Visual Exploration of Landmarks and Trends In the Medical Informatics Literature

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Abstract. This study presents preliminary results from a visual study of a new dataset of forty years of citation data from publications of twelve journals in the medical informatics field covering the time period from 1964-2004. Highly cited and pivotal documents, areas of specialization within medical informatics, and emergence of research topics are visually mapped through a progressive knowledge domain visualization approach to detecting and visualizing trends and patterns in scientific literature.

INTRODUCTION

Medical Informatics has been described as having a "long and delayed adolescence" which continues to "find itself in search of self-definition" [1]. Previous studies using a literature based approach to reveal the structure of Medical Informatics have examined journal co-citation patterns [2] among a core journal set covering the Indexing period January 1993-July 1995. Our previous pilot study [3] of medical informatics applied an animated three-dimensional (3-D) visualization model to a limited dataset based on AMIA publications. Animated 3-D models vividly depicted the growth of the field, but they were cognitively demanding. New visualizations based on a greatly expanded dataset are now being developed using CiteSpace II [4], a Java application which combines information visualization methods, bibliometrics, and data mining algorithms in an interactive visualization tool for extraction of patterns in citation data.

METHODS

Two new datasets for analysis of Medical Informatics have been developed. The Institute for Scientific Information's (ISI) Journal Citation Reports list of medical informatics journals for 2003 was cross-referenced against a list of medical informatics journals from AMIA [5]. Twelve journals were selected and checked against the NCBI journals database for publication history, and the journals which were predecessors of some of the current journals were identified. A dataset of 11,952 citation records covering forty years from 1964-2004 was extracted from Web of Science and the closely equivalent time period and journals dataset of 13,369 records collected from PubMed.

RESULTS

Figure 1 presents an example of a time-zone view, in this case an overview of the pattern of the most highly cited authors by decade.

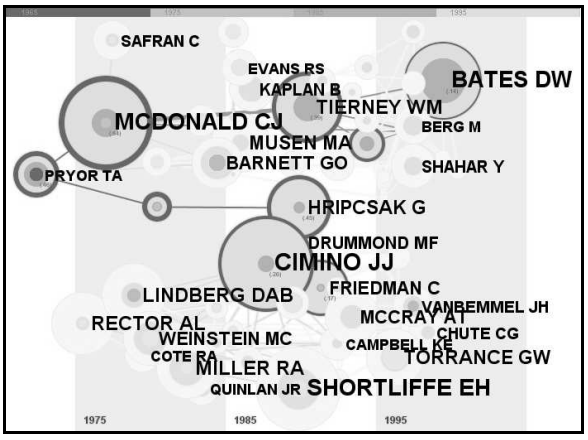

Figure 1. Highly cited authors, 1965-2004

Highly detailed images will be presented depicting areas of specialization, landmark documents and the evolution of themes that could be considered central to medical informatics research and practice over time.

References

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