IN SEARCH OF A VISION: ONTOLOGICAL VIEW ON USER MODELLING CONFERENCES' SCOPE

Tatiana Gavrilova, Seppo Puuronen

Abstract: The paper continues the research of user modeling (UM) field on visionary level. It proposes possible views on meta-ontology of the user modelling field based on the results of a workshop and analysis of a call for papers. Ontology is meant to structure the state-of-the-art in the field and serve as a central reference point and as a basis to index systems, papers and learning media. The domain has the bias on ubiquitous UM. The paper presents more questions than answers. It is a bit provocative as it is intended stir a debate within UM community of researchers.

Keywords: Ontology Design, Knowledge, Educational Ontology, C Programming, Ontology Visualization.

Introduction

Starting research in the field of user modelling (UM) is a challenge. The area of the user modelling research is a rather young field and as all human-computer interaction study possesses a great deal of polysemanticism and heterogeneity. The terminology is full of contradictions, multiple meanings and not standardized yet. A lot of terms have several synonyms (e.g. decentralized/distributed, personalized/individualized, etc.) and some terms are rather fuzzy (e.g. generic user model). Every researcher creates his/her own vocabulary and ontology of the domain and tries to share it with others on the conferences and workshops.

Conferences help us to re-structure, to augment or to share our vision (if we have any). Young researchers mainly undervalue the broader overview and their works suffer from shallow bias. This paper presents a framework that may be helpful for students and young researchers to have a broader view on the field in their endeavours in the field. In addition, it details an approach to promoting integrity for the research community. Providing a mind map of two workshops in ubiquitous and decentralized user modelling (Workshop "Ubiquitus User modeling UBIQUM" within European Conference on Artificial Intelligence ECAI 2006, Riva del Garda, Italy, and International Workshop on Ubiquitous and Decentralized User Modeling UbiDeUM'2007 within the 11th International Conference on User Modeling UM 2007, Corfu, Greece) this paper may be essential for anyone concerned the scientific study in the field.

There exist a lot of approaches to UM but a common schema that would attempt to classify them all has not been proposed yet. Such lack of structure makes attempts to conduct novel research or implement known approaches in the area of UM quite a demanding task.

This is why we dared to propose a classification, an ontology of UM field [3, 5] that may lead towards a central reference point of UM field, in a similar way as ACM computing classification system acts as a general reference point (ACM CCS) [1]. The development of UM Meta Ontology (UMMO) was a part of wider research aimed at development of user model centered learning portal. UMMO is an attempt to externalize the current approaches, techniques, and tools [2,7,8].

In this paper we elaborate that step by proposing an ontological view on the papers and topics of above mentioned workshops. Such ontology helps to present in a visual structured form the current state of the art and may serve as a teaching tool or the basis for comparing papers and pieces of research in the specific area of UM.

Mind-mapping as Ontology Design

A mind map [4] is a diagram used to represent words, ideas, tasks or other items linked to and arranged radially around a central key word or idea. It is used to generate, visualize, structure and classify ideas, and as an aid in study, organization, problem solving, and decision making [9].

Well-structured mind map can work as a visual draft of domain ontology. The process of ontology development may be guided by a recipe [6] that can be shortly summarized down to the following steps:

- glossary development,
- concept laddering, and
- visual mapping (balance, harmony, clarity).

Ontological view on UBIQUM 2006

We tried to develop ontological structure of UBIQUM workshop. The programme included the following contributions:

