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SEMANTIC WEB TECHNOLOGIES FOR DEVELOPING A COMMUNITY OF PRACTICE PORTAL

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Abstract. *In this paper I study the needful technologies, methods, and Web applications for developing a strong community of practice with Web support, providing facilities for the personal and professional development, as well as for a good internal and external communication. The semantic Web technologies provide a lot of support for developing a community of practice portal, where is essential to establish relations and communication bridges between the peoples and even between the institutions.*
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Introduction

The intellectual delight offered by a scientist is due to his personality, to his open spirit, but also to the ability of making various connections between different pieces of his knowledge, often surprisingly. The semantic Web applications aim to create dynamic connections between various pieces of information, by using ontologies, agents, Web services, or social Web technologies. There exist a lot of projects which goal is to consolidate a certain type of community.

The problem which my paper want to address concern the study of needful technologies, methods, and Web applications for developing *a strong community of practice with Web support*, providing facilities for the personal and professional development, as well as for a good internal and external communication. The community of professors and students inside a university, the community of researchers inside a research center or inside a company, the community of artists, doctors or architects could be viewed as target groups of this article.

Web Application Modular Structure

A Web platform that provides support to a community of practice has to facilitate both the collaborative and individual work, for professional purposes as well as for private needs. Such Web platform could be constituted by the following modules:

- A module providing access to an artistic Web collection of music, movies, paintings, literature, the adding of each piece in collection being accompanied by different annotations. By thus, this module enables users to search and locate some artistic production matching with a certain subject. This module has an important role in the personal development: each person has own artistic interests helping to the extension of his conscience, by offering fruitful relax moments.
- A module providing access to the classified documentation - in text, audio, and video format - regarding the specialization domain. Each user could contribute at the development of this collection, by inserting new annotated references or documents, and by annotating the existing pieces. Also, there should be interesting to integrate some work instruments: dictionaries, glossaries, etc.
- In order to be reached an authentic communication between users, these have to know each other and to be aware of the common interests. So, in the *module for users management*, the initial personal profile (including profession

and specializations, interest domains, reading domains, hobbies) have to be enriched permanently, with each new annotated reading, personal scientific paper, research topic, attended or given course, individual or collective project, etc. By thus, the Web system could signal, to each user, all users having different kinds of affinities with him.

- A *Personal studio module* could provide the place for personal work of each user: the management of private documents, with a similar system of correlations, and the possibilities of integration or, at least, of communication with various software tools, according to the user specialization (text processing, electronic painting, software development, etc). Also, each user has to provide public or restricted access to some personal documents.
- A *Team work space module* could facilitate the creation and development of private work spaces for different teams: project teams, research groups, but also spontaneously constituted teams between users with common interests.
- A *Communication module* could be integrated in each individual or collective work space: e-mail, forums, chat, instant messenger, blogs. The interesting aspect of this module regards the possibility of dynamic establishing correspondences between mail/messages archives.
- An *Activities organizer module* could provide to each user or team the possibility of assigning tasks, establishing dead-lines, making announcements for all or certain users or user groups. Correspondences could be established, also, between similar activities.
- The *administration module* could be in charge with the user and modules management, but also with the community brand: the Web portal design, logo, slogans, netiquette, user support, etc.
- Also, using the results of the *Social Web* technology, the Web platform should provide the possibility of communicating between different on-line communities, also the possibility for a user to be a member of various communities, but to manage a single personal work area [3].

Fundamentals and related Works

My approach is grounded upon the following actual research directions:

1. *The theoretical aspects of developing communities of practice*

Experience has shown over and over that what makes for a successful community of practice has to do primarily with social, cultural, and organizational issues, and secondarily only with technological features. It is crucial to understand the kind of communities wanted to be supported and the kind of activities they engage in and relationships they develop [5, 8]:

- How well defined is the domain of knowledge?
- How tightly knit is the community?
- Are they likely to know each other? To have established reputations?
- What is the main goal of the community?
- How much common knowledge are they building?
- How much work are they doing together?
- Are interactions mainly discussions, such as expressing opinions?
- How important are documents, tools, and other artifacts?

The Web framework should be adaptive enough to give support or emphasize the certain aspects of the previously listed.

