertising, the appropriateness of various contributions to newsgroups, and the social behavior of the newcomers in general began to become issues of concern. Ethical issues developed, such as the possible tension between individualism and protection of the network and its resources. In an attempt to resolve these problems, the concept of netiquette (i.e., acceptable social behavior on the Internet) began to take form.

Finally, it was during this period that a group Flichy calls the "cyberelite" began to develop. Seeing itself as the avant-garde of the Internet, this group of information leaders attempted to lead and direct the future direction of the Internet imaginaire. Two developments in this direction were the founding of *Wired* magazine and the Electronic Frontier Foundation (EFF). *Wired* was launched, according to founder Louis Rossetto, "to discuss the meaning or context of social changes [networked computing] so profound their only parallel is probably the discovery of fire . . . ." The EFF, according to its mission statement, was "established to help civilize the electronic frontier, to make it truly useful and beneficial not just to a technical elite, but to everyone; and to do this in a way that is in keeping with our society's highest traditions of the free and open flow of information and communication." Thus, by the middle 1990s, we see the Internet Utopia, this concept of the Internet for everyone, begin to develop.

The second half of the work, "A Virtual Society Imaginaire," discusses several applications for the Internet. The cyber imaginaire presented is much broader in scope, and considers various aspects of a new digital society. A number of intellectuals are discussed, as are their contributions to the new visions being developed for the Internet in the 1990s. Flichy divides them into three groups published in *Wired*: the visionaries (Marshall McLuhan & Teilhard de Chardin), the futurologists (Alvin Toffler & Nicholas Negroponte), and science fiction writers (William Gibson, Bruce Sterling, & Neal Stephenson). In discussing these writers, Flichy ties a number of their ideas, such as the new

democracy, computer replacement of mass media, and the science fiction genre of cyberpunk, into the then-emerging vision for the new cyber society and Internet Utopia.

Flichy includes a chapter on virtual reality, showing its interaction with a number of imageries, especially that of visual artists and musicians. Describing virtual reality's genesis in the field of simulation, he attempts to define it as "the play among artificial, real and realistic," with interaction between the three being a key element. The chapter then goes on to describe a number of experiments in media and virtual reality interaction from the 1990s.

Referring to the community imaginaire, the concept of cyberdemocracy is considered. A third way, between representative and direct democracy, cyberdemocracy allows the use of the new communication channels of the Internet to be used in interactions between citizens and their government. Looking at the possibilities for expanded debate and discussion in this new "public square," Flichy points out that often, rather than achieving consensus, online debate often had a tendency to encourage fragmented and contradictory points of view. In discussing the role of government in regulating the Internet, it appears that consensus was, for the most part, achieved in the online community. Denying government any role, members described the Internet as a "world apart," with its own rules and norms.

Originally, free sharing of the Internet was taken for granted. It did not take long for a competing idea to emerge: the use of the Internet for business-related purposes. As the author noted (p. 179), "A head-on collision between the two views resulted: free access and even free sharing versus payment and business." Built with government funds, the Internet was originally free to use. New applications that were developed were made freely available, both for use and for further development. During the 1990s, this cooperative approach to the Internet began to change, as new business models began to surface. The five major models were mass advertising, the Internet as marketplace, the push media, one-to-one marketing, and virtual communities. It was at this time that the concept of the "new economy," a merger of free trade, deregulation, and the revolution in information technology, began to emerge. This "new economy" culminated in the "dot com boom" of 1995–2001.

Flichy sees the Internet imaginaire as an "American imaginaire," with many of its themes referring to the United States, especially those of the frontier, the community, and individual initiative. Yet, he argues, these themes do not resonate only with Americans. Rather, they are, at the same time, both totally American and completely universal. He concludes (p. 211), "The Internet imaginaire, like the technology accompanying it, was born in the particular context of the United States but subsequently became universal. Wherever one is in the world, logging on to the Internet is, in a sense, plugging into modernity and the country that best symbolizes it."