1. "Efficient Text Summarization for Web Browsing On Mobile Devices" by Gaлl Dias and Bruno Conde
2. "Creating Ontology for User Modelling Research" by Tatiana Gavrilova, Peter Brusilovsky, Michael Yudelson and Seppo Puuronen
3. "Exchanging Personal Information" by Christian Wartena, Peter Fennema and Rogier Brussee
4. "Adaptation of Ubiquitous User-Models" Andreas Lorenz, Andreas Zimmermann
5. "User Modelling in a Distributed Multi-Modal Application" by Andreas Zimmermann, Andreas Lorenz
6. "Web Services and Semantic Web for Adaptive Systems" by Francesca Carmagnola, Federica Cena, Cristina Gena, Ilaria Torre
7. "Case-Based to Content-Based User Model Mediation" by Shlomo Berkovsky, Ariel Gorfinkel, Tsvi Kuflik and Larry Manevitz
8. "Ambient Audio Notification with Personalized Music" by Ralf Jung and Dominik Heckmann
9. "Ontology-Based User Modeling for Pedestrian Navigation Systems" by Panayotis Kikiras, Vassileios Tsetsos and Stathes Hadjiefthymiades
10. "Exploiting the Link Between Personal, Augmented Memories and Ubiquitous User Modeling" by Alexander Kroner and Dominik Heckmann and Michael Schneider
11. "An Agent-Based Approach Supporting Personal Ubiquitous Interaction" by Francesca Muci, Pawel Drozda, Giovanni Cozzolongo
12. "Towards Situated Public Displays as Multicast Systems" by Hans Jorg Muller and Antonio Kruger

displays one of many possible visions of the UBIQUM (“Ubiquitous User modeling UBIQUM” within European Conference on Artificial Intelligence ECAI 2006, Riva del Garda, Italy) workshop.

The most challenging was meta-level labels definition process and the problem of location as many papers may be attributed to several branches. Ontological engineering procedure is subjective but very rewarding. It shows

- the level of understanding of the problem or expertise,
- the research bias,
- the background, etc.

We suppose that any ontology is better than none. As any roadmap is helpful, but… Wrong roadmap is dangerous. The analysis of Fig. 1 may help to create some conclusions:

- The workshop programme was well balanced between "theory" and "applications".
- The branch "tools" was underrepresented may be because UBIQUM applications are very specific now and are not general enough for creating more or less universal tools.
- Small number of papers doesn't give any chance to create representative groups for more deep analysis.

