

Using personal ontologies as a context based user modeling tool for bridging Information Filtering (IF) and Personal Information Management (PIM) research

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This on-going research proposes a framework for representing profiles as a set of personal ontologies, based on results of three case studies where feasibility of ontological and contextual user modeling was analyzed. The cases illustrate links between Personal Information Management (PIM) and Information Filtering (IF).

1. Students using an IF system in the Public Health domain

In this case, students were asked to provide relevance feedback to health related documents suggested by an IF (Quiroga and Mostafa, 2002). The system ranked the documents based on a user profile, modeling the user in terms of topics of interest and user relevance feedback. Although the learning technique was successful, user satisfaction was reduced because of the lack of contextual data in the representation. Missing contextual elements were related to lifestyle, domain expertise, credibility and comprehensibility of information sources, as well as health status of friends and relatives. Personal ontologies are being tested as a way to represent IF user profiles (Quiroga, 2006).

2. A writer producing a book

This case reveals needs that transcend systems compartmentalized by service or by an aspect of a user being modeled. One way to understand the writer context – information interaction and needs - is to describe tasks in every stage of a book production: pre-production (e.g. searching in public and personal archives looking for possible team, collaborators, illustrators, indexers, proofreaders), production stage (e.g. searching newspapers, companies and personal archives, clippings; managing results from interviews, field trips; clearing copyright of texts or photographs) and post-production (e.g. promoting the book in websites, distributing fliers, participation in book fairs, signing books events). This has been the approach used to study metadata needed in the production of audiovisual media (Bailer & Schallauer, 2008). Based on this study, personal ontologies have been proposed as a way to partially represent data elements and relationship for the writer personal digital library and website (Quiroga, 2006).

3. Patients of diabetes in need of alerts, recommendations and social networking support

The goal is to prepare a conceptual design of a decision-support system (DSS) based on patient modeling that enhances the communication and relationship among health care providers (i.e. physicians and nurses) and patients with diabetes (Yip and Quiroga, 2009). In addition to data in the EMR, potential types of elements for patient profile are: 1) vital signs and physiological parameters; 2) quality of life (QOL) issues; and 3) social behavior. Vital signs and physiological parameters are measurements such as blood glucose level, blood pressure, and body weight that are collected periodically by patients themselves. QOL issues are qualitative indicators of how well patients are managing their disease, such as the amount of exercise that a patient is performing daily, or the amount of calories that a patient is consuming, lifestyle preferences of the patients (e.g. smoker, prefer alternative treatment) their personal goals, plans, strategies, success and impediments regarding their management of the disease. Social behavior includes browsing of health-related websites, social networking websites, and participation in patient support groups. Another potential area for patient profiling comes from the use of genetic screening for personalized medical treatments, drug therapies (Abrahms, 2009). Although the nucleus of the profile is the EMR the need for emotional affective and sentimental dimension is emerging as an element equally important.

The framework for representing profiles as a set of personal ontologies includes following elements: **a)** Cognitive, social and emotional user needs. **b)** Dynamism levels: ontologies will be created according to levels of dynamism of the specific data: level 1 for those profiles attributes that are permanent such as demographic factors. Level 2 will include semi-permanent attributes, such as current professions, projects and jobs. Inferences from the ontology will resemble stereotypes rules and triggers. Level 3 will include factors highly situational such as health developments and associated emotional states. **c)** In order to increase acceptability the notion of scrutability (Niu & Kay 2009) will be incorporated by attaching to each metadata of the ontology scheme, an identifier of privacy level indicating the user willingness and circumstances to share data elements. **d)** Roles and scenarios will be main factors to create a different ontology to model that particular aspect on an individual: a person as a mother, grandmother, caregiver, affected by a certain illness; each production stage of a writer work.

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