2. The perspective of one on-line community could be remarkable enlarged by appealing to the *social web* opportunities: “Suppose that while working on a solar energy project in California, you could use such a system to find an engineer in Shanghai whose experience is directly relevant to your project?”[1]

In traditional networking terms, what are being linked are devices or objects: phones, fax machines, computers, and documents. The term "social network" implies moving to the next level, where what are being linked are people and organizations [1]. So, that must be developed the organization profile, as well as the people's profile, in order to establish connections and collaborations. The better way to manage a profile and the connections with other profiles is through ontologies.

3. *Semantic Web technologies and projects*

The Semantic Web will enable machines to *comprehend* semantic documents and data, not human speech and writings." (Tim Berners-Lee). The main idea of the Web space second phase is that "anything can link to anything". The computers must become able to process the data by an intelligent manner. Very important for this purpose is the establishing of new models of knowledge representation.

Some aspects considered by the Semantic Web applications, which should be integrated in the Web platform [4, 10, 11, 13-15, 20, 21, 26, 27]:

- The links between resources have associated semantics, and to could be extended;
- The resources could be extended and classified by using conceptual specifications;
- At the programming level, exist entities able to intelligent process the information and to action, providing the users/computers with complex services
- Users are able to share information, whatever it's storing/representation manner.

4. *Web ontology* is a specification of a conceptualization of a knowledge domain. Ontology is a controlled vocabulary that describes objects and the relations between them in a formal way, and has a grammar for using the vocabulary terms to express something meaningful within a specified domain of interest. The vocabulary is used to make queries and assertions. Ontological commitments are agreements to use the vocabulary in a consistent way for knowledge sharing.

For developing the framework for a community of practice Web platform, there could be integrated and developed various ontology types [16-19, 22, 28]:

Upper-Level Ontologies - provides us with a vocabulary, from which can be find the bridge concepts between various shared vocabularies inside the platform. Two examples are Dublin Core [9] and VRA Core [25].

– The Dublin Core metadata standard [9] is a simple element set for describing a wide range of resource: the community members, the documents, the physical resources. The Web metadata might be used to infer semantic relationships.

– The VRA Core Categories Version 3.0 [25] consists of a single element set with which we can create records to describe works of visual culture as well as the images that document them. As Dublin Core, only one object or resource may be described within a single metadata set. The elements of VRA Core Categories could be used to annotate the visual resources collections about works and images, and to facilitate the sharing of information among them.

Scientific Classification provides a standard way to describe a domain. In order to effectively study plants and animals for example, all scientists need to use the same names. Taxonomy is a subject-based classification that arranges the terms in a controlled vocabulary into a hierarchy. The Web platform must provide the taxonomies for all the community interest domains.

Thesauri are controlled vocabularies of terms in a particular domain with hierarchical, associative and equivalence relations between terms. These thesauri sometimes contain definitions of the term included which might provide guidance for the definition of concepts. Example thesauri are MeSH1, Wordnet2, AAT and ULAN.

– The Art and Architecture Thesaurus (AAT) [6] was developed as a vehicle for indexing catalogs of art objects.

– The Union List of Artist Name (ULAN) [24] is a structured vocabulary which contains around 259,000 names and other information

about artists. Linked to each artist record are names, related artists, sources for the data, and notes.

– Data catalogs provide metadata and terminology about their data including lists of variables with definitions and the time period for the data collection. Furthermore, knowledge catalogs provide online tools for collaborators and practitioners to describe and share their practice, research methods, and data.

For developing and integrating various ontology types inside the platform, there could be used the existing ontology authoring tools [16]. For ontology specification there could be used the existing XML-based languages: OIL, RDFS, DAML+OIL, OWL.

5. *Information Retrieval Systems*: Semantic Web applications enriched the actual search possibilities, and there should be interesting to integrate some new retrieval techniques inside the community portal. There exist research projects especially on the information retrieval topic [7, 12, 23], but also there exist semantic Web projects providing retrieval systems [4, 10, 11, 13-15, 20, 21, 26, 27].

Conclusions and Further Work

The semantic Web technologies provide a lot of support for developing a community of practice portal, where is essential to establish relations and communication bridges between the peoples and even between the institutions. In the future, there shall be interesting to develop the ontologies and to implement the modules, maybe in the framework of an international project.

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