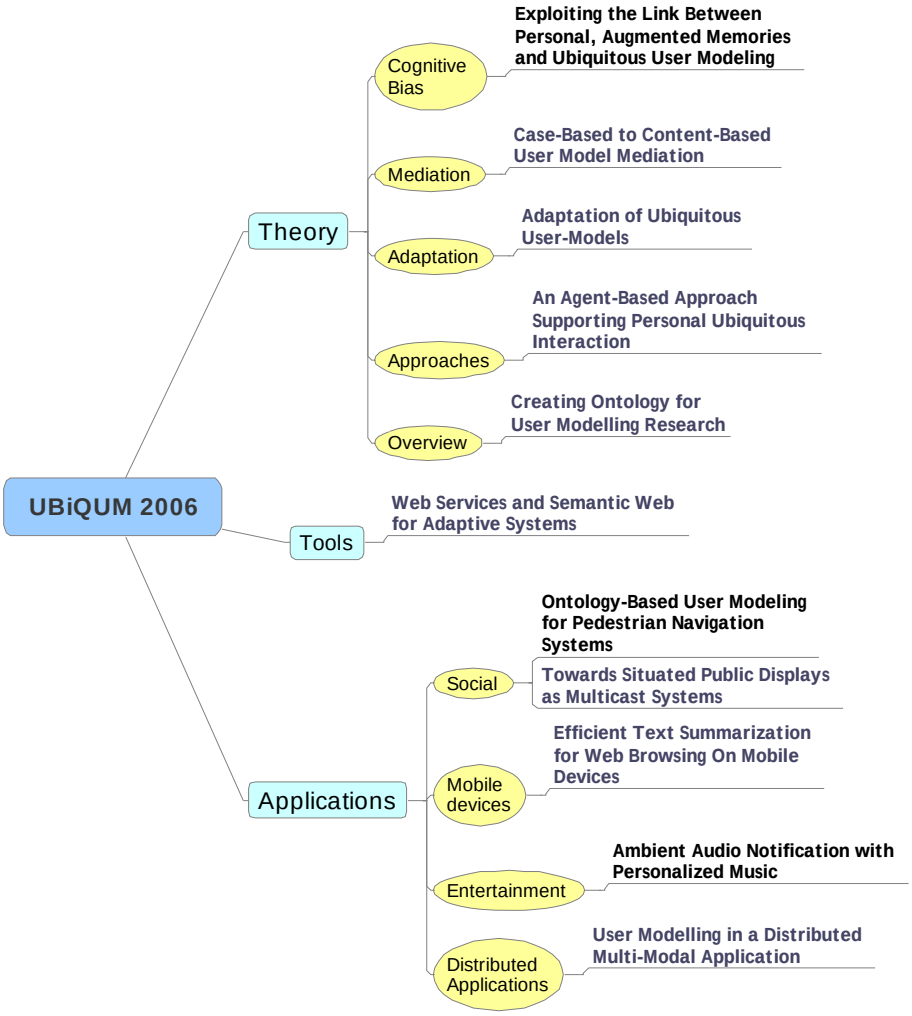

Fig. 1. Mind Map of the main topics of UBIQUM 2006 workshop

The authors will be very thankful to any other comments or interpretations of Fig.1. Alternative mind maps of the same workshop are very welcome!

It will be a challenging and exciting work of comparing this subjective view with other ones or analyzing several workshops on the same topic.

4 Analyzing UBIDEUM Call For Papers

Another research interest for us deals with very common work that is done rather often by any researcher – it is looking through call for papers. Normally this process pursuits several goals, e.g. answering the questions like

- Does this CfP match my interests?

- What is the level of the conference?
- Does the event deadline give any chance to write something substantial and relevant to the topic list?
- Is the time and place nice?

The four questions above may be answered after unconscious assessment and evaluation based on level of individual expertise in the domain. The task seems to be totally impossible for the newcomers and the beginners. We suppose that one of the way to facilitate this evaluation procedure may be the mind mapping of CfP. We tried to do it for UBIDEUM'2007. Next paragraph is borrowed from the CFP.

" Topics of interest include, but are not limited to:

- Generic user modelling in mobile and ubiquitous computing
- Context aware ubiquitous user modelling (in mobile and distributed environments
- Construction and acquisition of distributed user models –
- Semantic web approaches for user modeling (i.e. user model ontologies)
- Privacy, security and trust in decentralized user modelling
- Personalized and adaptive applications and interfaces in decentralized and ubiquitous environments
- Case studies, user experience and evaluation of ubiquitous and decentralized UM approaches
- Distributed architectures and interoperability of personalized applications like recommender systems, adaptive hypermedia, e-learning, adaptive navigation guides, personalized shopping guides, etc.
- Service-oriented architectures for decentralized and ubiquitous user modelling and adaptive systems
- Dynamic changes and their implications on the adaptive services in decentralized and ubiquitous environments
- Knowledge modelling, integration and management for personalization in constrained environments
- Reasoning methods in constrained environments
- Personalized content authoring, delivery and access in mobile environments
- Personalized multimedia applications
- Ubiquitous access to personalized applications
- Challenges for user personalization in mobile/distributed environments"

Creating a mind map representing ontology of the future workshop was even more sophisticated activity that designing of ontology on Fig.1. The level of synonym and excessiveness was higher. We have two assumptions on that. First, it is understandable as the purpose of CfP is to invite the wider scope of researchers - so as topics works as attractors they should cover all possible relevant domains that may bear different names.

But it is well known thesis that science begins of classification, and classification begins from the glossary creating. The Fig. 2 clearly shows that the glossary is under development yet. The second reason for heterogeneity is caused by collaborative character of work when collective decision is taken by disjunction not conjunction algorithm.

