# Editorial Preface

# Special Issue on Advances in Cloud-Based Applications

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Cloud computing, the Internet of Things (IoT) and the enabler like Cloud of Things (ClouT) are currently the dominant Internet technologies, but cloud computing embodies the maturity of the computing field with its clear path to software generation, transmission, distribution and control. The essential technologies for the above-named innovations are in place and also continually being perfected, but applications in different domains that will leverage these developments are growing as multi-disciplinary researchers take on the emerging challenges in the engineering of smart sensing devices, big data, networking, and cloud and IOT services. This Special Issue (SI) emanating from the GOCICT 2016 proceedings features eight papers that discuss research findings and challenges that exist in cloud-based systems. These application-oriented cloud papers cover works in secure intelligent agents, software systems, autonomic computing, artificial intelligence and healthcare social networks. The papers were thoroughly reviewed by the GOCICT organizers adopting the double-blind peer evaluation standards.

In the paper, Secure Intelligent Agents by Hamilton and Alasti, the authors developed a cloud intelligent agents that are configurable by cloud users. These agents are autonomous and are managed mainly by intelligence and the parameters set by the user. It thus empowers users to control cloud data security. This solution introduces cloud intelligence agents that may be implemented in the business network or by cloud service brokers. In another study by Carter, the author described the concept of a Backend-as-a-Service (BaaS), that a user could develop on its own. The proposal defines, architects and designs a heterogeneous micro-application based platform. The BaaS platform is a critical business resource that could avoid vendor lock-in, platform shutdown/sun-setting/retirement, or any adverse changes.

Benson and others, developed a fault-tolerant flight software operating system for the cloud environment. The software enables research experiments on a payload while in low earth orbit. To survive in an adversarial space environment, the CubeSat OS is implemented as a deterministic state machine, storing its state in a fault tolerant global memory structure. The system was validated via a full end-to-end test of the CubeSat with its ground station, and demonstrate its capability to tolerate and even actively mitigate potential faults resulting from space radiation. In another study, Euzebio and others developed an autonomic biomimetic algorithms for robots in the rehabilitation of the lower limbs in the cloud environment.

In a subsequent paper, Balluff and others used recurrent neural network method to analyze meteorological data in a high-performance computing environment. This paper presents current results of wind speed forecasts using recurrent neural networks (RNN) and the gradient descent method plus a backpropagation learning algorithm. Extracted data from NASA's Modern Era-Retrospective

Analysis for Research and Applications (MERRA) were analyzed in a GEOS-5 Earth System Modeling and Data Assimilation System. The presented results show that wind speed data can be forecasted using historical data for a trained RNN in a more robust high performance computing environment.

Situations in which large dataset are exposed to privacy threat abound in social networks and cloud environment. In a pertinent paper, the author Elmisery introduced a fog based middleware (FMCP) that runs at patients' sides and allows exchanging of their information to facilities recommending and creating support-groups without disclosing their preferences to other parties. This application could find extensive utility in a cloud environment. A scenario was presented that depict a privacy-respecting recommender service for the implicit discovery of support-groups in a healthcare social network.

In a paper on applied artificial intelligence, authors Ziesche and Yampolskiy discussed the relation between various types of minds and the part of the fun space, which is accessible for them. Particular focus was given on accessible fun space for human minds, which is relevant at a time when the extension of the life span and/or enhancements for humans become realistic options. Finally, Raigoza and Karande described the problem of overload with massive dataset. The researchers studied a recommender system that used the concepts of collaborative filtering and content-based filtering. This allows recommendation systems to gain significant importance for their ability to solve this choice overload problem by providing users with the most relevant products from all the possible choices.

In conclusion, this Special Issue presents some current developments in application-oriented cloud-based systems that educators, students, professionals, and researchers could build upon for further research. The ensuing cloud-based systems are obviously of practical utility to government, industry, institutions, and individuals.

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