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3D INFORMATION VISUALISATION

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ABSTRACT

In a World Wide Web, there are so many search engines that provide a list of query result according to the user keyword. User has to read line by line to search for the information they want. Some of the search engine result is confusing and unstructured. 3D information visualization allows a greater working volume for information presentation with focus, context and point of interest managed dynamically by the viewpoint. 3D graphics offer a greater level of flexibility for representing, organizing and presenting the information. With 3D information visualization, human experience in interacting and exploring within 3D environment is exploited. In this research the list of query result will be transformed into 3D information visualization to make easier for the user to find information from the web query. In order to test the effectiveness of the approach, an experiment was done to find out how fast the user get the information they want in 3D information visualization. The result showed an acceptable performance where in 3D information visualization, users working performance is increased.

Keywords: *information visualization, abstract data, 3D environment*

INTRODUCTION

Information visualization is the use of computer-supported, interactive, visual representations of abstract data to amplify cognition. Cognition is the acquisition or use of knowledge. Information visualization is useful to the extent that it increases our ability to perform cognitive activities. Scientific visualization is visualization applied to scientific data, and information visualization is visualization applied to abstract data.

Information visualization is about utilizing interactive graphics to represent information and support interactions. The problem that we always experience is not in getting the information but more in finding it and sorting out the one useful information from hundred similar items. It can also allow the environment to store detailed search and allow zooming in or popping up details on demand [5]. Therefore, information visualization systems allow the user to explore the data universe at a more abstract level, harvesting looking items as they are found.

It is estimated that the World Wide Web contains over 350 million pages of data [3]. However, there is no widely accepted cataloguing mechanism, which makes it extremely difficult to locate information resources. A number of tools for searching the web known as search-engines have been implemented, all of which have been developed on an essentially ad hoc basis with respect to both indexing and query support, with a consequent lack of interface consistency and behavior [2].

This paper will review the system that has been developed to investigate the potential contribution of information visualization to interpret the results of the search engines queries. The results provided by search-engines in response to user queries have all the properties normally associated with complex data and should be suitable to the application of visualization techniques [6]. The remainder of this paper describes the materials and methods used in this research, then followed by results and a discussion of the performance of the system.

MATERIALS AND METHODS

3D information visualization system is a system that transforms the query result from the web to 3D information visualization environment. This system helps users to find information in abstract data in 3D environment. The system that has been developed needs to transform a list of web query result, which is provided by the search engine to 3D information visualization. This transformation is to represent the query result in a different way in order to find out whether this method is easier for the user to find the information. User can keep and save the query results after transforming them to 3D information visualization. User can also choose to add new data or to remove the data before transforming them to 3D information visualization.

In 3D information visualization, the main problems for users are those of; orienting themselves and moving in three dimensions, locating themselves within the data landscape, picking out patterns in the data and observing features of the data that might be obscured by the mass of data itself [1]. In designing the system, these factors are the main concern.

To transform the query results into 3D information visualization, Java and Virtual Reality Modeling Language (VRML) are used. VRML is the file format standard for 3D multimedia and shared virtual worlds on the Internet. VRML adds the next level of interaction, structured graphics, and extra dimensions to the online experience [7]. While Java is a Object Oriented Programming language for developing program that is easily usable and portable across different platform.

Figure 1 showed the illustration of query results after being transformed into 3D information visualization. There are three attributes, which are title, URL and relevance, which are of concern from the query result. The three attributes have been sorted before the transformation. After the transformation, there will be a number of 3D spheres on a three-axis that represents each of the query result. Users can click at the sphere, which will bring the user to the information they want. The 3D sphere, which represents the query result that is the most relevant to the user needs will look bigger than other spheres. The output of the system is a VRML file where users can view the 3D information visualization transformation. Users can walk and navigate through the 3D environment searching for the information needed.

Figure 1. The result of transformation the list of query results into 3D information visualization
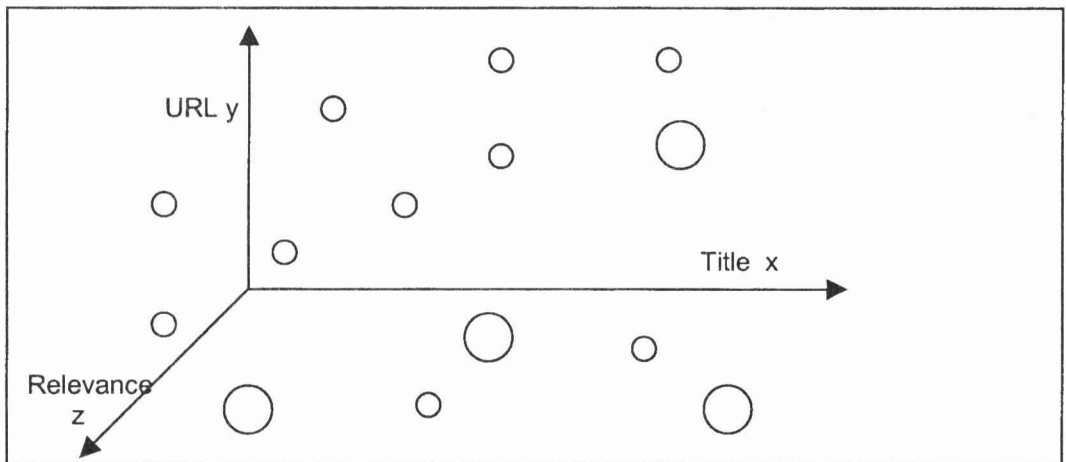
RESULTS AND DISCUSSION

The system has been tested on a small group of users. User working performance has been evaluated to compare to the usual presentation. When we look in usability criteria, the result shows that most of the users found it easier and faster to find the data in 3D information visualization. User can see the overall of the query result. By clicking on the sphere, user can get more detail information. The focus context approach creates an integrated view that shows a lot about some of the information (focus) amidst a little about much more (context) [5]. The result also shows that the user can easily navigate through the 3D environment and

it is a good way to view the data. The system also allows user to add and remove the data before transforming them to 3D information visualization.

There are some important qualities, which must be considered when designing visualization such as simple navigation with minimum disorientation, high information content, low visual complexity, well structured and approachable user interface [4]. This system almost has all these qualities. However, there are few weaknesses that can be improved. For further work, the system should add more features and functions to allow users to manipulate the way the data is viewed in 3D information visualization. The sphere, which represents the data, can be done in different colors and animation for different percentage of relevance to support more rapid and effective navigation, analysis and interaction.

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