

Mind Map Based Semantic Web Browser for Tablets

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ABSTRACT

Semantic Web embeds “meaning” to data in order for users to retrieve information more effectively. The number of webs that have semantic tags is increasingly available in many domains. However, tools for using Semantic Web nowadays are still difficult to use and require understanding of semantic tags. This research aims to provide a tool to help students and children to have access to Semantic Web. As tablets start to become a standard platform for students and children to access the internet, Semantic Web browser on tablets is a logical development. To simplify a query, users compose the query using Mind Map metaphor. An interface based on touch can be implemented to compose a query diagram. This interface makes learning more fun and retrieving information more easily. It also encourages students to explore knowledge by themselves. Instructors can also present information more interestingly in form of relationships between topics.

Keywords

Linked Data, Mind Map, Semantic Web, tablet

1) INTRODUCTION

The Semantic Web is a new technology where there are mechanisms to link various components and combined them into a system. It is difficult to design a program to connect typical users especially children to the Semantic Web. Users require

understanding Semantic Web as a basis to use it effectively.

To make it easier to use the Semantic Web, the design of the user interface should be in the form of the diagram which reflects the structure of a Semantic Web. We consider many diagrams that typical people and children can understand it without technical knowledge or even little knowledge about computers. We believe that Mind Map is appropriate for this case due to ease of understanding. The format of Mind Map fits to the structure of meaning of Semantic Web. That is the main idea of this research.

2) BRIEF INTRODUCTION TO THE MIND MAP

Mind Map is a diagram that represents the connection of concepts, ideas, topics or thoughts. The Mind Map has been used in large scale, especially in academic. Mind Map starts with the main idea at the center of the diagram and the related ideas branch out like a tree. Each branch is further divided into several other related ideas. The important highlight of the Mind Map is that each branch can continue as long as there are new ideas related to the subdivision. Figure 1 shows an example of a Mind Map.

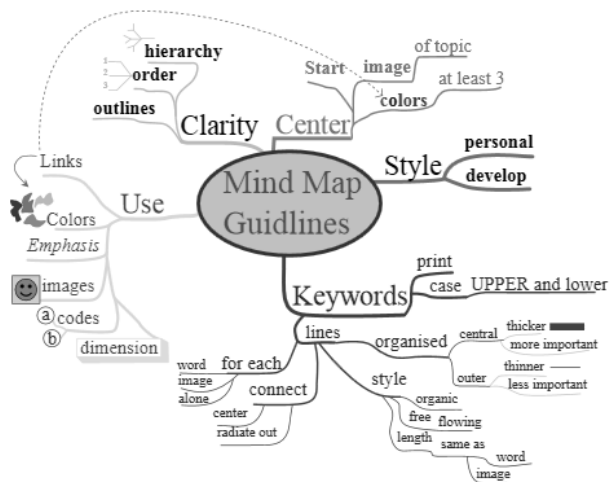


Figure 1: An example of a Mind Map¹

3) BRIEF INTRODUCTION TO THE SEMANTIC WEB

Semantic Web is a new technology based on current Web technologies and the Internet. Essentially, the Semantic Web is a set of protocols at different levels that work together to enable us to store the data structures on the Web in the form of the relationship. The relationship can connect between many systems via the Internet to form a virtual large distributed database. Simply speaking, if the World Wide Web is the web of traditional documents linked by hyperlink, Semantic Web is a web of data linked by semantic relationship which we call this as Linked Data.

This is some example to show advantages of Linked Data over the current Web. To finding information about proteins that affect the treatment of Alzheimer's disease. It has been studied around the world today. If you search using the regular search engine results might be greater than 200,000 documents from web sites around the world and we are unable to distinguish or discover them at all. However, in the Linked Data, the result may be a list of just merely 20 of proteins that affect the disease from the Semantic Web of the current researchers that share information. Figure 2 illustrates the layers of related

technologies integrated together as the Semantic Web.

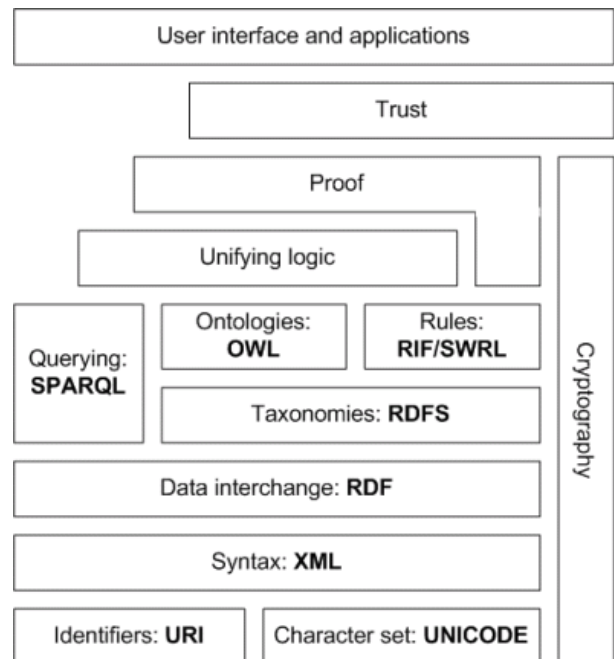


Figure 2: Layers of technologies that work together as the Semantic Web²

4) THE IDEA OF RETRIEVING THE DATA FROM THE SEMANTIC WEB IN THE FORM OF MIND MAP

To search data from the Linked Data using Mind Map metaphor, starting from creating a main concept with a keyword you want to search. For example, to search for information from Linked Data about the term 'Chula' will be shown in Figure 3.



Figure 3: Start creating main idea from keyword to find

The first node is the node 'Chula' then the program will find information from Linked Data about this main concept as shown in Figure 4.