Flichy's discussion of the imaginaire, and its place in the development of the Internet, provides good insight into the development of this resource that has become so ubiquitous in the early 21st century. While the first section is solid, showing a deep understanding of the societal forces and trends that led to the development of this system, the second half seemed less coherent, attempting to take disparate themes and force them into a framework that may not have been appropriate. I would like to see an updated version of this work that provides a description not only of what trends and societal changes became possible with the advent of the Internet but also insight into what their implications might be today and in the future.

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Human Rights in the Global Information Society. Edited by Rikke Frank Jørgensen. Cambridge, MA: MIT Press, 2006. 324 pp. $25.00. (ISBN 0–262–60067-6)

Does the right to freedom of expression translate into the right to diverse media and equitable access to means of communication? Does the right to access constitute the "third generation" human right on par with the right to peace?

Questions such as these concerning human rights in the Global Information Society (GIS) have no easy and convincing answers because they involve issues of great complexity, such as varied national legal cultures and the role of private actors in GIS. Rikke Jørgensen's collection marks an important beginning in opening up the debate in this area.

William Drake and Rikke Jørgensen's introduction to the volume surveys the human rights scene. GIS debates, they note, have focused thus far on two issues: the use of Information and Communications Technology (ICT) to increase global awareness of human rights violations and state and government attempts to regulate the Internet. They also survey the various mechanisms for human rights put in place in the 20th century, isolating two key challenges: enforcing state compliance and giving greater detail to internationally agreed rights and to clarify their meaning and applicability under diverse conditions. The World Summit on Information Society, finalized as a two-stage summit in 2005, created a Human Rights Caucus (HRC) in 2002. Stage 1 called on governments to list all the internationally agreed rights, but also to ensure that other provisions such as spectrum management, national ICT regulation, and labor rights were fully consistent with the world human rights conventions (Stage 2). This second phase, as Drake and Jørgensen admit, met with little success. The work of the HRC, write Drake and Jørgensen, has two basic components: influencing official negotiations and convincing civil society. Can the HRC push for the right to communicate as a human right? A question such as this invokes fierce battles about the very nature of human rights and arguments. HRC, recognizing the importance of the matter, has now an Independent Commission on the Information Society and Human Rights.

In the first part of the book, the focus is on freedom of expression, access to information, and privacy protection. Jørgensen explores the principles behind the right to freedom of expression. With ICT, the challenges faced are diverse, shows Jørgensen. These include the lack of access (a very real challenge, especially in developing nations), privatized censorship, filters restricting online content, the relevant jurisdiction (over a nonbounded space which is the Internet), and regulation of Internet Service Providers. Jørgensen proposes comprehensive measures such as indicators to measure compliance of national regulation with freedom of expression norms, spreading awareness of online communication and information access in school syllabi, establishment of low-cost Internet access, establishment of mechanisms to ensure continuous development of a strong public domain of information, among others. David Banisar turns to the citizens' right to access public information. This right, Banisar noted, is part of the right to freedom of expression. Several countries have now provided laws to ensure right to information (India, from where I write, introduced it recently.) Banisar argues that it is not enough for governments to think about this: Civil society has a significant role to play here so that a "culture of openness" evolves over time. Kay Raseroka looks at a possible structural mechanism to spread information and provide access to communication: the library. Raseroka argues that since cultures often rely on people-centered knowledge and information networks, the coalition of libraries can

provide a useful structure for the same. Local content creation can be nurtured through elders' telling stories in native languages, their word processing and eventual databasing in an effective link between orality, information, and technology (Raseroka is referring to Botswana Vision 2016 where such a project is under way.) Robin Gross addresses a thorny issue: the public domain of knowledge versus intellectual property rights regimes. Gross argues that U.S. copyright laws—what she describes as "maximallist"—are being imposed across the world so that information flows from North to South, in a kind of "information age colonialism." Gross then outlines some principles of communication rights in the information age: national sovereignty over their domestic information policies, protection for the intellectual "commons" (which includes ensuring public access to scientific information acquired at public expense), intellectual property rights should promote creativity, promotion of open-source software, intellectual property rules should shrink the knowledge gap, protect private copying rights, and intellectual freedom. Gus Hosein explores the right to privacy in the information age. Hosein notes the legal measures in place here, and also the diverse threats: mandatory gathering of communication data, exchange of passenger data, profiling systems, online tracking, and biometric data collection/surveillance.

