

Web Intelligence: the Future for Communications Agency



Engineering

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Dr. Debaprayag Chaudhuri

Jadapvur University, Kolkata

ABSTRACT

Web intelligence is the present most vital research topics in the world. Several works have been started. In this study we discussed some key factors for successful web intelligence. Data mining is a very important tool for Web intelligence. We also discussed the key factors for successful Web intelligence in the present societal needs.

Introduction

Web intelligence is the area of study and research of the application of artificial intelligence and information technology on the web in order to create the next generation of products, services and frameworks based on the Internet.

The term was born in a paper written by Ning Zhong, Jiming Liu Yao and Y.Y.Ohsuga in the Computer Software and Applications Conference in 2000.[1]

Web Intelligence recognized as a new direction for scientific research and development to explore the fundamental roles as well as practical impacts of Artificial Intelligence (AI) (e.g., knowledge representation, planning, knowledge discovery and data mining, intelligent agents, and social network intelligence) and advanced Information Technology (IT) (e.g., wireless networks, ubiquitous devices, social networks, wisdom Web, and data/knowledge grids) on the next generation of Web-empowered products, systems, services, and activities. It is one of the most important as well as promising IT research fields in the era of Web and agent intelligence.

The challenges of Internet computing research and development in the next decade will be WI centric, focusing on how we can intelligently make the best use of the widely available Web connectivity. The new WI technologies will be determined precisely by human needs in a post-industrial era; namely (2):

Information empowerment,
Knowledge sharing,
Virtual social communities,
Practical wisdom development.
Information Empowerment

Over the last 50 years, the cost of computing – information processing – has fallen a billion-fold. The first hard drive was the size of a large cupboard and held a trifling amount of data by today's standards – just 5MB. By 1979 a hard drive capable of storing 250MB of data would fill a large supermarket trolley. By 2007, hard drives had reached the size of 1TB (terabyte, i.e. 1,000 GB). Only two years later, the first hard drive with 2 TB of storage arrived: while it took 51 years to reach the first terabyte, it took just two years to reach the second. If the prices of motor cars had fallen as fast, you would be able to buy 4000 Rolls Royce Silver Shadows for just £1.

The rise of the computer (and everything it makes possible) has transformed our society: work, leisure, products, services – the economy itself. Within this transformation we can see some distinct phases.

In the first phase, before 2000, information processing power was embedded into products that were sold the normal way: personal computers, video games, cars, cookers, cameras, phones etc. This first phase will never end. Products will always get smarter, but the second phase took a new and different direction. Between 2000 and 2010 information-driven Internet services exploded onto the stage: e-commerce (Amazon, e-Bay), search (Google), price comparison sites, blogging, social networking (Face book) and so on. The big shift had begun: indi-

viduals were beginning to use information as a tool in their own hands, to pursue their own purposes.

The next phase is only just beginning. It takes the theme of information as a tool in the hands of the individual to a new level – and in a different direction. Up until now, even as the costs of gathering, storing and managing information continued to fall, the job of 'information management' remained a monopoly of big organizations. Organizations managed information. Individuals accessed it.

Today, individuals are becoming managers of their own personal information in their own right. As this White Paper shows, that changes everything

Knowledge sharing

Knowledge Sharing is an activity through which knowledge (i.e., information, skills, or expertise) is exchanged among people, friends, families, communities, or organizations.[3][4]

Organizations have recognized that knowledge constitutes a valuable intangible asset for creating and sustaining competitive advantages.[4] Knowledge sharing activities are generally supported by knowledge management systems.[4] However, technology constitutes only one of the many factors that affect the sharing of knowledge in organizations, such as organizational culture, trust, and incentives.[6] The sharing of knowledge constitutes a major challenge in the field of knowledge management because some employees tend to resist sharing their knowledge with the rest of the organization.[7][8]

Virtual social communities

A virtual community is a social network of individuals who interact through specific social media, potentially crossing geographical and political boundaries in order to pursue mutual interests or goals. One of the most pervasive types of virtual community operate under social networking services consisting of various online communities.

