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Ontology Visualization Methods – A Survey

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Ontologies, as sets of concepts and their interrelations in a specific domain, have proven to be a useful tool in the areas of digital libraries, the semantic web and personalized information management. As a result, there is a growing need for effective ontology visualization for design, management and browsing. There exist several ontology visualization methods and also a number of techniques used in other contexts that could also be adapted for ontology representation. The purpose of this work is to present these techniques and categorize their characteristics and features in order to assist method selection and promote future research in the area of ontology visualization.

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1. INTRODUCTION

Recently, the continuing progress in network technologies and data storage has made possible the digitization and dissemination of huge amounts of documents, making it more and more difficult for the user to successfully search and retrieve information both in the Web and in a digital document collection, personal or otherwise. The need for more effective information retrieval has lead to the creation of the semantic web and personalized information management notions, areas of study that take advantage of the semantic context of documents to facilitate their management. In many of the proposed solutions in this field, it is common to take advantage of an ontology. A term initially borrowed from philosophy, it is now used to denote a set of concepts and their interrelations in a specific domain. Consequently, the need for effective ontology visualization for design, management and browsing has arisen.

Visualization of ontologies is not an easy task. An ontology is something more than a hierarchy of concepts. It is enriched with role relations between concepts and each concept has various attributes related to it. Furthermore, each concept most probably has instances attached to it, which could range from one or two to thousands. Therefore, it is not simple to create a visualization that will display effectively all this information and will at the same time allow the user to perform easily various operations on the ontology.

In the field of ontology visualization, there are several works, mostly in 2D. Apart from these systems that propose visualizations especially tailored for ontologies, there is a number of other techniques, used in other contexts such as graph or file system visualization that could also be adapted to display ontologies.

The purpose of this work is to present these techniques and categorize their characteristics and features in relation with a set of requirements compiled for an ontology visualization tool. Such an overview of techniques may be useful for choosing an ontology visualization for a specific application, taking into account both

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