COMPUTER-BASED MEDICAL GUIDELINES AND PROTOCOLS: A PRIMER AND CURRENT TRENDS

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Computer-based Medical Guidelines and Protocols: A Primer and Current Trends

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Preface

This book, "Computer-based Clinical Guidelines and Protocols: a Primer and Current Trends", is the result of the effort of the editors, started in 2006 with the organisation of an ECAI-2006 workshop at Riva del Garda titled "AI Techniques in Health Care: Evidence-based Guidelines and Protocols" and, subsequently, with the organisation of a workshop on "Computer-based Clinical Guidelines and Protocols (CCG'08)" at the Lorentz Centre of Leiden University at the beginning of 2008, to bring together researchers from the area of computer-based clinical guidelines and protocols with the aim of informing both researchers and others interested in clinical guidelines and protocols about the state of the art in this area. The ECAI-2006 workshop was a follow-up workshop from the "First European Workshop on Computerized Guidelines and Protocols" held in Leipzig, Germany in 2000 and the "Symposium on Computerized Guidelines and Protocols (CGP-2004)" held in Prague, Czech Republic in 2004.

With the current rise in the complexity and costs of health care, on the one hand, and increasing expectations of society about what health care is able to deliver, on the other hand, health-care professionals have developed a, sometimes urgent, need for care-practice support. Clinical guidelines and protocols have become the main instruments for disseminating best practices in health care. A clinical guideline gives general, usually nation wide, recommendations and instructions to assist the medical professional and the patient in decision making. In this book protocols are defined as local, specialised versions of guidelines, obtained in most cased by summarising information extracted from a guideline and by adding more detail, for example with regard to actual drugs or doses of drugs to be prescribed. As the detailed information may vary from hospital to hospital, the clinical protocols will reflect these differences between health care organisations.

Clinical guidelines and protocols promote safe practices, reduce inter-clinician practice variations and support decision-making in patient care while constraining the costs of care. In many cases, clinical guidelines and protocols have been useful in improving the quality and consistency of health care, by supporting health-care quality assessment and assurance, clinical decision making, work-flow and resource management. The benefits of having access to clinical guidelines and protocols are widely recognised, yet the guideline development process is time- and resource-consuming. In addition, the size and complexity of guidelines remains a major hurdle for effectively using them in clinical practice. Despite this, the number of clinical guidelines being developed and revised by professional health-care organisation has been rising steadily.

At the time when this preface was written, clinical guidelines were still textual documents, available in the form of booklets; it is only recent that these booklets have also become available in electronic form on the guideline-developers' world-wide web sites. Thus, present-day guidelines are still far removed from being 'computer-based'. With the now almost ubiquitous presence of information technology in modern society it is likely that this will change, and that clinical guidelines will become computer-based in the very near future. This development was already foreseen by a small number of researchers, who started doing research in computer-based guidelines more than a decade ago.

It has taken a relatively long period of time in comparison to other areas, such as banking, before computers were accepted as valuable tools by medical doctors and nurses for the clinical management of disease of patients. Many countries are now on the brink of the wide-scale introduction of electronic patient records, which implies that, after many centuries, paper will no longer be used to store patient information and that computers will even become more important than they already are in health care. In this context, it seems even more likely that clinical guidelines will become computer-based, i.e., computer interpretable and executable. However, in order to make this happen, there is still a large gap between the current practice of guidelines development, on the one hand, and computer-based guidelines, on the other hand, that needs to be bridged. This issue is addressed by some of the chapters in this book.

Many researchers expect that the computer-based development, use and dissemination of guidelines will have a positive effect on the time required for the development of new guidelines and protocols, for the revision of existing ones, for deployment in daily care and dissemination. Furthermore, computer-based methods are indispensable for ensuring that guidelines are in agreement with the latest requirement for guideline development.

This book brings together results from different branches of computer science (in particular, artificial intelligence), medical informatics and medicine to examine cutting-edge approaches to computer-based guideline modelling, verification and interpretation. Different methods have been developed to support the development, deployment, maintenance and use of evidence-based guidelines, using techniques from artificial intelligence, software engineering, medical informatics and formal methods. Such methods employ different representation formalisms and computational techniques. As the guideline-related research spans a wide range of research communities, a comprehensive integration of the results of these communities was lacking. It is the intention of the publication of this book to fill this gap. It is the first book of its kind that partially has the nature of a textbook.

The book consists of two parts. The first part consists of 9 chapters which together offer a comprehensive overview of the most important medical and computer-science aspects of clinical guidelines and protocols. Not only are these chapters meant as a review of the state of the art, since, in addition, these chapters indicate cross links between topics and directions for future research. All chapters were written by authors with extensive expertise in the covered areas. Topics covered are: guideline development and deployment in medical practice, guideline representation languages, guideline modelling methods, use of formal methods in guideline development, temporal aspects of guidelines, planning, guideline adaptation, visualisation of guidelines and guideline compliance.

The second part of the book consists of chapters that are extended versions of selected papers that were originally submitted to the ECAI-2006 workshop mentioned at the beginning of this preface. These chapters will provide the reader detailed information about actual research in the area by leading researchers.

Chapters in both parts of the book have been extensively reviewed and profited from the feedback received in the writing process.

Thanks should go to the people–unfortunately too many to explicitly mention here–who helped in reviewing the various chapters included in the book and who provided very useful feedback to the authors. Finally, we are grateful to the Lorentz Centre at Leiden University for the facilities they offered in the process of completing the book, without which it would not have been possible to achieve the level of quality we were able to reach.

The Editors, 14th March, 2008,

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