

Preface

I look to the future because that's where I'm going to spend the rest of my life.

-- George Burns (1896-1996)

The World Wide Web has just turned 20! Within this short span of time, it has caused one of the most significant and influential revolution of modern times; its influence has impacted almost every aspect of our life and activities and almost all fields, irrevocably. And, in the past few years, it has evolved quite rapidly into Web 2.0, Web 3.0, and so on, forging many new applications that were not previously feasible. The Web has also caused paradigm shifts and transformational changes in business, social interaction, governance, and education, among others. The Web's evolution continues, and there is no sign of it stopping.

And, we are yet to discover and exploit the Web's full potential. Perhaps we might not realize its full potential soon, as we don't yet know what its full potential is. And, its potential is expanding in unanticipated directions. But what we can say is the Web's future is very bright, and its influence on us would be much greater than what it has been.

This book is a humble attempt to present Web's evolution in the recent years and portray its major influences in different areas, and to look at the phenomenal evolution of Web from different perspectives – technological, business, and social, comprehensively and holistically. The book outlines new generation Web – Web 2.0, 3.0, and X.0 – and its applications, both existing and emerging, and how they are transforming our lives, work, education, and research. The book also presents some interesting new research that helps us in creating new kinds of applications that were unimaginable before.

This Handbook of Research on Web 2.0, 3.0, and X.0: Technologies, Business, and Social Applications is a comprehensive reference that explores the opportunities and challenges the new generation of Web technologies and applications present, illustrated with real world examples and case studies, and examines the technical, social, cultural, and ethical issues these applications present.

We believe the handbook provides valuable insights for further research on new generation Web technologies, applications, and social issues. We hope this book fulfills its major objective of being an excellent resource for researchers, academics, and professionals seeking to explore the issues and emerging trends in Web and Web-based applications. The book also serves as reference for senior graduate students who want to get a glimpse of emerging new applications and garner some new ideas that they might want to pursue further.

To help you easily navigate this volume, next, let me give you a peek into the handbook.

A PREVIEW OF WHAT'S INSIDE

In this handbook of research, we feature 50 carefully selected chapters that together present a big picture of the new generation Web and its applications and recent research work in this area. For easy identification and comprehension, we present these chapters under nine themes: 1. Overview; 2. Web Modeling and Design; 3. Web Architecture; 4. Information Search, Bookmarking, and Tagging; 5. Semantic Analysis and Semantic Web; 6. Web Quality, Trust, Security, and Effort Estimation; 7. Educational Applications; 8. Enterprise 2.0, Healthcare, Finance, and Other Applications; and 9. Social Web: Foundations, Analysis, and Visualization.

Overview. We begin the journey by providing you an overview of the Web's evolution in the first two chapters. By presenting a comprehensive overview of new generation Web, these chapters refresh or prepare you for gaining a better understanding and appreciation of technologies, applications, and issues discussed in the rest of the chapters. The first chapter traces the Web's continuing evolution and phenomenal strides, outlines the features and characteristics of Web 2.0, 3.0, and X.0 and examines their prospects and potential. The second chapter presents interesting perspectives on the Web X.Y movement, synthesizes new definitions for the Web X.Y, and classifies well-known Web applications according to these definitions.

Web Modeling and Design. In this section, we present some of the technological aspects that lay the foundation for new generation Web applications. Easy-to-use, interactive user interface is a hallmark of Web 2.0 applications that appeals to users. First, we introduce a model-driven approach that incorporates interaction models to design of rich Internet applications (RIAs) and illustrate it with a case study, followed by modular interface design for RIAs, and a conceptual model that captures novel features of RIA features and that can be automatically converted into implementations in popular RIA technologies and frameworks. We also outline how the design tool WebRatio and its companion conceptual model based on WebML can be extended to support the new requirements imposed by RIAs. We also explore how to merge Web 2.0 technology with grid computing overlay to support the Web 2.0 framework and illustrate this idea with a case study--managing health information based on users' experiences.

Web Architecture. Then focusing your attention on Web architecture, we present criteria for evaluation of RIA architectures; an immersive Web X.0 framework for e-commerce, a mobile service oriented architecture for businesses, and a unifying architecture for next generation Web applications.

Information Search, Bookmarking, and Tagging. Then turning your attention to the Web application arena, in six chapters, we outline how Web's evolution is influencing and improving information search, bookmarking, and tagging, all major activities of Web users. We present an overview on folksonomies, which is a relatively new concept that hasn't been widely studied, and on social semantic bookmarking, a novel paradigm that combines the positive aspects of semantic annotation with those of social bookmarking and tagging while avoiding their respective drawbacks. We also outline the promises of social bookmarking for enhancing Web search and for building novel applications. Next, we present a comparative analysis of two popularity measures of Web pages, PageRank and SBRank, which is defined as an aggregate number of bookmarks that a given page accumulates in a selected social bookmarking system. For realizing a more effective search, we illustrate how SBRank and PageRank measures could be combined to re-rank results delivered by Web search engines.

Collaborative tagging, popularized by Web sites such as Del.icio.us and Flickr, has now become quite popular. We present a study on social tagging and their applications and on social tagging analysis and mining. We also outline how cross-language information retrieval could be improved by effectively harnessing advances in social Web and how user-specified metadata could be used to personalize image search.