Part 2 of the book deals with freedom of association, participation, and procedural protections. Charley Lewis notes, using a wide range of examples, how the use of ICT has drastically altered the spaces of association for individuals and organizations. Hans Klein discusses the right to political participations and suggests that we might have to rethink the private–public distinction of liberalism. Meryem Marzouki looks at the slow and steady increase in the powers of the police, with a concomitant erosion in the powers of the judiciary. Marzouki argues that recent legislation (e.g., the U.S. Patriot Act and EU privacy regulations) often has ignored procedural rights. State surveillance has increased substantially, but with little concern for procedural safeguards.

In the final section of the book focusing on development and equality, Mandana Zarrehparvar's essay indirectly addresses questions of the digital divide when she demonstrates discrimination in and through the GIS. The essay offers two possible areas of intervention and political rethinking: (a) the use of the Internet to reject, deny, or even confront efforts to deal with racism and other forms of discrimination, and (b) the basic inequality of access to technology. Heike Jensen, also focusing on discrimination, isolates women's human rights as an area where ICTs have to rethink priorities, decision-making procedures, and effects. Jensen is particularly interested in drawing attention to the women of the South, and the potential ICTs have in terms of community building, employment opportunities, and information. Birgitte Kofod Holsen looks at the interface of minority rights and the GIS. Holsen moves from looking at conventional structures for minority protection and argues a strong case for regulatory mechanisms that ensure rights of access, transparency in information gathering about ethnic minorities, and cultural rights of minorities in cyberspace (including the troubling question of minority languages, and their absence in cyberdiscourses). In the concluding essay, Ran Greenstein and Anriette Esterhuysen return to the digital divide and propose the inclusion of the right to communication and information as a part of the right to development.

Human Rights in the Global Information Society expands already circulating concerns about the digital divide. What emerges from this dense volume—a good mix of empirical studies, cultural policy studies, and political theory—is the indisputable fact that human rights, women's rights, and minority rights are yet to figure on the agenda of GIS debates. It also is clear that development studies of ICTs, technology studies have looked at only representations of minorities or women in cyberspace (Flanagan & Booth 2002), with little attention to cultural policies (Beth Kolko's 2006 work is a notable exception here.), legal measures, and global networks of power and regulation. The volume is characterized by an appropriate sense of urgency in many of its essays: Considering the speed of development in technology and policy governing the technology, to *not* address human rights is to set GIS on a path that only will lead to a more unequal destination in cyberspace.

The volume, I believe, reaches far more than scholars in technology studies or development studies. It should appeal to people working in various disciplines such as media studies, sociology, women's studies, and cultural studies because human rights is central to each of them. The volume will help give the disciplines a necessary spin in the era of heightened technocapitalism and informatization.

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Radio Frequency Identification Handbook for Librarians. Connie K. Haley, Lynne A. Jacobsen, and Shai Robkin. Westport, CT: Libraries Unlimited, 2007. 166 pp. $45.00 (ISBN: 978-1-59158-371-4)

Two librarians and an RFID (Radio Frequency Identification) vendor's president continue their collaboration, following installation of RFID systems, in producing this five-chapter work. The writers focus on two items: educating librarians about how RFID is being applied in libraries, and providing documentation to help librarians decide whether to pursue RFID, including, for those who are interested, documentation to assist with arranging an installation. In the process the authors hope that they can also enable libraries already using RFID to maximize its benefits.

