

## Guest Editorial Preface

# Special Issue on Advanced Research in Internet of Things (IoT): Applications, Services, and Implementations

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We want to start this preface by a proverb that summarizes the subject of our special issue: “We need to get smarter about hardware and software innovation in order to get the most value from the emerging Internet of Things.” – Henry Samueli<sup>1</sup>.

In the last decade, Big Data and the Internet of Things (IoT) are becoming one of the main issues in the future of computer science. these two terms will be less and less dissociable because the Internet of Things will double the size of the digital universe every 2 years. The intersection of these two terms gives the name of the big data connectivity which represents the interconnection of objects, devices and sensors by internet (Faraway & Augustin, 2018). The evolution of this field is sweeping the frontiers between computers and everyday products since its applications touch virtually all areas: health, remote monitoring systems, agriculture, biology, digital arts, etc.

Since 2014, the number of connected objects is greater than the number of connected humans and it is expected that 50 billion objects will be connected in 2020. According to the American company Cisco, in 2019, the IoT generates 800 zettabytes of data. In 2013, it was only 3.12 zettabytes. If you burn that amount of data on DVDs, you would need 20 billion discs (Bouarara, Hamou & Rahmani, 2018).

To be able to use these huge mountains of data, data centers that record and analyze the data are needed - and of course the right Big Data algorithms. however, Big in Big Data does not only refer to the volume of data, but also to the speed with which it is generated, and to the different types of data (Faraway & Augustin, 2018).

This special issue of the international journal of information retrieval and research (IJIRR) addresses a variety of domains and concerns in big data connectivity, including the elaboration of new applications, services and architectures of IoT by touching all news sectors such as datamining, ontology, text mining and meta-heuristic algorithms, etc. Finally, we received 11 papers, and after evaluation by members of our editorial review board and we accepted 4 papers for publication organized as follows.

In the first article, the authors implemented a massively parallel version of the simulated annealing algorithm called PSA algorithm, in an asynchronous way where no information is exchanged among parallel runs. They have compared their results with another well-established scheduling HEFT heuristic and based on a randomly generated graphs show a much better performance of the PSA.

The second article talks about a new algorithm called ABCMap+ in order to map two ontologies expressed in OWL. The algorithm calculates the similarity between two entities of two ontologies

based on syntactic, linguistic and structural measures. The similarity values calculated by the linguistic, syntactic and structural measures are called “partial similarity values” between two entities, and they are stored in a similarity database (Vectors). The partial similarity values are calculated by standardized measures, so they are in the range of 0 to 1. These partial similarity values are then aggregated to achieve a single final similarity value between two entities, which is also between 0 and 1. By checking this final similarity value against a predefined threshold, two entities are considered similar (equivalent) or different.

The third article is a combination of workflow scheduling based on Clustering of data and dynamic data replication strategies has been introduced together. A Cloud simulator Cloudsim is used to evaluate the performance of the proposed algorithm. Simulation results show the effectiveness of the proposed algorithm in comparison with well-known algorithms such as random data placement and the Build Time algorithm.

The last article of this special issue is concerning a novel and prestigious neighbor-based similarity measure called Improved PageSim algorithm, which applies heterogeneous propagation of PageRank score based on the prestige measure of each webpage.

Finally, it is my hope that these contributions can help researchers interested in cloud computing, big data, social web, text mining, datamining, information retrieval and artificial intelligence. We hope that reading these high-quality papers will inspire different researchers, students and engineers to have a starting point for new ideas in the field of IoT.

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## ENDNOTES

<sup>1</sup> Henry Samuelli is an American businessman, engineer and philanthropist.