Preface

The WWW continues to grow at an amazing rate and is the largest and most widely known knowledge repository of hypertext objects in HTML format. Hypertext links refer to other documents by their Universal Resource Locator's. These can refer to local or remote resources accessible using different protocols. So far, various classical information retrieval, pattern recognition and data mining tools have been used to search for the required information/knowledge from the WWW. But the problems associated with abundance, redundancy, noisy information and the ever-growing data volume continuously pose research challenges in this research domain. This special issue focused on 'Computational Intelligence on the Internet' is an attempt to investigate some of the recent developments in the Web mining domain using modern computational intelligence tools.

In the first paper, Walker proposes a novel search engine, which could improve the precision and recall mechanisms of some of the popular search engines. The new search engine consists of four major components and uses a hierarchical communication topology which partitions the nodes of a distributed computing system into sub-clusters. The hierarchical communication topology makes use the social structure of honeybees to ensure efficient sharing of information.

Rungsawang and Angkawattanawitt in the second paper propose a novel Web crawler that could collect relevant Web pages and learn from experience. To improve the Web crawling experience, authors convert the information of previous crawling attempts into knowledge bases comprising of URL's, key words, etc. These knowledge bases are then used to build the experience of the learnable topic specific Web crawler.

In order to get useful information, it is desirable to review several search results. Though individual summaries are useful, it is also important to summarize the various viewpoints from several documents. In the third paper, Sunayama and Yachida present a novel approach that summarizes a document based on a user's viewpoint according to the user's search keywords.

In the fourth paper, Sinka and Corne address the importance of unsupervised learning and category similarity for document clustering. Authors formulated a benchmark dataset, which could be used for any Web intelligence research. The dataset was used to investigate how unsupervised clustering performance varies with the relative *distance* between the categories inherent in the data and how this is affected by the use of stemming and stop-lists. Some interesting research results are presented in this paper.

Discovering hidden and meaningful information about Web usage pattern is always very interesting as it is critical to determine effective marketing strategies, optimize Web

server usage and so on. Wang et al. in the fifth paper presents a concurrent neuro-fuzzy network model to discover hidden knowledge from the Web log data. Self-organizing maps were used to identify the data clusters and a fuzzy inference system is used to predict the number of visitors. Empirical results are very promising and such frameworks could be extended to other Web environments.

Due to increasing incidents of cyber attacks, building effective intrusion detection systems are essential for protecting critical information systems, and yet it remains an elusive goal and a great challenge. In the last paper, Mukkamala et al. address this important issue by using an ensemble of different soft computing and hard computing techniques. Authors show that an ensemble of neural networks, support vector machines and multivariate adaptive regression splines is superior to individual approaches for intrusion detection in terms of performance accuracy.

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Guest Editors

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