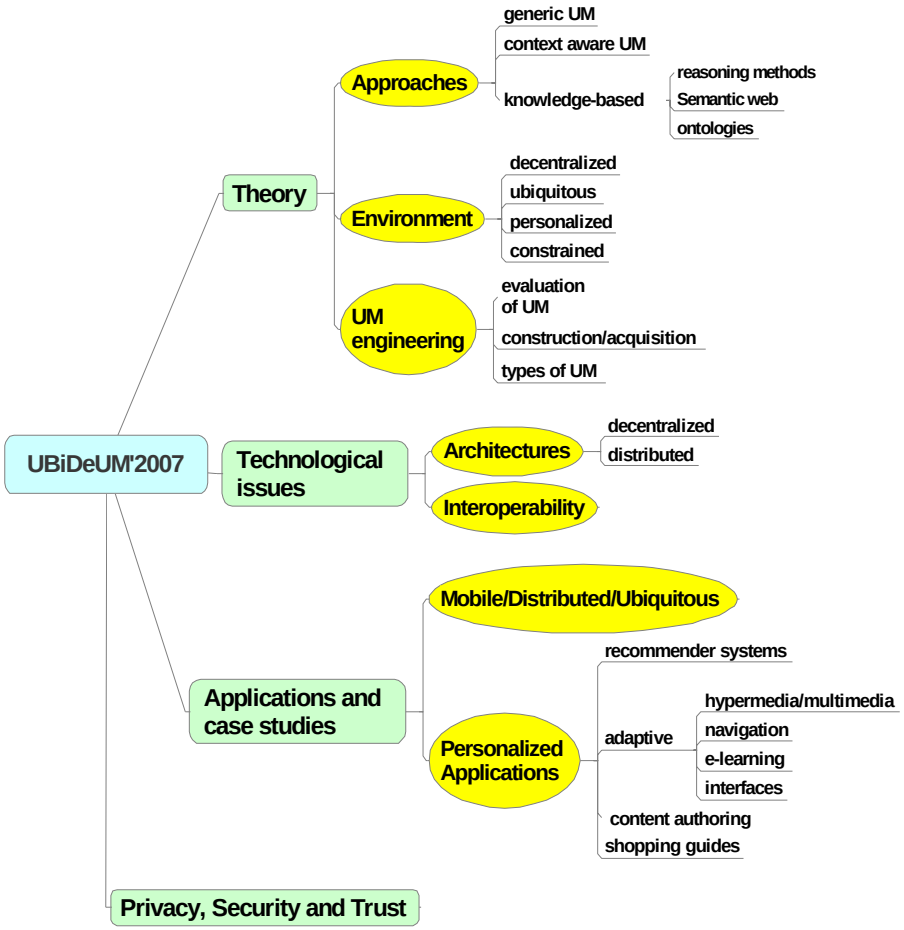

Fig.2 Mind map of UBIDEUM'2007 topics

There are a lot of other considerations born in the process of this mind map design and development. But the mot exciting will be the assessment done by the UBIDEUM'2007 participants. It will be interesting to create the same mind-map after the conference and to compare the "to be" mind map of CfP and "as is" mind map of accepted contributions.

The other step may be done in comparison of different mind-maps of CfP done by other participants.

Discussion

The quintessential issue of such upper-level ontology is not identification of the lower level concepts that correspond to the individual approaches, but the working out and verbalizing the meta-level concepts that would help generalizing the main concepts and paradigms of ubiquitous and decentralized UM methodology. The role of such map in any of research fields is manifold. First, such meta-ontology is an important uniform framework to structure this science field in general. Second, it can be used as a roadmap for the beginners and as a skeleton for teaching. Since the field is large and really ill-structured, upper-level ontology is useful as an indexing tool for the learning material.

And may be its main goal is knowledge sharing and understanding within the research community. The presented ontologies don't pretend to be ultimate they only put first stones into the foundation of mutual understanding on the research we are doing together.

The similar approach may be applied to KDS conferences, and working out of KDS' ontology may be done just on the site of the conference.

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Author information

Tatiana Gavrilova – Saint-Petersburg State Polytechnic University Intelligent Computer Technologies Dpt. 195251, Politechnicheskaya, 29, St. Petersburg, Russia + 7 (812) 550-40-73; e-mail: gavr@csa.ru

Seppo Puuronen – University of Jyväskylä, P.O. Box 35, FIN-40014, Jyväskylän yliopisto, Finland; e-mail: sepi@cs.jyu.fi