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David Riaño (Ed.)

Knowledge Management for Health Care Procedures

From Knowledge to Global Care

AIME 2007 Workshop K4CARE 2007

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Revised Selected Papers



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Preface

The incursion of information and communication technologies (ICT) in health care entails evident benefits at the levels of security and efficiency that improve not only the quality of life of the patients, but also the quality of the work of the health care professionals and the costs of national health care systems. Leaving research approaches aside, the analysis of ICT in health care shows an evolution from the initial interest in representing and storing health care data (i.e., electronic health care records) to the current interest of having remote access to electronic health care systems, as for example HL7 initiatives or telemedicine.

This sometimes imperceptible evolution can be interpreted as a new step of the progress path of health care informatics, whose next emerging milestone is the convergence of current solutions with formal methods for health care knowledge management.

In this sense, K4CARE is a European project aiming at contributing to this progress path. It is centered on the idea that health care knowledge represented in a formal way may favor the treatment of home care patients in modern societies. The project highlights several aspects that are considered relevant to the evolution of medical informatics: health care knowledge production, health care knowledge integration, update, and adaptation, and health care intelligent systems. These aspects were taken as topics of the workshop “From Knowledge to Global Health Care” that was organized as part of the 11th Conference on Artificial Intelligence in Medicine in 2007 (see LNAI 4594). The workshop was chaired by David Riaño and Fabio Campana, and it received 14 papers from which 10 were selected according to their relevance, quality, and originality. As it was previously accorded, workshop papers were not included in the conference proceedings or published elsewhere. As a result of this, David Riaño started the process of editing them in a separate book.

This volume contains extended versions of all the papers accepted in the workshop, plus two invited papers that contribute to providing a broader vision of the above-mentioned aspects that are relevant to the progress of medical informatics. The papers are structured in four sections: health care knowledge management, health care knowledge elicitation, health care knowledge transformation, and health care intelligent systems.

The first paper characterizes health care knowledge management (HCKM) as the systematic creation, modeling, sharing, operationalization and translation of health care knowledge to improve the quality of patient care. This paper serves both as an introduction to the important concepts in HCKM and also as an inspiring personal vision of what we can expect from HCKM for the near future. The second section, health care knowledge elicitation, is about ICT for either acquiring knowledge from human experts or learning from data. In this setting, four papers about the extraction of formal knowledge from textual health

care documents (i.e., text mining), from semi-structured Web Pages (i.e., Web mining), and from structured databases (i.e., data mining) are provided.

Health care knowledge may require one or several sorts of transformation before it is applicable at the point of care. Some of these transformations are the adaptation of general knowledge to a particular patient, situation or requirement, the integration of several areas of knowledge that are relevant to the current case, and knowledge update. Three papers are included in this volume, each one related to one of these health care knowledge transformations.

Health care intelligent systems as a middleware between the formal representation of health care knowledge and the real world are the final products of medical informatics. As far as the way these systems interact with formal health care knowledge, three approaches are observed: systems that exploit knowledge generated by others, systems in which ad hoc knowledge is an embedded component of the system, and systems that behave (or evolve) as some knowledge dictates. This volume includes one example of the first approach with a system that uses an intelligent agent to query the Cochrane Library to compile evidence on concrete clinical practices, and two examples of the second approach, the first one a multi-agent system that incorporates a Bayesian network in order to make decisions on the management of pediatric care in rural areas, and the second one a system that combines several expert systems and a data-base to operationalize the management of hypertension. A paper on the third approach is also included in which explicit procedural knowledge is used to guide a multi-agent system to provide support in the health care of patients at home.

I would like to thank everyone who contributed to the workshop “From Knowledge to Global Health Care”: the authors of the papers submitted, the invited authors, the members of the Program Committee, the members of the K4CARE project for additional reviews, and the European Union which is partially funding the K4CARE project under the 6th Framework Programme. I would also like to thank Andrey Girenko from EURICE for his help in making the first contact with Springer.

January 2008

David Riaño

Organization

The workshop “From Knowledge to Global Health Care” was organized by David Riaño from the Department of Computer Science and Mathematics, Rovira i Virgili University and by Fabio Campana from the Centro Assistenza Domiciliare (CAD RMB). The edition of this book was organized by David Riaño from the Department of Computer Science and Mathematics, Rovira i Virgili University.

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