The bulk of the book's explanation comes in the first three chapters. After the first chapter's brief comparison of RFID in other environments to its use in libraries, chapter 2 examines in thirty pages many pros and cons regarding RFID. Chapter 3 lays out types of RFID tags and readers. Thus, before teaching technical "basics," clearly the authors first want to answer the question, "Why bother with RFID?"

They answer by highlighting both benefits and areas of concern related to RFID. As expected, the writers emphasize benefits to both libraries' circulation departments and patrons through faster processing of items with less manual handling. Important components of processing involving book drops, patron self-checkout stations, and security gates are examined in order to clarify distinctions, benefits, and concerns in comparison to equipment already owned by many libraries.

Appropriately, privacy concerns also receive emphasis; guidelines prepared by the American Library Association are included, as well as a list of proposed legislation in numerous states related to RFID (yet not specifically regarding its use in libraries). The writers argue that most concerns regarding privacy are mitigated by avoiding encoding bibliographic information. Unless the link between an item's barcode and the item's record in the Integrated Library System (ILS) can be made, obtaining only the barcode number has no meaning.

Section 3 of chapter 2 is unique in the chapter since it outlines the RFID data model, namely the requirements for data elements and data structure on the RFID tag. The section discusses models developed in Europe and the related work done in North America. Given the great influence of standards and how many of them regarding RFID are still being developed, this technical discussion is valuable. Yet it likely could have been better placed, possibly in chapter 3 where the standards receive more treatment. Overall, these chapters successfully explain technical topics. The writers employ language that is adequately specific to explain the facts, while avoiding straying beyond the book's scope. In chapter 3, critical distinctions regarding WORM (Write once read many) and R/W (Read/Write) tags are explained, including various approaches to managing security. The writers note when there might be difficulty with different tags working well together, and also address problems regarding handling audiovisual materials. As part of the discussion regarding security procedures, the writers contrast two communication protocols used between the tags and the readers that connect to the computer system, namely RTF (reader talk first) and TTF (tag talk first).

While obviously embracing RFID, the writers avoid presenting RFID as a one-size-fits-all solution that has no drawbacks. The authors achieve this balanced perspective by including estimation of costs, presentation of data regarding how well tags function, and an assessment of where RFID helps and where it does not. For example, the writers admit on p. 89 that while RFID speeds retrieval of items when their location is not known, it does not speed retrieval of holds from known locations.

In chapter 4, three lists of questions are provided to help readers consider options. The first list enumerates questions to ask vendors, while the second offers questions to ask current customers of the vendors. The third list summarizes questions that librarians should ask themselves as they gather information. These practical aides effectively draw together in one place many of the points already made. Because the lists result from the combined experience of the three authors, the lists should be very helpful to readers. However, the lists are general and not tailored specifically to a certain type of library.

Numerous photographs in chapter 5 illustrate how a variety of materials can be tagged with RFID tags, and suggestions are made for managing the conversion process. These suggestions are supported by items presented in the appendices, such as a sample budget sheet and sample conversion guidelines (Appendices B and C), as well as a sample request for proposal (Appendix G).

Brief yet helpful discussions on accomplishing tagging of items during the conversion process are presented in sections 5 and 6 of chapter 5. The authors estimate an average number of items that can be tagged per hour, outline options regarding recruiting temporary staff or volunteers in order to keep the project within an acceptable budget and schedule, and recommend topics to be included in staff training.

This book clearly grew out of the experiences of the writers and their institutions, including the documents in the appendices, such as the budget sheet, which are directly reproduced. Yet in the regular text and the appendices the writers also provide background information to their readers such as the discussion of standards, chapter bibliographies, and also Appendix D, a survey of RFID vendors summarizing their offerings. Further, Appendix F lists a variety of RFID resources available on the Web, such as listservs, new sites, and industry organizations. However, this work would have been made stronger by a glossary of acronyms and a list of tables and graphs.

