

# Guest Editorial Preface

## Special Issue on Information Retrieval-Part II

Muhammad Sarfraz, Department of Information Science, College of Life Sciences, Kuwait University, Kuwait & Sabah AlSalem University City, Shadadiya, Kuwait

Information retrieval (IR) is an active and important area of study and research today. It is the activity of obtaining resources relevant to an information need from a collection of information resources. IR is considered as the science of searching for information from a variety of information sources related to texts, images, sounds, or multimedia. Due to a high need of the time, it is desired to explore theoretical innovations and methods in the retrieval of information.

A compilation of latest advances in IR research may be a source revolutionizing for facilitating and enhancing the exchange of information among researchers involved in both the theoretical and practical aspects. This special issue theme was targeted to cover the techniques, algorithms, architectures and systems used for IR using intelligent and smart ways. A call for papers was set to disseminate where special considerations were given to the use of Cognitive Intelligence for IR. The coverage was including but not limited to the topics of advanced software development related information retrieval issues; classification; clustering approaches; content and context awareness and environment awareness; data mining; data visualization; filtering system; index techniques; information mining; information retrieval in cloud computing issues; information retrieval in education; information retrieval in healthcare; information retrieval in science, engineering, and technologies; information retrieval in social science, social behaviours; information retrieval with business, commerce, etc.; information retrieval with internet of things; knowledge mining; link analysis; machine learning on documents; message passing; metadata and xml retrieval; mobile computing related information retrieval issues; multimedia retrieval; performance measures; query languages and optimization; retrieval architecture; retrieval evaluation; retrieval languages and operations; retrieval strategies; retrieval systems; retrieval theories; retrieval with big data technologies; scalability; search algorithms; search engine; social media related information retrieval issues; taxonomy theory and applications; text mining; text, document, and image retrieval; and web mining.

This is Part II of the special issue of the International Journal of Cognitive Informatics and Natural Intelligence (IJCINI) contains five papers. Part I of this special issue, consisting of six papers, has already been published in IJCINI, Vol 14(4). The papers, in this Part II, cover a range of aspects including content-based image retrieval, satellite imagery noising with generative adversarial networks, applications in information retrieval process and associated challenges, arrhythmia classification using radial basis function network, and breast cancer segmentation and classification. Each of these papers has undergone full double blind peer review by at least three referees, prior to being selected for this special issue.

The first paper “A Visual Saliency Based Approach for Content-based Image Retrieval”, by Amir Khan and Anand Singh Jalal, is an opener for this special issue. During the past two decades an enormous amount of visual information is generated. As a result, Content-Based Image Retrieval (CBIR) has received considerable attention in the recent years. In CBIR, the image is used as a

query to find the most similar images. One of the biggest challenges in CBIR system is to fill up the “semantic gap,” which is the gap between low-level visual features and the high-level semantic concepts of an image. In this paper, the authors have proposed a saliency-based CBIR system which utilizes the semantic information of image and users search intention. First of all, they identify a significant region with the help of Structured Matrix Decomposition (SMD) method using high-level priors which highlight the prominent area of the image. After that, a 2DPCA is used as a feature, which is compact and effectively used for fast recognition. Experiment results are validated on different image dataset having an extensive collection of semantic classifications.

In the next paper “Satellite Imagery Noising with Generative Adversarial Networks”, Mohamed Akram Zaytar and Chaker El Amrani describe that using satellite imagery and remote sensing data for supervised and self-supervised learning problems can be quite challenging when parts of the underlying datasets are missing due to natural phenomena like clouds, fog, haze, mist, etc. Solving such a problem will improve remote sensing data augmentation. It will make use of it in a world where satellite imagery represents a great resource to exploit in any big data pipeline setup. In this Paper, the authors present a Generative Adversarial Network (GAN) model that can generate natural atmospheric noise. It will serve as a data augmentation pre-processing tool to produce input to supervised machine learning algorithms.

Information retrieval refers to identifying relevant information and to recover it through specific procedures. There are various information retrieval techniques which are used in numerous applications that deal with subjective intelligence. Such applications generate incite identified with various issues. For example, in technology domain, if the conceivably sudden size changes of the objectives as they approach the sensor are not taken care appropriately, the altered changes can present substantial issues in information affiliation and position estimation. Under such type of systems, the meaning of the objective state is the fundamental advancement for programmed comprehension of dynamic scenes. This is the reason of requirement of cognitive models for information retrieval. The existent models move around the connection between data list terms and records. Whatever it may be, the present retrieval prerequisites request fragile control to demonstrate the client inclinations and criticism. Sometimes, the possible outcomes are accentuated for information blast. This discussion is continued in the third paper “Applications of Cognitive Intelligence in Information Retrieval Process and Associated Challenges” by Mamata Rath, Joel Rodrigues and George Oreku. It examines and investigates the difficulties related with this new pattern of Information retrieval utilizing psychological insightful innovation in core sectors of technology.

The health care industry is a field where a substantial amount of data are collected using different clinical reports and patient manifestations. Most of the medical dataset are dispersed, widespread, and assorted. It is interesting to discover hidden patterns and valuable knowledge from a large dataset. Saumendra Kumar Mohapatra and Mihir Narayan Mohanty in “Arrhythmia Classification using Radial Basis Function Network with Selective Features from Empirical Mode Decomposition” have proposed a work that classifies four types of long duration arrhythmia electrocardiograms (ECG) using radial basis function network (RBFN). They have taken the data from Massachusetts institute of technology-Beth Israel hospital (MIT-BIH) arrhythmia database and features are extracted using empirical mode decomposition (EMD) technique. For most informative contents, the authors have evaluated average power (AP) and coefficient of dispersion (CD) from six intrinsic mode functions (IMFs) of EMD. Principal component analysis (PCA) is used for feature reduction for effective classification using RBFN. The performance of the technique is quite appealing as the classification accuracy is found to be 95.98%.

The final paper in this special issue of the IJCINI, by Ichrak Khouliqi and Najlae Idrissi, is “Split and Merge based breast cancer segmentation and classification”. They have described that breast cancer is the most frequent cancer in Morocco. It is the second leading cause of death for women all over the world. The effective way to diagnose and treat breast cancer is the early detection because it increases the success of treatment and the chances to survive. Digitized mammographic images is the

one of the frequently used diagnosis tools to detect and classify the breast cancer at the early stage. To improve the diagnosis accuracy, computer-aided diagnosis (CAD) systems are beneficial for detection. Such systems can help to reduce the rate among women with breast cancer. Generally, a CAD system consists of four stages: Pre-treatment, Segmentation, Features Extraction and Classification. This paper presents some work towards the development of a CAD system. It segments breast tumour (microcalcifications) on mammographic images and classify it. The work has been implemented by devising an algorithm. It provides good results using a technique of a vote.

The Guest Editor is grateful to the Administration of the International Journal of Cognitive Informatics and Natural Intelligence (IJCINI) to bring you this Part II of special issue. Their continuous assistance and cooperation was of highest level. Very special thanks go to the authors whose contributions will inspire the worldwide community from their valuable efforts. A volunteer dedication of the anonymous international referees was a humungous support to have this special issue. I hope that reading these high quality papers will support the Information Retrieval research community.

*Muhammad Sarfraz*  
*Guest Editor*  
*IJCINI*