MIE 2008 Göteborg 26-28 May
eHealth beyond the horizon – get IT there
Poster abstract

Visualization of Patient Proximity in Medical Case-Based Reasoning Systems

Alexey TSYMBAL [a,1], Dime VITANOVSKI [a,b], Cristian MIRCEAN [a], and Martin HUBER [a]
[a] *Corporate Technology Div., Siemens AG, Erlangen, Germany*
[b] *University of Erlangen-Nuremberg, Germany*

Keywords: decision support, knowledge-based systems, data visualization

There is growing interest in the use of clinical decision support systems (DSS) to reduce medical errors and to increase health care quality and efficiency. One important DSS subclass is that of Case-Based Reasoning (CBR) systems – systems which have reasoning by similarity as the central element of decision support. CBR is a recognized and well established method for building medical systems. It is, however, commonly acknowledged that CBR has not yet become as successful in medicine as in some other application domains. A commonly reported reason for the relatively slow progress of the field is the lack of transparency and explanation in medical CBR. We believe that, one way to approach this problem is to better visualize the underlying inter-patient proximity, which is perhaps the core concept of any clinical CBR. We have evaluated a number of visualization techniques which, we believe, hold promise in being adopted in the clinical workflow. Here we present a comparative analysis and our implementation for three of these which we found suitable: relative neighbourhood graphs, treemaps, and combined correlation plots/ heatmaps. Besides, we present a novel graph-based patient visualization technique that effectively depicts clinical history and related treatment workflow for each patient.

Health-e-Child (www.health-e-child.org) is an EU-funded Framework Programme 6 project aimed at improving personalized healthcare in selected areas of paediatrics, especially focusing on integrating medical data across disciplines, modalities, and vertical levels such as molecular, organ, individual and population. The results presented here contribute to the development of decision support systems in the project and are based on preliminary results conducted using early samples of real-life patient data collected by participating clinicians.

Within Health-e-Child, one goal is to develop a prototype DSS *CaseReasoner*, based on similarity search, which will employ the considered visualization techniques. The basic idea is to provide a clinician with a flexible tool for such operations as data filtering and similarity search over the Grid, and also for the exploration of the resulting data sets. The poster presentation will be supplemented by a computer supported demonstration of CaseReasoner.

[1] Corresponding Author: Siemens AG, Günther-Scharowsky-Str. 1, 91058 Erlangen, Germany; E-mail: alexey.tsymbal@siemens.com