¹ http://en.wikipedia.org/wiki/Mind_map

² http://en.wikipedia.org/wiki/Semantic_web



Figure 4: Another related ideas found from Semantic Web

When you double-click or double-tap on any of the sub topic, the program will search and display information in Linked Data associated with that sub topic. Figure 5 and Figure 6 shown when tap on the 'Chulalongkorn' and 'Chulalongkorn University', respectively.

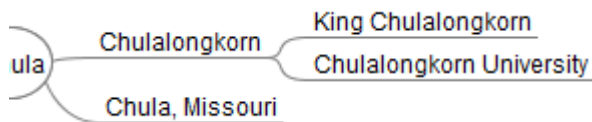


Figure 5: To expand the sub topic

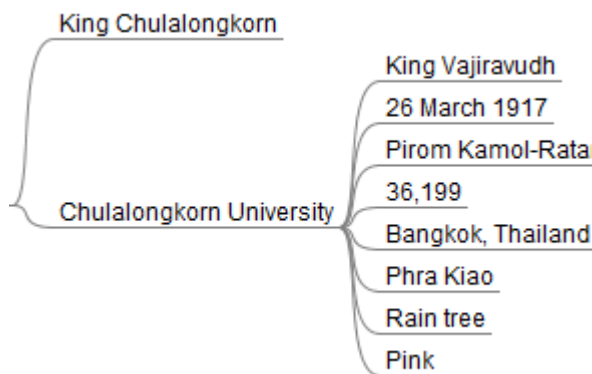


Figure 6: Expand another more sub topic

If you want to know the relation of the sub topic to the prior topic or want to know the type of data the sub topic, move the pointer over or directly tap the sub topic then program will show the relationship between the topic or the kind of such information. For example, in Figure 7, when tap on '26 March 1917' it shows that is the establishment of the university. In Figure 8, when tap at '36,199' it shows that is the total number of all student in the university.

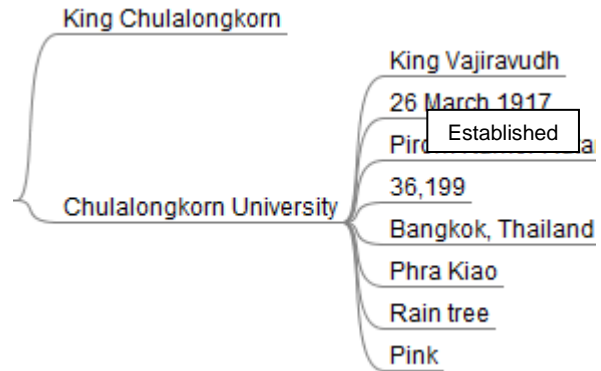


Figure 7: Shows the relationship of the sub topics

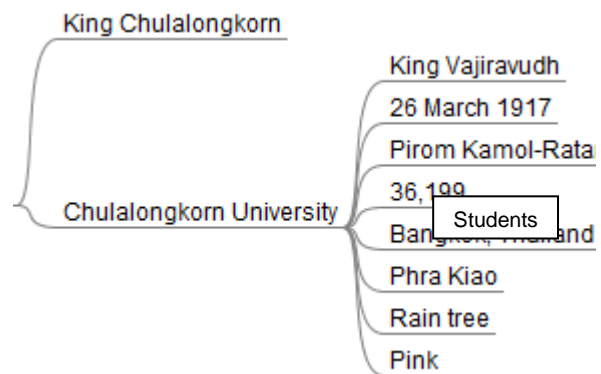


Figure 8: Shows the kind of sub topic data

To expand the sub topic, there may be some cases where the expanded topic has been previously displayed on the Mind Map. The program will display an arrow link and links back to the first topic appeared to reflect the relationship of the relevant information and avoid duplication and redundancy in the case that has caused the loop. For example, in Figure 9, the topic 'King Vajiravudh' is found to have a sub topic called 'King Chulalongkorn' which appears previously.

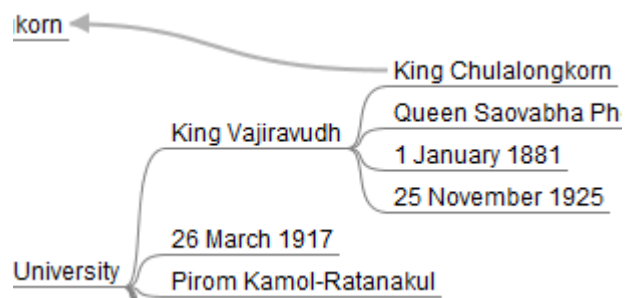


Figure 9: Show link in the topic that is previously displayed

5) EXAMPLE OF SEMANTIC WEB QUERY

Finding information from Linked Data to display on the Mind Map required multiple components of the Semantic Web. However, one of the most important parts is to create queries in SPARQL. We will not describe the details of SPARQL here but rather simply shows an example query to achieve results from 'Chulalongkorn University' sub topic expansion of the example in Figure 6.

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX : <http://dbpedia.org/resource/>
PREFIX dbpedia2: <http://dbpedia.org/property/>
PREFIX dbpedia: <http://dbpedia.org/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>
```

```
SELECT ?property ?hasValue
WHERE {
  <http://dbpedia.org/resource/Chulalongkorn_University>
  ?property ?hasValue
}
```

6) CONCLUSION

To facilitate naïve users to use Semantic Web, the query based on drawing Mind Map diagram is proposed. The relationships in Mind Map are naturally fit to the relationships in the Semantic Web. Hence, forming a query is easy and it has additional advantage that users do not require technical knowledge about database and need very little computing skill. This tool can increase the access to the knowledge on the web for ordinary people and young children.

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