

論 文 要 旨

Thesis Abstract

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※報告番号	甲 第 2 1 1 号	氏 名 (Name)	Sarunya Kanjanawattana
<p>主論文題名 (Title)</p> <p>A method of graph information extraction and retrieval for academic literatures by use of semantic relationships</p>			
<p>内容の要旨 (Abstract)</p> <p>Information retrieval is a fundamental technique for modern search engines. This technology is designed to advocate information discovery. Generally, the data used by this technology is text descriptions. However, images, especially graph images, typically contain much useful information. In academic literature, the graph images are very important to summarize and represent experimental results and statistical data. Therefore, a search engine system to discover the graph images and their information is definitely necessary for researchers to obtain precise and concise knowledge. However, to utilize both graphical and literal information, the problem of the semantic gap should be addressed. To do so, it is necessary to give meaning to the graphical information and link it to the linguistic information; thus, a proper solution is to use an ontology to bridge the gap. Regarding the necessity of my dissertation, the users necessitate employing the proposed system because it provides precise and concise information from relevant graphs with less ambiguity. This should advocate their studies and fulfill their academic inquiries. The main objectives of this research were to solve the problem of semantic gap by constructing an ontology-based search engine system as well as to design ontology and database schemes to support the search engine and OCR-error correction systems.</p> <p>In this dissertation, I proposed a novel ontology-based search engine system applied to the graph images and their descriptions. To obtain the graph information, I also introduced several systems: graph-type classification, graph components extraction and identification, OCR-error correction, and graph information extraction. After their processes were completed, much of knowledge have been acquired from the graphs. An ontology and a database were constructed to store the obtained knowledge for utilizing in the search engine systems. This system contributes several benefits and usefulnesses to society, particularly in academics. Researchers need accurate and reliable information to support their studies. This system can fulfill their requirements by providing the relevant graphs and concise information. The ontology also offers new knowledge; though, a relational</p>			

database cannot surpass this benefit. The main contribution is that the novel ontology-based search engine system applicable to the new design of ontology storing graph information. All systems had been tested and presented results, including new findings. The results showed that the performance of each system proposed in this dissertation was highly effective. The F-measure reached to 0.7, which was much higher than the traditional search engine system. It clarified that the ontology-based search engine system provides precise and concise information outperforming than the ES-based search engine system. To sum up, the objectives of each study have been achievable proven by their evaluations. In my future research, I intend to concentrate on improving the systems to cover the user's needs. I will increase a size of data and extend study domains. To improve the efficiency of the system, an answering question system will be an attractive function because the users can directly query some questions to the system and obtain accurate knowledge. This function may be developed by using a deep learning. Additionally, a keyword recommendation system will provide benefits to the users. This function will analyze the user behavior and suggest some possible keywords relating to a user intention. This will be great, if the system will be published on the Internet. Moreover, it should be assembled to other existing ontologies.

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