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CSCWD: New Applications and Challenges

J.UCS Special Issue

Marcos R. S. Borges
(Department of Computer Science, Universidade Federal do Rio de Janeiro, Brazil
mborges@dcc.ufrj.br)

José A. Pino
(Department of Computer Science, Universidad de Chile, Santiago, Chile
jpino@dcc.uchile.cl)

Weiming Shen
(Tongji University, Shanghai, China
wshen@ieee.org)

The Computer Supported Cooperative Work in Design (CSCWD) field started in the 1990's. Since the beginning, this has been a very active field of research closely related to applications. In recent years, it has been impacted by new technologies and vice versa, CSCWD has provided answers to new challenges. The technological innovations from CSCWD have thus significantly contributed to the work of multidisciplinary design teams. CSCWD communities have been actively involved in the dynamic research and practical developments from both academia and industry. In order to present the response to the new challenges that CSCWD communities are facing, we carefully selected fourteen manuscripts from 143 papers presented at the 14th International Conference on Computer Supported Cooperative Work in Design (CSCWD 2010), Shanghai, China, on April 14-16, 2010, to generate this J.UCS special issue. It is intended for researchers and practitioners interested in CSCWD applications and challenges. All selected papers have been revised by their authors, adjusted to the scope of this special issue and extended into the current versions. The final set of papers was further reduced to ten. The whole editing process was supported by three rigorous review rounds.

The first paper refers to support for a group of geographically distributed designers. The single-user application AutoCAD needs to be transformed transparently into groupware system to support real-time collaboration between geographically distributed designers by adopting fully replicated architecture. Traditional algorithms to maintain the consistency of the distributed replicas support only linear data model, and may lead to low algorithm efficiency and small operation types when adapted to the collaborative design field. Gao and Lu present a novel layered document model to abstract the document model of AutoCAD, and the AST algorithm is adapted according to the model to achieve transparent and real-time collaboration.

Goncalves, Souza and Gonzalez also refer to workgroups: they study current software developers' work practices, specifically the aspects of collaboration, infor-

mation seeking and communication. Their results are important to understand how developers collaborate, communicate with each other, manage the development process and search for information using new technology to create solutions and solve problems.

The third paper by Garcia, Vivacqua and Tavares discusses the crowd participation in Governmental decision making. Democratic governments constantly attempt to meet their citizens' requirements to make appropriate decisions reflecting the overall wishes and needs of the population. However, except for mandatory voting scenarios, a low rate of citizen participation in government decisions through democratic processes is an aspect that defies democracy itself. This paper introduces mParticipation, an agent-based model for eliciting and answering citizen demands in a participatory government structure using mobile technology.

Social networks, and in particular scientific social networks are investigated by Stroele, Silva, de Souza, Mello, Souza and Zimbrão to present an approach using data mining techniques in order to identify intra and inter organizational linkages amongst groups of people with similar profiles. Using clustering techniques, they identify groups of people in a way that allows them to evaluate how researchers collaborate in the Brazilian scientific scenario of Computer Science.

Trust, a fundamental issue in electronic commerce and in certain collaborative design activities, is the subject of the fifth paper. Wang, Love, King and Wang study the effects of information exchange channels in different communication modes on trust building in computer-mediated remote collaborative design. They describe trust building processes in computer-mediated collaborative remote design and demonstrate how the influences are exerted by a combination of communication modes and information exchange channels.

Chiang, Wu, Trappey and Trappey present their study on an intelligent system for automated binary knowledge document classification and content analysis. The motivation for the research is the need for effectively and efficiently identifying and managing technology specific patent documents. This work applies a back-propagation artificial neural network (BPANN), a hierarchical ontology technique, and a normalized term frequency (NTF) method to develop an intelligent system for binary knowledge document classification and content analysis. The intelligent system minimizes inappropriate patent document classification and reduces the effort required to search and screen patents for analysis.

Current recommender systems showing good results might be difficult to implement and may require a lot of computational resources to perform because of the possible huge amount of available data. Konow, Tan, Loyola, Pereira and Baloian describe a novel approach to recommender systems. They present a recommender system simpler than traditional ones. This system clusters users according to the frequency an item has been visited by users belonging to the same cluster, performing a collaborative filtering scheme. Results obtained are comparable to other approaches found in the literature which are more complex to implement. They also explain the application of this system to an e-content site scenario for advertising.

Pan, Tang and Li present their approach to Web services discovery in a pay-as-you-go fashion. In this paper, a framework based on dataspace techniques is proposed. In this framework, a loosely structured data model models is presented to describe

web services and the relationships among them, and then keyword-based query is supported on top of this model by using the existing dataspace query language. To support similarity-based service discovery, dataspace techniques are extended to declare the similarity among web services, and a discovery algorithm is presented. The paper also describes a lightweight way to add semantics to the query processing.

Tsai, Li and James present a methodology for improving the efficiency and generality of Genetic Algorithms (GA). The methodology provides the novel function of adaptive parameter adjustment during each evolution generation of GA. The important characteristics of the methodology are: (1) superior performance members in GA are preserved and inferior performance members are deteriorated to enhance search efficiency towards optimal solutions; (2) adaptive crossover and mutation management is applied in GA based on the transformation functions to explore wider spaces so as to improve search effectiveness and algorithm robustness. The research was successfully applied for a luggage design chain to generate optimal solutions.

Finally, Luo, Wu and Yang present an optimization of gateway deployment with load balancing and interference minimization in Wireless Mesh Networks (WMN). They propose a new gateway deployment approach that combines two heuristic algorithms, i.e., MSC-based location algorithm (MLA) and load-aware and interference-aware association algorithm (LIAA), to determine gateway positions and construct gateway rooted relay trees. Simulation results show that the proposed approach performs better on MR (mesh router)-GW (gateway) path, load balancing and interference minimization without deploying more gateways.

The Computer-Supported Cooperative Work in Design field is exciting with its many challenges and applications. Advanced computing technologies evolve CSCWD research and applications. The selected 10 papers reflect this dynamics. We hope that you find this selection as inspiring as we do, and that it encourages you to actively engage in research in this very interesting field.

Marcos R.S. Borges
José A. Pino
Weiming Shen
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