Virtual communities all encourage interaction, sometimes focusing around a particular interest or just to communicate. Some virtual communities do both. Community members are allowed to interact over a shared passion through various means: message boards, chat rooms, social networking sites, or virtual worlds.[10]

Practical wisdom development

Practical wisdom is a true characteristic that is bound up with action, accompanied by reason, and concerned with things good and bad for a human being.

Practical wisdom is not concerned with the universals alone, but must also be acquainted with the particulars: it is bound up with action, and action concerns the particulars.

Practical wisdom is concerned with human things and with those that about which it is possible to deliberate.

Levels of WI

To develop a Wisdom Web to benefit from the information infra-

structure that the Web has empowered, we have witnessed the fast development as well as applications of many WI techniques and technologies, which cover the following four conceptual levels at least:

1. Internet-level communication, infrastructure, and security protocols. The Web is regarded as a computer-network system. WI techniques for this level include Web data pre-fetching systems built upon Web surfing patterns to resolve the issue of Web latency. The intelligence of the Web pre-fetching comes from an adaptive learning process based on the observation and characterization of user surfing behavior (11,12).

2. Interface-level multimedia presentation standards. The Web is regarded as an interface for human-Internet interaction. WI techniques for this level are used to develop intelligent Web interfaces in which the capabilities of adaptive cross-language processing, personalized multimedia representation, and multi-modal data processing are required.

3. Knowledge-level information processing and management tools. The Web is regarded as a distributed data/knowledge base. We need to develop semantic markup languages to represent the semantic contents of the Web available in machine-understandable formats for agent-based autonomic computing, such as searching, aggregation, classification, filtering, managing, mining, and discovery on the Web (13).

4. Application-level ubiquitous computing and social intelligence environments. The Web is regarded as a basis for establishing social networks that contain communities of people (or organizations or other social entities) connected by social relationships, such as friendship, co-working, or information exchange with common interests. They are Web-supported social networks or virtual communities. The study of WI concerns the important issues central to social network intelligence (social intelligence for short) (14).

Data mining for Web Intelligence

Through the billions of Web pages created with HTML and XML, or generated dynamically by underlying Web database service engines, the Web captures almost all aspects of human endeavor and provides a fertile ground for data mining. However, searching, comprehending and using the semi structured information stored on the Web poses a significant challenge because this data is more sophisticated and dynamic than the information that commercial database systems store.

Why DATA Mining?

The Web-an immense and dynamic collection of pages that includes countless hyperlinks and huge volumes of access and usage information - provides a rich and unprecedented data-mining source. However, the Web also poses several challenges to effective resource and knowledge discovery.

- q Web page complexity far exceeds the complexity of any traditional text document collection. Although the Web functions as a huge digital library, the pages themselves lack a uniform structure and contain far more authoring style and content variations than any set of books or traditional text-based documents. Moreover, the tremendous number of documents in this digital library has not been indexed, which makes searching the data it contains extremely difficult.
- q The Web constitutes a highly dynamic information source. Not only does the Web continue to grow rapidly, the information it holds also receives constant updates. News, stock market, service center, and corporate sites revise their Web pages regularly: Linkage information and access records also undergo frequent updates.
- q The Web serves a broad spectrum of user communities. The Internet's rapidly expanding user community connects millions of workstations. These users have markedly different background, interests, and usage purposes. Many lack good knowledge of the information network's structure, are unaware of a particular search's heavy cost, frequently get lost within the Web's ocean of information.
- q Only a small portion of the Web's pages contains truly relevant or useful information. A given user generally focuses on only a tiny portion of the Web, dismissing the rest as uninteresting data that serves only to swamp the desired search results.

Concluding Remarks

WI has been recognized as one of the most important as well as the fastest-growing IT research fields in the era of the World Wide Web, knowledge Web, grid computing, intelligent agent technology, and ubiquitous social computing.

WI technologies will continue to produce the new tools and the infrastructure components necessary for creating intelligent enterprise portals that can serve users wisely.

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