The appeal and value of the collaboration between the three authors lies in its synergy; they were able together to produce a more balanced and complete presentation than would otherwise have been possible. The overall good quality of the technical writing demonstrates this balance. Similarly, sections of the book are not signed by a single author, and give-and-take between the librarians as customers and the vendor is evident in the text, such as in a discussion about the vendor's claims regarding using RFID to do shelf reading (p. 91).

The contributing RFID vendor, Mr. Robkin, highlights his company's offerings chiefly in the appendices, including the conversion guidelines (Appendix C) and tag sorting features (Appendix E). Thus while Robkin's company, Integrated Technology Group (ITG), receives some extra attention, this attention is not excessive.

The authors chose a narrow focus in providing basic explanation of RFID systems and assisting in the evaluation librarians must make regarding purchasing a system. For these specific goals the book is successful. Yet due to this focus the book offers less to libraries already using RFID. The detailed discussion about tags and readers in chapter 3 may

be the most helpful for libraries needing to make adjustments following installation of an RFID system.

In certain places, the writing is unclear due to difficulty with the book's organization, specifically in instances where the writers introduce an acronym without detailed explanation. For example, AFI (Application Family Identifier) is first mentioned on p. 9 (chapter 2), but the serious discussion of this topic comes later in the chapter on p. 25.

In addition, a side effect of the "benefits first, technical explanation second" organization, combined with the book's specific purpose, is that some topics never receive their own focus. For example, marketing the new system as well as maintaining an RFID installation are both discussed at various points as part of what should be considered in the initial purchase of a system, yet these topics are never the sole focus of a chapter. Also, progress of technology and its future impact is included but not focused in one place.

Readers seeking more substantive assistance with maintaining or marketing an RFID system will need to look elsewhere in journals or other monographs for more material. One possible resource is a forthcoming book by university library cataloger and adjunct informatics instructor Diane Ward; this book is listed in the publisher Neal Schuman's "How To Do It Manual" series as a more expensive and lengthy work with chapters addressing these topics. Clearly the work by Haley, Jacobsen, and Robkin offers significant help with both technical information and management choices for librarians wanting to investigate and initiate use of an RFID system, yet other resources may better support readers with other needs.

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Fuzzy Logic and the Semantic Web. Edited by Elie Sanchez. Amsterdam: Elsevier, 2006. 479 pp. $132.00 (ISBN: 0-444-51948-3)

The semantic Web, as the next generation of the rapidly growing Web, is a revolution, in a long-term time scale, that is promising to make the Internet totally different, with more power. Meanwhile, there are many kinds of logic, like the many versions of Petri nets, with classical predicate logic as the queen, simulating how humans think. Initially, crisp, two-value-based logical systems were designed as the bases of reasoning. In simple cases, such crisp logic is sufficient to solve problems. Unfortunately, the world is full of information that is uncertain, imprecise, inconsistent, partially true, approximate, ill-structured, and fuzzy. To reflect exactly what the real world is like, fuzzy logic (a kind of multiple-valued logic) is a necessity. Without fuzzy logic, the semantic Web may still work; however, with fuzzy logic, it can work well. The book says, "Fuzzy logic will not be the basis for the semantic Web but its related concepts and techniques will certainly reinforce the systems classically developed within W3C" (p. x in the Foreword). This book discusses how fuzzy logic, with about forty years' history, is embedded into the semantic Web, with only several years' history, to make a fuzzy semantic Web.

This book includes most of the advances of the semantic Web using fuzzy logic, and points out many directions for further study. As chapter 1 says, "the world, even the formalized one, is full of contradictions" (p. 4), comes the fundamental question: "the question for semantic Web research is whether the basis of semantic Web standards should be the bivalent monotonic case with the uncertain and/or non-monotonic cases as a specialization thereof, or whether the basis should be the uncertain case with bivalent monotonic logics as a special case" (p. 5). Although similar to fuzzy logic, probabilistic logic is subtly different, which should be noted; section 3.2 in chapter 1 has some details