Semantic Analysis and Semantic Web. Web 3.0, which encompasses the Semantic Web, is on the rise. Hence, in our coverage, we look at the Semantic Web and semantic analysis, focusing on a couple of key aspects. Effectively harnessing blogs, wikis, social networks, online content sharing, and online collaboration, the Web has been swamped with user generated content (USG). USG is one of the key features of new generation Web and has created new value chains and business models. In this section, we deal with topics such as accessing, analyzing, and extracting information from USG, wiki semantics, and means of disambiguating social tags, also known as folksonomies.

Web Quality, Trust, Security, and Effort Estimation. Today, major issues confronting the Web, particularly many Web 2.0 applications, are quality of contents and applications, trust and security. In this section, we discuss how to model content quality for the Web 2.0 applications, and then present a Web site quality assessment model. Next, we present an electronic reputation system to encourage socially desirable online behavior in absence of a central authority, as well as the dynamics of reputation formation and spreading, and a role-based access control for collaborative Web portals that realizes security at different levels of the portal. We also present effort estimation concepts for new generation Web applications.

Educational Applications: Education and training has been an early and a major adopter of Web 2.0 and there have been several applications based on Web 2.0, transforming significantly how students gather and contribute information, interact, collaborate, and learn. In this section, we examine several key aspects of learning in the networked age, covering a range of topics, including: integrating social Web technologies and applications in software engineering education, both inside and outside the classroom; a pedagogical patterns-assisted methodology for incorporating social Web technologies/applications in software engineering education; embracing social networking to better engage the Facebook-generation in their university life; use of the wiki and its role as a cognitive tool to promote interaction and collaborative learning in higher education; and instructional strategies and techniques for successfully harnessing Web 2.0 tools for classroom collaboration and pedagogical issues that arise in these settings.

In addition, in this section, we describe a system that facilitates context-aware learning on the Web, present a study on learning in virtual worlds, discuss the role of virtual reality 2.0 that characterizes typical features of the Web 2.0 and its application in knowledge building by enabling users create content and objects themselves; report the findings of a study on student and faculty use and perceptions of Web 2.0 technologies in higher education; and social and cultural issues in Web 2.0-based learning environments from potential users' and learners' perspectives and key implications for Web 2.0 and the Semantic Web on general effectiveness in the learning context.

Enterprise 2.0, Healthcare, Finance, and Other Applications. Under this theme, we cover a range of topics of growing significance: Prosumerism 2.0 in the context of Enterprise 2.0 and Web 3.0; an 8C framework for analyzing collaborative Web 2.0 applications; comparative analysis of popular online social networks and their business models; healthcare 2.0 - the use of Web 2.0 in healthcare; a case study on a collaboration portal and Wiki that supports health information technology decisions; examination of impact of virtual communities on the financial performance of a company, highlighting the Berlin Stock Exchange as an example; an RFID-supported library system on Second Life called SmartRFLib; embracing the social Web for managing patterns; and the use of Web 2.0 in environmental decision making - environmental intelligence (EI).

Social Web: Foundations, Analysis, and Visualization. On our concluding theme, social Web, we tackle some interesting problems and issues. Though the terms social Web and social software have been widely used and talked about, to many, what makes social software social remains unclear. In the chapter, "Social Software and Web 2.0: Their Sociological Foundations and Implications," we answer this question by examining Web in the context of social theories by thinkers like Emile Durkheim, Max

Weber, Ferdinand Tönnies, and Karl Marx, and view Web 1.0 as a web of cognition, Web 2.0 as a web of human communication, and Web 3.0 as a web of cooperation. Then, we examine the sociology of virtual communities and social software design and attempt to answer the question: Are virtual communities simply ordinary social groups in electronic form, or are they fundamentally different, and what is really new about recent Web-based communities?

Then we classify various forms of online human activity networks (OnHANs) formed by Web 2.0 applications based on their social and business objectives, and provide a theoretical discussion on how these networks provide values to the individuals and the organizations involved in those activities. We present a simple strategy for developers to provide visualization functionalities to social networks, illustrating it with a case study. Then, focusing your attention on USG, we discuss how the unlimited possibilities that Web users now have to produce and widely share their content on the Web present new social and ethical dilemmas.

We also report on a study on employee uses for Web 2.0 that came up with interesting findings: Employees use of Web 2.0 applications to share a wide-range of ‘insider information,’ express conflict, and ‘take action’ against employers. In our last chapter, we address the issue of privacy in our modern networked world supported by the Internet, wireless communications, Web 2.0, personalization, location based services, and ubiquitous computing.

IN CLOSING

I take pleasure in presenting you this comprehensive handbook that covers a range of areas and issues of current interest in the context of the Web’s evolution. I believe this handbook of research presents useful insights and ideas about the new generation Web and how you can embrace its potential. I also believe, whether you are a researcher, an academic, or a practicing professional seeking to explore the prospects and potential of new generation Web or a senior graduate student who wish to get a glimpse of emerging Web applications and some new ideas, you will find the book a very helpful guide and a comprehensive informative resource. If all this sounds promising, read on!

As Francis Bacon said, “Some books are to be tasted, others to be swallowed, and some others to be chewed and digested.” I hope, depending on your interest and need, you find some things in this handbook to chew and digest and some other things to taste. If you think this book might be useful to someone you know, please recommend it to them. And, I welcome your comments and feedback on the handbook at webhandbook@gmail.com. Now, I am delighted to hand over the handbook to you.

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