

Research Objectives

Contributed by Paragraphe

Translated by Bruno Menon.

Under the thrust of the Web phenomenon, our research and our contributions to the nine H2PTM conferences (Hypertext and Hypermedia: Projects, Tools, and Methods) since 1989 constantly adapted to these last years's situation and are increasingly oriented towards the Net.

New topics of interest arise:

- new generations of search engines, more powerful and more accurate, facing the challenge of the exponential growth of Web pages, the diversification of information sources, and the multiplication of applications and languages;
- text-mining technology;
- scientific, technical and strategic intelligence;
- a semantic Web, collaborative and dynamic;
- the construction of a cyber geography, and a cartography of information content and links;
- the development of computer-assisted collaborative work;
- the development of ergonomics and cognitive science applied to the IT field;
- the development of interactive hypermedia authoring (videogames).

The activity of Paragraphe laboratory has been devoted to hypertext, hypermedia and to increasingly targeted applications thereof. By reinforcing our research group's interdisciplinary dimension, we intend to increase the coherence of the new orientation, which pertains to a patchwork of models, methods, concepts, tools and formalisms.

Since 1983, we have put up an operational tool in the form of an interdisciplinary research laboratory, which is recognized nationally and internationally in the following fields:

- hypertext and hypermedia;
- interactive writing;
- IT usage and users;
- automated text production;
- reasoning, knowledge acquisition, organization and management;
- collaborative, social and dynamic semantic Web;

- ergonomics and processes of design and creation.

Our activity and achievements include:

- numerous national and international publications;
- several published books;
- the organization of international conferences;
- partnerships in national and international conferences;
- the supervision of a number of doctoral dissertations;
- the creation of several research prototypes (text generator on Internet; multilingual cartographic search engine; Hypermap: an environment for assisted indexing; Proxilex: fast approximate word search; HyWebMap: hypertext authoring; H-NILS: knowledge management; K-Web Organizer: collaborative Web search engine; Proospace: groupware for communities of practice; ICRS: collaborative information retrieval; SPECS: creation of educative content; etc.)

On the fringes of its activity, Paragraphe also initiated inter-university relationships on an international scale, with countries such as: Canada, The United States, China, Lebanon, Morocco, Tunisia, etc.

The integration of C.R.A.C. group « Compréhension, Raisonnement et Acquisition des Connaissances » (Comprehension, Reasoning and Knowledge Acquisition) reinforces our interest in the human factor and its cognition and ergonomics dimensions.

Our research objectives in the years to come are as follows:

1. To set up a reliable methodology for the evaluation of our tools and approaches, in various contexts: intelligence, information retrieval, the sociology of knowledge, humanities and art creation.

2. To take part in the creation of a social and semantic Web: an information retrieval system (IRS) on the Web can be a mere search engine, but could also be a more "intelligent" system, basing its search on related knowledge, as it is done in the Semantic Web. From a more social viewpoint, human intelligence can also be brought into play for the creation of a novel IRS. Metadata can be provided by users themselves and shared in a kind of "collective memory" to assist information retrieval. This line of investigation bears a considerable interest in terms of fundamental research (information theory, collective and distributed intelligence, collaborative work); its applications to the creation of an intelligent and social IRS is also, and more generally, relevant to the multimedia content industry. In this research perspective, using Pierre Lévy's IEML (Information Economy Meta Language) appears very promising.

3. To develop interactive and multimedia writing, especially interactive narrative and digital poetry; the phrase "interactive narrative" encompasses quite a lot of domains and practices: it is used in the contexts of the videogame industry, edutainment software, interactive cinema, literary hyper fictions. In all these fields, whatever form is taken by interactive narratives, authors must face similar difficulties: how to reconcile narration and interactivity, or rather,

how to make them happen simultaneously? Interactive narratives provide us the opportunity to investigate how a narrative adjusts to the constraints of digital media, and what solutions can be found to make sense on digital media. How is the narrative consequently mobilized in the framework of these tools? Can certain narrative techniques and strategies bring about solutions to render multimedia content legible?

4. To contribute implementing IT standards; the standardization of information is paradigmatic of IT convergence, but also of linguistic and cultural diversity preservation.

- Audiovisual standards (MPEG 4, 7 & 21 family), which raise normative R&D questions, but also questions of social (enriched interactive TV) and professional appropriation of the prospects these standards open up as social redistribution of activities.

- Standards for the encoding of written language (ISO-IEC JTC1 SC2 & Unicode): raising the question of a meta-culture of the document and writing systems; arising of a new visibility of compared script cultures (ideography, alphabet; diversity of script learning / knowledge).

- Standards for computerized terminology, or "terminotics" (ISO TC37), development of the Cartago project.

- E-learning standards, esp. with regard to educational resources (ISO-IEC JTC1 SC36).

5. To play a part in the development of tools to benefit handicapped people; our major project in this field is focused on "instrumental genesis" and the power to act of people with disabilities. It regards the usage and appropriation of the "Bibliothèque Numérique pour le Handicap" (Digital library for the impairment) and targets a scientific contribution to solving the problems of activity limitation and restricted social participation met by people with disabilities. Today, technology brings about a multiplicity of technical aids to compensate various sensory impairments; it opens new prospects, especially towards enforcing the legislation about equal rights and opportunities, participation and citizenship for handicapped people - 2005 Disability Act (Loi n°2005-102 du 11 février 2005).

6. To develop learning tutorials, within the framework of project ANR COEF (2007 – 2010). This is one of the focal directions of the laboratory. The project's application area involves basic skills education. More precisely, it aims at completing a comparative study of the influence of content effects on solving arithmetic problems, which are a basis for skill acquisition, and at applying the results to facilitate skill acquisition. From this perspective, the project offers novel prospects when it comes to education; it tries to show that an essential part of learning resides in the capacity to move from a spontaneous interpretation, constrained by the semantic dimension embodied in the problem's content, to an interpretation congruous with its formal structure. This research leads to modeling, construction of automated cognitive diagnoses, and the development of learning tutorials.

7. To pursue and extend our fundamental research in order to bypass the limitations of current information cartography algorithms (instability, partially arbitrary results, lack of reproducibility…)

8. To develop an approach of individual and collective human activity in natural situations of relationship to technology: use and usage, appropriation and instrumental genesis processes, design and creation.

These objectives represent for us a major stake for the advancement of research in information and communication

technology as well as for the future development of applications that make use of hypermedia technology. The next four-year plan will be taken advantage of to reinforce synergy.

Finally, we have noticed that many problems relating to information processing depend not only on computing but also on research in human and social sciences as well as information and communications sciences: technology use and usage in natural situations, individual and collective appropriation processes, design/utilization/creation dialectics, modeling of collective phenomena, vision, memory and representation mode, linguistics, ergonomics. We are therefore compelled to significantly develop our interdisciplinary stance.