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Visualisation Method for Effective Presentation of Hadith Commentary Using Cone Tree

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Abstract: Information Visualization (IV) techniques in the delivery of Hadith commentary aims to address the limited space and use of display screen and to offer a structured display to enhance users exploration. The objective of this study is to propose a Hadith commentary visualization method based on cone tree technique. design visualization process involves the development of a hierarchical structure of Hadith commentary nodes as a visual display. The technique is also complied with an interactive framework allows users to interact using an enlarged image, detail view of display and visualized information on request. The resulting application serves as a visualisation presentation to ensure information regarding Hadith commentary are accessible in a structured and efficient format.

Key words: Information visualization, interface design, Islamic education, presentation, development, address

INTRODUCTION

Information Visualization (IV) is an area that involves human and computer interaction using graphical representation of complex data to stimulate user's perception and cognition in a systematic and logical manner. The ultimate goal of a visualisation system is to produce insights into data, instead of to create an image that represent the data (Shneiderman and Catherine, 2010). Thus the system requires interface design that is adequately simple and intuitive to enhance users creativity and understanding yet flexible to allow users to explore the data.

The adoption of information visualisation has emerged in marketing and advertistment domains due to its inherent ability to represent complex data in understandable form and to attract users with fascinating presentation. Although, IV has a lot of potential in education domain, its use require careful thinking and considerations (Moere and Purchase, 2011). For example, the visual design of IV system in education domain particularly the treatment of visual elements are quite different from marketing, eventhough they both use a similar mapping algorithm to structure the hierarchical data.

To incorporate IV in education field, it involves a review on students requirement and assessment of its use using educative methods by iteratively creating and prototyping designs and engaging the design in public domain. In the field of Hadith learning, students are required to understand, memorise and repeat the lesson regarding narrative describing the words, actions or habits of the Islamic Prophet Muhammad under strict and regulated procedure. Hadith comprise crucial and fundamental concepts of Islam that assemble each individual Muslim's required knowledge. Innovative learning technique such as IV system may contribute to effective dissemination of such important knowledge that considers repetitive information display according to learner's needs (Abbas *et al*., 2016).

The study of Hadith commentary involves a careful commentation regarding the purpose and contents of a Hadith including the detail meaning of the Hadith. SThe commentation offers detail narration chains, clarified meaning of the Hadith based on scholarly interpretations and discussions on related contemporary issues pertaining to certain concepts mentioned in the Hadiths.

The current issues regarding visual display and access to information of systems related to Hadith include crowded information in a single display besides lack of organization and classification according to Hadith category (Ismail and Sembok, 2012). Furthermore, unstructured information leads to maximize use of display screen and eventually difficult to be assessed by users. Due to its pertinent importance to have sound knowledge of fundamental aspects of the religion to practice as a Muslim, this study attempts to provide visual presentation of the commentaries to the selected Hadith.

Hence, the study proposes the application of cone tree visualization technique to present Hadith commentary which optimise complex information presentation using structured display design.

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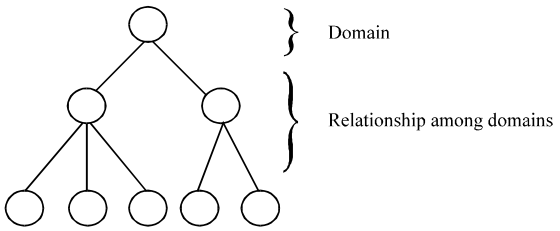

Fig. 1: Cone tree structure

Visualisation using cone tree technique: Information Visualization (IV) is a process to transfer and present data using illustrations and images that optimise the discovery and analysis of data through visual exploration (Plaisant *et al*., 2008). IV is a branch of Computer Science that is based on theory of information design, computer graphics, human and machine interaction and cognitive science (Spence, 2001). Accordingly, IV uses the concept of interactive, sensory and visual representation of information to improve user's cognitive ability. In the context of information technology, IV emphasises on the transformation of information delivery method which has been based on the text and documents to a visual and graphics form to enhance cognitive ability.

To visualise Hadith commentary, we consider the type of data regarding the subject, i.e., Hadith commentary to be hierarchical format due to various relationships between elements in the Hadith. Cone tree is chosen because of the need for a systematic information retrieval. Cone tree is a hierarchical structure arranged uniformly using a 3D design that resembles the shape of a funnel. Figure 1 shows an overview tree cones and are organized according to a hierarchy with cone top position reflects the roots followed by its children. Cone tree display is executed by clicking on a required node followed by rotation of that node and display of content in the selected node. The cone tree composition offers maximize use of available screen space in 3D display and allows access to the overall visual structure (Shneiderman *et al*., 2012).

