

Knowledge Horizon Dynamics in Applied Computer Science

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Abstract

Mapping the ordered large dataset allows to study the structure and dynamics of knowledge in macro scale and discover the scholar trends and themes according social, economic and geopolitical issues. Visualization of science can also help to identify subdisciplines and research areas as well as their interrelationships within a particular field. Output information space must depict semantic correlations between measured objects which can be scientific publications and journals, patents, conference proceedings or different forms of web users activity.

We present the novel mapping method of classified documents derived from ACM Digital Library (Osinska & Bala 2008, 2010). Thus the dynamics of both computing literature categories and Computing Classification System were analyzed and the new, faceted classification system was proposed. We used nonlinear similarity measure of co-classes that allow to arrange their in output space – sphere surface (see Fig.1) and next project on a flat visualization layout. The sphere surface is chosen as a target information space because of its perfect ergonomic properties.

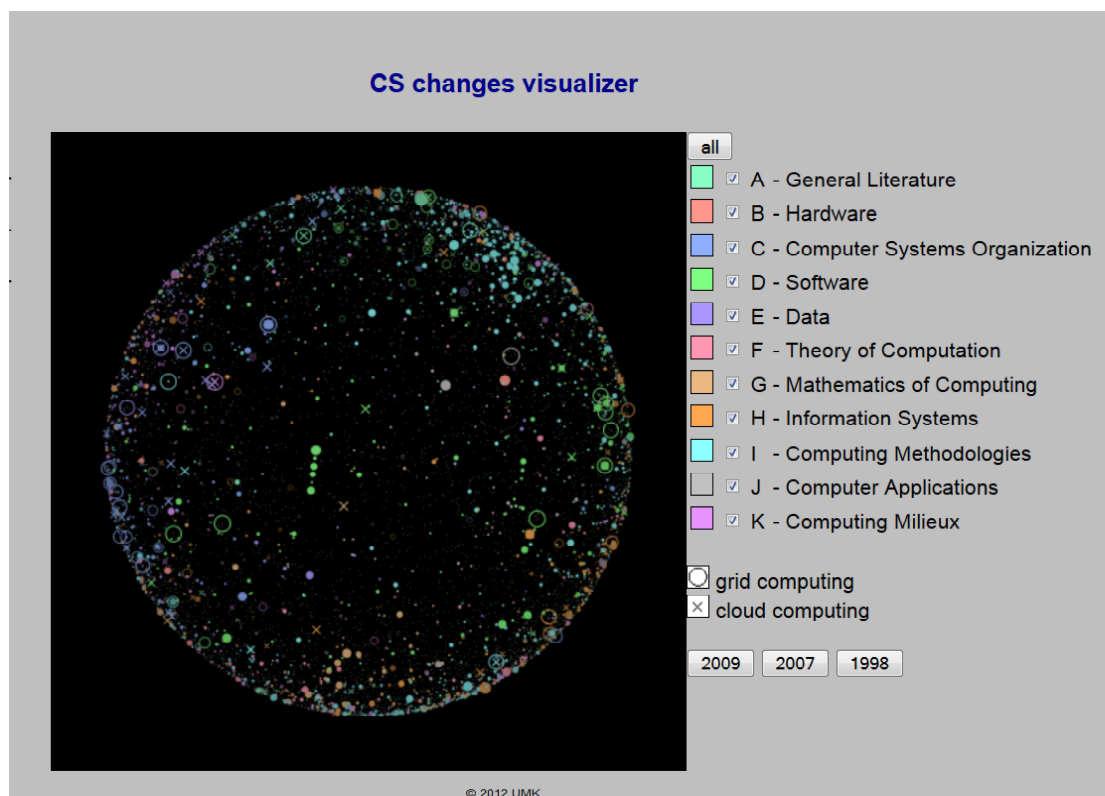


Fig. 1. Visualization of classification – spherical layout

If output visualization was enriched by feedback regarding the user it could be served as documents retrieval interface. For evaluation of visualization layout different groups of users were typed and surveyed. The results show that visualization maps might be used for methodological study of classification schemes as well as their dynamics. Furthermore the experiment provide the knowledge about key features of visual interface (dynamic) for exploration of diverse data. From another side visualization maps (static) are appropriate research material to analyze how human percept and interpret graphical pattern characterized by high complex structure.

If visualization of dataset (classification) is considered in time range, the series of output layouts show discreetly the dynamics of changes. To involve a user(s) into analysis process it is essential to apply the animated layers method (Chen, 2005). Another issue is to seek the topological continuity in time of visual landscapes generated by different methods. Topological coherency can point on a proper approach to discover dynamics of changes. Actually we work towards improving the visualization interface which can be useful in discovering a new semantic features on knowledge landscapes.

Keywords: visualization interface, Infoviz, mapping classification, memetics.

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