about these two kinds of logic. Likewise, two similar notions, belief and trust, are compared with each other in the next section. Fuzzy ontology is discussed in chapter 2 and a definition is given (p. 22). The ontology concept is different in philosophy and computer science. Furthermore, ontology in the computer science sense is different from object-oriented programming. Constructing fuzzy ontology is a process of continuous learning, continuous training, and continuous improving, like neural networks and CMMI (Capability Maturity Model Integration). The core keyword for chapter 3 is classification (of information). However, this chapter is a little difficult to read. What is discussed in chapter 4 is very clear, a fuzzy description logic, namely fuzzy SHOIN (D). The central point of chapter 6 is about gradual truth and uncertainty, their distinction and relevance. Chapter 7, concentrating on uncertainty, is by the same author as chapter 4, emphasizing fuzziness. Chapter 8 mainly discusses fuzzy quantification. The founder of fuzzy logic, Professor Lotfi A. Zadeh, to whom this book is dedicated, wrote the keynote chapter 9 (Interestingly, this chapter is dedicated back to Elie Sanchez, the editor of this book). How to transform search engines into question-answering systems is summarized. The intrinsic difference between these two systems is that a question-answering system needs the deduction capability to synthesize an answer to a query by drawing on bodies of information residing in various parts of the knowledge base (p. 163). Bivalent logic and bivalent-logic-based probability theory are unable to make a search engine into a question answering system, but fuzzy logic plays an important role during this transferring process. Unlike most existing relevant work that focuses on filtering the returned search result (p. 211), chapter 10 is a study of how to modify the original query, using fuzzy semantics, before it is sent to a search engine. Figure 1 (p. 212) clearly shows the fuzzy semantic deduction in a Web search. Chapter 11 discusses in depth the issue of how humans think, and the concept of a knowledge tree is at the center of the chapter. Chapter 13 proposes a bottom-up fashion of ontology construction, which is not yet regarded as a generally valid recipe, but is really useful for the ad hoc style of conceptualization used in some situations. Several kinds of graphs are mentioned in chapter 14, namely, knowledge graphs, conceptual graphs, query graphs, answer graphs, and RDF (Resource Description Framework) graphs. The key to understanding this chapter is to grasp the meaning of these graphs and the semantic distance first. Chapter 15 studies the information-fusion issue, also called *combination of information* or *integration of information*. The abstract part of this chapter explains related technical terms and problems to be solved with simple examples, so it has some characteristics of a tutorial. The inclusion of such examples is very necessary for such an abstract topic as fuzzy logic and the semantic Web. Searching is an important part of what is done in cyberspace, and chapter 17 simply deals with the efficiency of searching to find the best (top-*k*) answer. *Concept* is the keyword of chapter 18, where no keyword is listed. Basically, it is an issue of matching between documents and queries. Chapter 18 uses a fuzzy conceptual structure both for indexing documents and for expressing user queries. Chapter 19 presents a knowledge-based system called KASIMIR, and two extensions of this system, one based on fuzzy logic and the other on the semantic Web. Finally a combination of these two extensions is proposed, which is consistent with the title of this book. The focus of chapter 21 is the evolving ontology that is able to represent the dynamic and uncertain nature of domains. In many domain relationships, concept understanding, classifications, and so on evolve over time (p. 416). Some useful general information is included in this chapter. For example, three different definitions of ontology are described (p. 417); two kinds of scientific discovery are mentioned (p. 418); definitions of and differences between data, information, and knowledge are given (p. 419); concepts are defined as the abstract of the data (p. 421), and are called the most basic units of thought and thus building blocks (p. 422). Finally, a definition of evolving ontology is presented (p. 437). Chapter 22 is written from a general perspective. The concept of the next generation of the semantic Web is proposed (p. 443).