Among manipulation techniques to be implemented in any information visualization applications proposed by Maletic *et al*. (2001) involve: full view to allow users to see the overall exposure of data, enlarged image that allow display manipulation according to its size, detailing serves as an information filter based on user needs, relationship orientation to describe the relationship between items or data, history that facilitates search through previous record and extract which allows users to track the essence of the item or data. Full view, enlarged image and detailing techniques were applied in the study due to their practical and useful interaction in exploring Hadith commentary.

To drive the development of an effective visualization system and in line with the objectives, Dulac *et al*. (2002) proposed a formal requirements specification. Four dimensional visualization system specifications detailed information, namely:

Content: The design study is based on the content outlined in the scope of Hadith commentary sciences with the main data source relating to slaughtering aspects in sacrifice ritual. Data source content refers to three Hadith of Sharh Sharh Bukhari, Kitab Sharh Sharh Muslim and Jurisprudence related to the topic; the selection is based on authenticity factor (Hayei, 2007).

Strategy: The technique selected is a tree hierarchy with the details requested. Data displayed in the form of graphics and navigation supported with the aim to improve the understanding and memory of users, especially students.

Supported annotations: This form of assistance aims to enhance understanding of selected visual using:

- Text as label, title and instructions
- Color and scale enlightenment
- Distance scale associated with the real world coordinates
- Symbol orientation as the arrow mark

Search strategy: Presentation of selected Hadith commentaries are based on static design, due to fixed Hadith. The benefit of static search strategy is its compatibility with unchanges data or information that allows for full control of the system.

MATERIALS AND METHODS

As presented in Fig. 2, the development steps of this study are summarized into four phases namely analysis, design, implementation and verification phase. The analysis phase involves analysing the sources of information domain, i.e., Hadith commentary, user requirements, application design and suitable IV technique. The design phase comprises designing activities related to interactivity, interface and application requirements to be used in the implementation and verification phase.

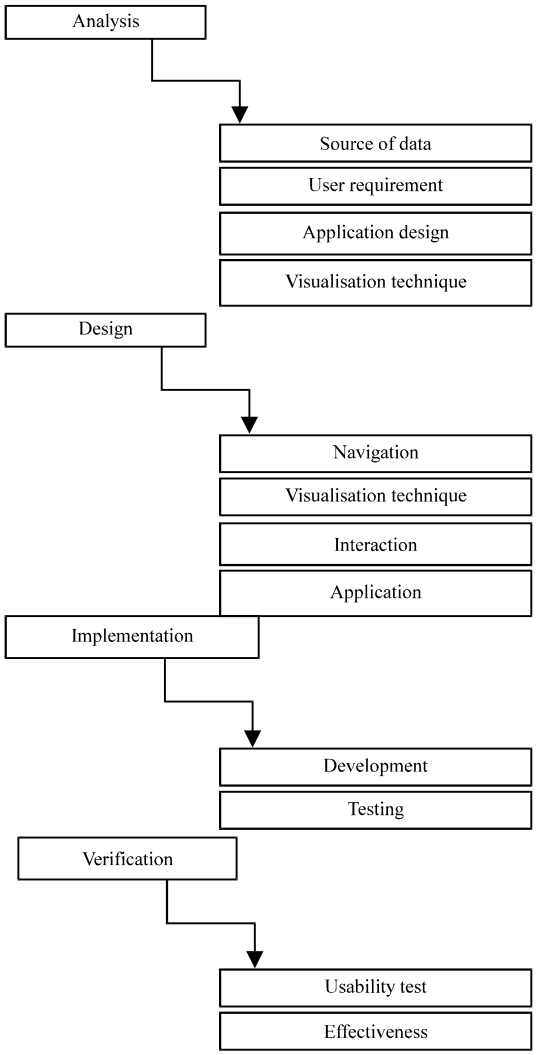

Fig. 2: Research phase

This study uses information visualisation process flow model as a reference in the prototype development process. This is to identify the process flow starting with the generation of data source to data presentation. Figure 3 shows the process flow to be categorised into three parts, i.e., data generation, visualization process and visualization analysis.

