Sharing guidelines knowledge: can the dream come true?

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Abstract and Objective

The panel aims to raise awareness of the challenges involved in sharing executable clinical knowledge in general, and guideline knowledge in particular. The panel will include renowned speakers who will address issues related to sharing of executable medical knowledge: (1) life-cycle approach for creating, publishing and maintaining sharable knowledge-based services for supporting patient care; (2) methodology for distilling the sharable knowledge from encoded knowledge that is tied to a particular institutions and systems; (3) practical methods to weave medical knowledge services into an application and to map clinical abstractions into institutional electronic health records (EHRs); and (4) incentives and business models for creating a knowledge-sharing community.

Keywords

Clinical guidelines, executable knowledge, knowledge sharing.

Panel description

Medical knowledge is traditionally shared using natural language and other media, which were created for human communication and understanding. The focus of the panel is on what we need to do to share knowledge in a form which computers can interpret, and which can be used in practical clinical tasks such as decision support and care planning. Among the potential benefits of a machine interpretable *and sharable* format are: the possibility of standardized platforms for deploying scalable knowledge based services; ensuring services are mutually compatible and interoperable and free of institution-specific details; developing content and service components which can be reused; automated cross-verification for assuring quality and safety, and establishing communities of practice who share, maintain, update, and improve content analogous to the publicly minded communities of programmers who develop and maintain open source software.

Much has been learned about formalisms which are needed for encoding knowledge and building useful clinical applications. Enough is now known that the primary focus should now change to address the practical challenges of developing re-positories of content which are sufficiently convincing to attract the support of publicly-minded contributors and the attention of the organizations who determine take-up of medical innovations in the real world. The latter include medical IT and publishing companies as well as healthcare service provider organizations.

Unfortunately, as we know from the open source software experience, the notion of publicly shared intellectual property is to a considerable degree opposed to the objectives of commercial organizations whose assumption is that competitive advantage depends on exclusive ownership of IP. The vision of sharable medical knowledge is therefore likely to be achieved only if (a) we can establish an open knowledge community which can operate sustainably as an independent sector (e.g., by servicing a market to which commercial players are not attracted), or (b) develop business models in which publically shared knowledge can be licensed for commercial use (e.g., selling applications which add value to the open content).

Panel Objectives and topics

The goal of the panel is to raise awareness of the challenges involved in sharing executable clinical knowledge. The panel will address issues related to sharing of executable medical knowledge, including: (1) life-cycle approach for creating, publishing and maintaining sharable knowledge-based services for supporting patient care; (2) methodology for distilling the sharable knowledge from encoded knowledge that is tied to a particular institution and hospital information system; (3) practical methods to weave medical knowledge services into an application and to map their clinical abstractions into institutional EHRs; and (4) incentives and business models for creating a community that shares knowledge.

Strategies to engage the audience in discussion

To ensure participation by the audience each panellist contributed three provoking one-sentence statements related to his or her point of view on guideline sharing (e.g., "guideline sharing could be achieved within 10 years", or "Guideline formalization activities do not typically address implementation settings and requirements."). We will ask the audience to vote on whether they agree with the statements before the Discussion.

Panel organizer and participants

Panel organizer: Mor Peleg, PhD, Head of the Department of Management Information Systems at the University of Haifa, Israel. Mor has been one of the key developers of the GLIF3 guideline modeling language while working as a post-doctoral fellow at Stanford Medical Informatics. Her research targets guideline modeling languages, workflow adaptation, guideline versioning, guideline patterns, libraries of executable knowledge components, and local adaptation and integration with institutional systems. In 2005 she received the American Medical Informatics Association *New Investigator Award*.

Mor will discuss practical methods to weave medical knowledge services into applications, including semantic indexing and search of knowledge components [1]. She will also discuss ways of representing guidelines that contain non institution-specific knowledge and revising them during local adaptation. She will discuss how Knowledge-Data Ontology Mapper [2] could be used to implement the Gobal-as-View approach to database integration (in order to map clinical abstractions used in non-local clinical guidelines into institutional EHRs.

Panel participant: John Fox, PhD, Department of Engineering Science, University of Oxford Parks Road, UK. John has been working on theory and practice of medical decision making. In 1975 he joined Cancer Research UK. In 1996 his team was awarded the 20th Anniversary Gold Medal of the European Federation for Medical Informatics for the development of the PRO*forma* guideline modeling language. John has published widely in cognitive science, computing and medical informatics [3]. In 2007 he moved to Oxford to set up COSSAC- interdisciplinary research collaboration in cognitive science and systems engineering between Oxford University, Edinburgh University, and University College London.

John will discuss options for addressing open-source publishing of medical knowledge, drawing on lessons learned in the OpenClinical project. OpenClinical.org is an international organization promoting awareness and use of decision support and knowledge management technologies for patient care and clinical research. OpenClinical.net's mission is to demonstrate how to deliver these at the point of care. It is developing novel methods for publishing and disseminating computer-interpretable knowledge following the life-cycle approach for application development, and demonstrated their use in domains such as breast cancer.

Panel participant: Robert Greenes, MD, PhD, Ira A. Fulton Chair of the Department of Biomedical Informatics, Arizona State University, Phoenix, since 2007. For over 25 years, he directed the Decision Systems Group at Harvard University, where he was widely recognized for its work in data mining and knowledge discovery, knowledge management, decision support, natural language processing, and education. He authored over 250 publications in biomedical informatics [4]. In 2008 he received the American College of Medical Informatics Morris F. Collen Award for sustained contribution that has made a lasting impact on the field of biomedical informatics.

Bob will discuss the stages that clinical knowledge in guideline form must go through to be adaptable to practice: (1) deciding which steps in a guideline are implementable; (2) precisely defining the setting and timing, the eligibility and exclusion criteria, and the conditions, actions, and data elements needed; (3) identifying the implementation/workflow aspects; and (4) rendering the final output in a form that can be readily incorporated into a host system. Progression along these stages requires structured capture of the knowledge content, encoding, and recognition of the separation between the medical content (in stages 1 and 2) and the business/applications considerations that are addressed in stages 3 and 4. Bob will describe activities of the Morningside Initiative aimed at formalizing this process.

Panel participant: Sheizaf Rafaeli, PhD, Head of the Graduate School of Management and the Center for the Study of the Information Society, University of Haifa, Israel. He has held positions at the University of Michigan, the Hebrew University, Ohio Sate and Stanford. Sheizaf's interests are in computers as media, value of information and information sharing in online environments. He served as founder and co-editor of The Journal of Computer-Mediated Communication, and is involved in the Citizen's Advice Board and Shvoong Q&A online services. He received several awards for the construction of shared systems. In 1997 he published Network and Netplay, and MIT Press book on virtual communities.

Sheizaf will discuss challenges in the construction and sustenance of online shared repositories. He will survey and contrast social, technical, hierarchical and market-based models for motivating and maintaining the sharing of information and processing tools, and will suggest organizing principles that can account for success or failure. Potential arrangements may vary from normative sharing such as Benkler's Wealth of Networks to strict markets like Innocentive's, from the "Wikinomics" of Wikipedia, through the status and reputation economy in Slashdot and ITSharenet, and vary between looser recommender systems, and Anderson's "Freeconomics" to Q&A [5] markets like Google's Answers.

All participants have agreed to take part on the panel.

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