Of all the 22 chapters, there are 6 chapters from Italy (one is coauthored with Spain and another one coauthored with France), 5 chapters from the USA, and 4 from France (one is coauthored with Italy). Other

than these, there are 2 chapters each from the Czech Republic and New Zealand; 1 each from the UK, Germany, Brazil, and Vietnam; and 1 chapter from Spain, coauthored with Italy. It is clear that the most active areas are Europe and North America. The organization of this book is different from the usual organization. Every chapter is a relatively independent and complete paper. The descriptive styles of some chapters are vivid, with many linguistic elements from real life and less dry scientific expression. However, other chapters are somewhat abstruse; books like *A Semantic Web Primer* (Antoniou & Van Harmelen, 2004) may be appropriate to read as background. There are a lot of technical terms and mathematical symbols in *Fuzzy Logic and the Semantic Web* book; understanding these is a prerequisite to reading this book. The first three chapters are introductory; they are the basis for understanding the rest of the book, so careful reading is needed. A lot of references are listed at the end of each chapter, which indicates that much attention has been given to the hot research topic of fuzzy logic and the semantic Web, both from academia and industry. The "Concluding Thoughts" section in the foreword is very instructive and full of information. We can not help to quote the main part of it, as follows:

> These are exciting times in the fields of fuzzy logic and the semantic Web, and this book will add to the excitement, as it is the first volume to focus on the growing connections between these two fields. This book will be a valuable aid to anyone considering the application of fuzzy logic to the semantic Web, because it contains a number of detailed accounts of these combined fields, written by leading authors in several countries. The field of fuzzy logic has been maturing for forty years. These years have witnessed a tremendous growth in the number and variety of applications, with a real-world impact across a wide variety of domains with humanlike behavior and reasoning. And we believe that in the coming years, the semantic Web will be a major field of applications of fuzzy logic. (p. xiii)

Furthermore, based on the concept Web IQ proposed by Lotfi A. Zadeh, a new and interesting concept named semantic Web IQ (SWIQ for short) is proposed in this section.

What distinguishes fuzzy logic from standard logical systems is that in fuzzy logic everything is, or is allowed to be, graduated, that is, to be a matter of degree (p. 165), so a lot of fuzzified concepts emerge, such as fuzzy ontology, fuzzy datatype, fuzzy class, fuzzy relation, fuzzy query, fuzzy search, fuzzy inference, fuzzy clustering, fuzzy aggregation, fuzzy cardinality, fuzzy satisfiability, fuzzy inclusion, fuzzy quantifier, fuzzy concrete predicate, fuzzy axiom, and fuzzy assertion. There

are nearly 10 fuzzified concepts listed on p. 333. In short, many things can be fuzzified.

Despite its usefulness, some deficiencies exist in this book. Generally speaking, a book chapter is composed of several sections, while on p. x of the foreword, it is stated that a section is composed of chapters. We suggest that *section* should be replaced by *part*. Examples are presented from time to time in chapter 1. This kind of arrangement helps to reify and visualize abstract scientific issues. However, the text is not plain enough. Note that the word *oncology* has a similar spelling to the word *ontology*. Chapter 19 is related to oncology and ontology simultaneously, while chapter 20 is only related to ontology. However, *oncological* is used in error to replace *ontological* when chapter 20 is mentioned in the foreword (p. xii). In chapter 10, list 1 should be mentioned when the first scenario to test the search performance is described (p. 219), and "List 1" at the last line of p. 220 should be "List 2".

In our opinion, the most impressive information from this book is the idea that we should research computer science in a fuzzy way, but not a crisp one, reflecting what the real world is; otherwise some difficulties are unavoidable and unsolvable. For example, we always try to establish a taxonomy without overlapping categories for a specific domain. In fact, a fuzzy taxonomy with overlapped categories may be easier to construct and use. The Chinese saying "being occasionally fuzzy-headed" can be applied to the semantic Web as well. Unlike a textbook or tutorial, this book has a relatively small target reader group. It is only fit for those who study the semantic Web and fuzzy logic, not for people in other research domains, even closely related domains.

Reference

Antoniou, G., & Van Harmelen, F. (2004). A semantic Web primer., Cambridge, MA: The MIT Press.

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