Data flow diagram for Hadith commentary is presented in Fig. 4 to explain the overall data flow in the IV application. Data transformation involves extracting data from the selected books into a structured arrangement. Abstract analytical involves applying node for visual display to be gathered in later stages of transformation and visual display as the final content of the application.

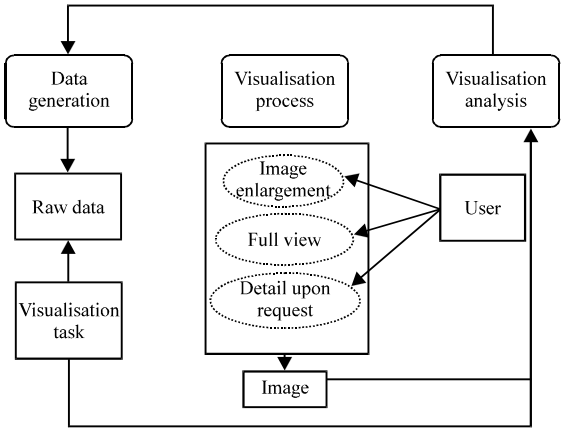

Fig. 3: Information visualisation process flow model

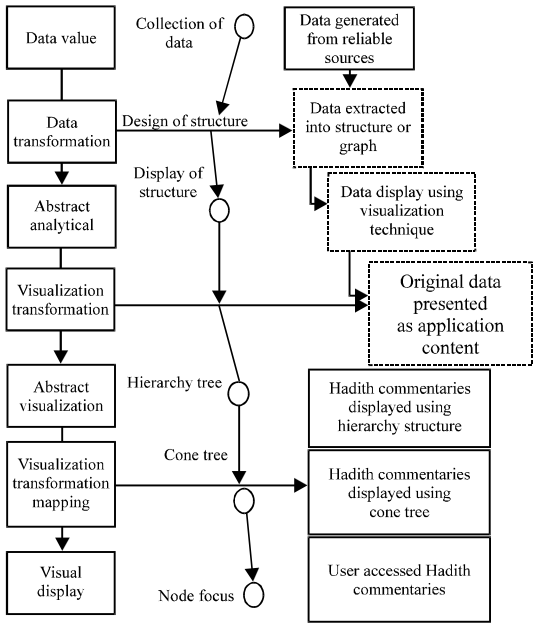

Fig. 4: Data flow of visualisation application

RESULTS AND DISCUSSUION

The objective of this study is to propose a Hadith commentary visualization method based on cone tree technique. The application model as presented in Fig. 5 highlights the navigation structure using cone tree technique as a hierarchical exploration structure defined by the logic flow of information.

As presented in Fig. 6, the IV process begins with a discrete step concerning acquisition and modeling of data up to visual encoder to generate interactive presentation display. Data table represents a structured data network such as graphs or trees to visually mapping the content. A model data has visual features such as

space layout, color, size and shape. This visual deployment process is responsible for transforming all the inputs into an appealing visual object. This view provides different perspectives on available data for example with panning support and image enlargement selection enables user to emphasise information in certain areas.

Color elements were used to systematically visualize important content as presented in Fig. 7. The color element of the node aims to describe the availability of sub structure in the hierarchy. Node sculpture acts as the main title in relation to its sub-category. The use of red color on the buttons to indicate that the page is active and the content display is being visualized. Consistently, the use of green color on the main subtitle button of the application (Fig. 8) aims to help users in making selection and click on direct links to the required information.

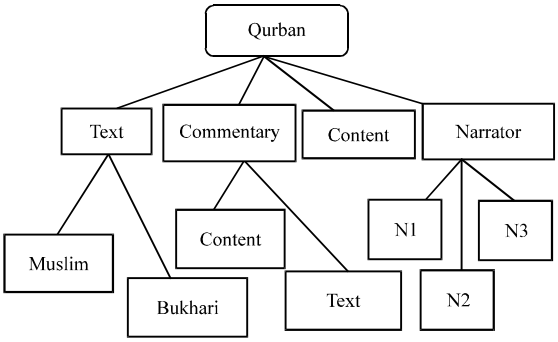

Fig. 5: Cone tree hierarchical structure for Hadith commentaries

These researches present important findings and conclusions regarding Hadith commentary visualization application based on cone tree technique. The results show that the use of several interaction manipulation techniques including full view, enlarged image and details upon request can be implemented in a cone tree hierarchical IV presentation to create a systematic and easy access to an organised and classified information regarding Hadith commentary.

This IV application aims to produce practical solution to address the limited space and use of display screen in presenting complex information and to offer a structured display to enhance users exploration (Nguyen and Huang, 2002; Robertson *et al*., 1991; Sastry *et al*., 2016). These features would enable user, especially, students in Hadith knowledge to manipulate the whole Hadith structure. The IV technique may illustrate the holistic organisation of selected Hadith presented as a mental model of Hadith practitioners and scholars (Fabil *et al*., 2011). The

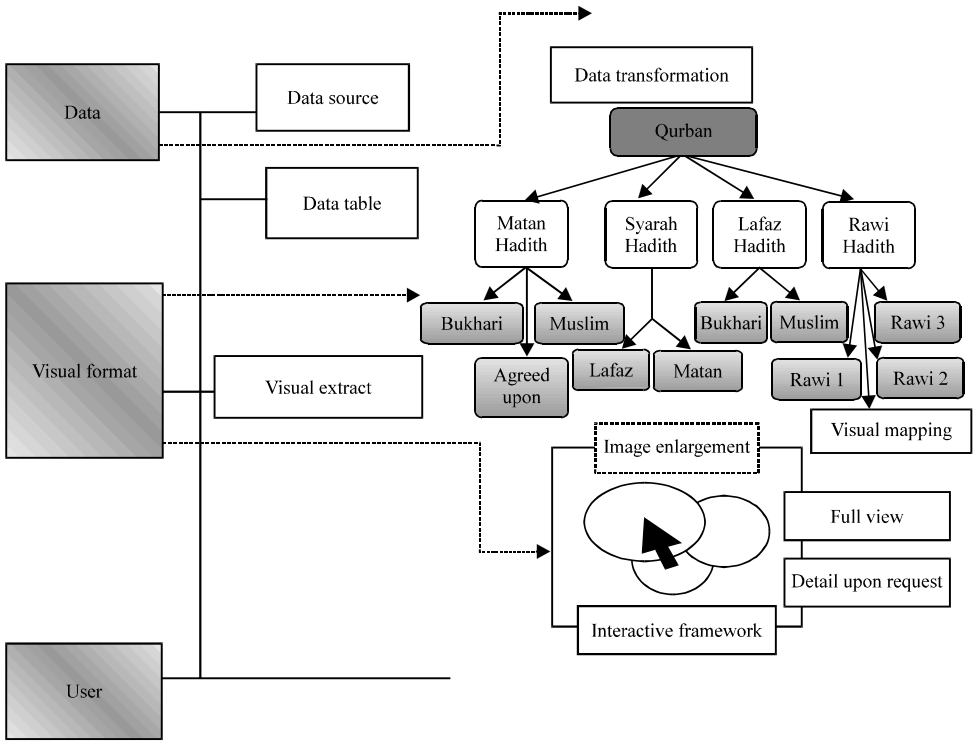

Fig. 6: Visualisation interaction model

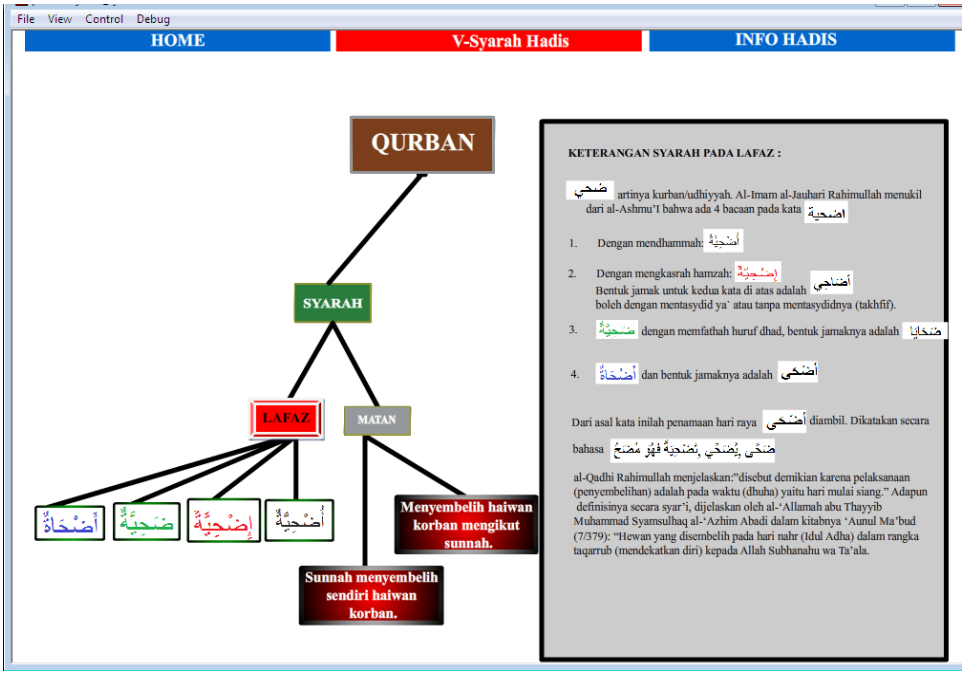

Fig. 7: Red color to emphasise selected content

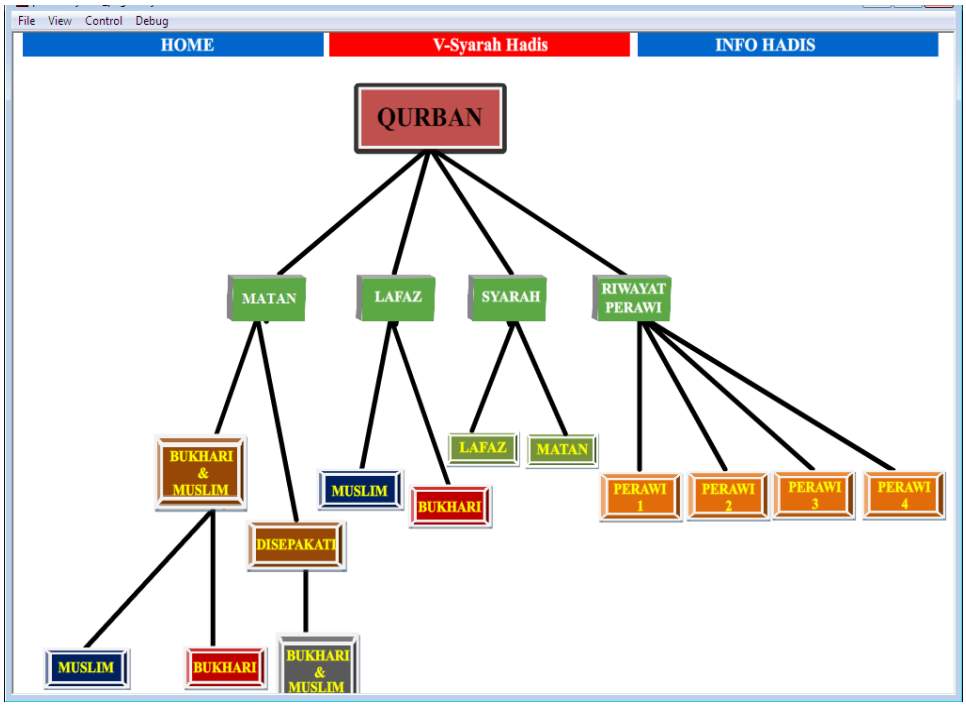

Fig. 8: Green color to emphasise sub-title options

technique also encourage users to exploit their mental capabiliity to imagine and build clear perception of information structure (Fabil and Ismail, 2005).

Besides, this IV application may serves as supportive teaching materials and platforms to enhance learning process using technology implementation (Nordin and

Hong, 2009). Diversified teaching methods including using visual graphic designs to deliver complex content considered to be among the most explicit, simple, concise and effective medium (Dewan, 2015).

CONCLUSION

The expansion of information technology has become a new challenge in delivering the Hadith knowledge. IV technique should be manipulated to present Hadith data optimally to enhance user interactions of the materials and exploration of the whole content structure. The selection of IV technique that corresponds to Hadith commentary proposes cone tree hierarchical configuration. Various manipulation techniques were applied to enhance user interaction including full view, image enlargement and detail upon request to support sensory and visual representation of information to improve user's cognitive ability.

RECOMMENDATIONS

More research in this field is needed to enhance content presentation and diversified technique in delivering Hadith commentary. Development in information technology should be a good opportunity for Muslim community to appreciate and deepen Islamic knowledge including the Hadith Science.

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