

Intelligent cloud computing

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Artificial intelligence (AI) is defined as the science of the Engineering that makes the machine intelligent. The AI term has been coined in 1956 indicating that the human possessions can be simulated and used by machines. Although this theory had some debate at the beginning, recently it has become essential part in industrial applications, as well as in many different other application areas, since the AI techniques allow us to solve many of the difficult problems, including the most complex optimization ones. The term AI has been modernized to include Machine Intelligent, Natural sciences, Natural computation, Swarm Intelligence, Neural Networks, and Fuzzy Logic, and it moves from building systems that are intelligent to intelligent systems. Several factors have affected, and are affecting the revolution of AI, such as the data driven products, new platforms, and the maturity of machine learning supported by cloud computing technology.

Cloud computing enlarges the field of distributed computing by providing elastic services, large data storage and processing, applications, and high performance computation in addition to the business cost reduction. It is considered as an excellent platform for AI; however, currently, the integra-

tion of AI into cloud is in its early stages and there is a need for more research effort in this direction. For instance, intelligence could greatly enhance cloud infrastructure, platform, and applications layers. The three classes of cloud computing networks, (1) public, (2) private, and (3) hybrid, open a new dimension in many application areas, from business to social, from engineering to research, in order to manage in a virtual world their applications without caring about the management details. The Cloud applications are hosted by data centers, where thousands of servers are allocated. Although this large number raises some issues such as management and energy, the current cloud applications are the driving forces, behind the use of this high number of resources. Some of the most popular applications are cloud gaming, drop boxes, software and services, industrial storage, and intelligent transportation.

This special issue aims to collect the new emerging works in cloud computing, with particular regards to the impact of the intelligence on cloud performance, and in problem solving. It tries to combine innovative intelligent solutions to the cloud computing problems. The selected papers reflect the quality and practicality of the used solutions. A good number of submissions have been received, which proves that the thematic proposed by this special issue is a hot, and challenging topic. All submitted manuscripts went through a strict peer-review process after which, only six of them were accepted to be included in this special issue. Next, we provide a short description of the selected manuscripts.

In “WAYFINDER: parallel virtual machine reallocation through A* search” by Eli M. Dow and Jeanna N. Matthews, the authors studied the path finding in Virtual Machine (VM) placement problem for cloud computing where a large number of VM required to be managed. The paper summarizes the current approaches, especially for the dynamic VM reallocation. In addition, it adapts the A* search algorithm as a

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heuristic search to determine optimal sequential migration plans to transition from a given VM-to-host allocation to an arbitrary desired allocation state.

In “A cloud computing based many objective type-2 fuzzy logic system for mobile field workforce area optimization” by Andrew Starkey, Hani Hagrass, Sid Shakya, Gilbert Owusu, Ahmed Mohamed and Daniyal Alghazzawi, the authors focus on mobile field workforce area optimization problem, where industries employ a large mobile field workforce, and engineers have to be assigned to tasks on these workforces. They try to find optimal design of these working areas as well as assigning the correct engineers to them. Instead of using multi-objective heuristic algorithm, e.g. multi-objective genetic algorithms, the manuscript proposes cloud based many objective type-2 fuzzy logic systems on a cloud environment to solve the mobile field workforce area optimization problem. The cloud environment enables solving large versions of the problem with multi-thread in very less time and type-2 fuzzy logic system helps to find more advanced solutions.

In “A proposed novel enterprise cloud development application model” by Behzad Karim, Qing Tan, Ibrahim El Emary, Bader A. Alyoubi and Rebeca Soler Costa, the authors propose an enterprise cloud application development model based on developing services (typically REST API services). The main purpose of the proposed model is to allow different types of applications to be used in addition to the migration of legacy code to cloud platforms. Furthermore, another aim of the new model is the on-demand resource assignment to nodes. Analysis and validation are provided for the model, as well.

In “A cloud computing based Big-Bang Big-Crunch fuzzy logic multi classifier system for Soccer video scenes classification” by Song Wei, Hani Hagrass and Daniyal Alghazzawi, the authors introduce an elegant solution to high levels of uncertainty in video scenes classification, and under-

takes securely and efficiently the heavy video processing. This research work is related to soccer video summarization and classification based cloud environment. The manuscript presents a classifier system based on neural networks and two fuzzy logic classifiers: type-1 and type-2 fuzzy logic. The classifier is then optimized by a Big-Bang Big crunch optimization for maximizing the system performance.

In “Authenticated media uploading framework for mobile cloud computing” by M. Shamim Hossain and Ghulam Muhammad, the authors deal the problem of trust of social media uploaded to the cloud environment. The manuscript proposes a mobile cloud-based media-uploading framework, which checks images for authenticity using Curvelet transform and Weber local descriptor-based system for the feature extraction. Support vector machine-based classifier measures the trust. Offline and online experiments are performed to validate the proposed approach.

In “Fireworks algorithm framework for Big Data optimization” by Mohamed Amine El Majdoui, Ismail Rboub, Saad Bougrine, Bouazza El Benani and Abdelhakim Ameer El Imrani, the authors present a novel optimization framework based on cloud computing for the class of the big data optimization problems. This manuscript tackles the Big Optimization of signals problem using Fireworks algorithms called “Big-OPT”. Two versions of it are developed and exploited, (1) single objective and (2) multi-objective algorithms, and six EEG datasets are considered for the validation of the proposed algorithms.

Finally, the editors would like to thank to all the authors who submitted their original manuscripts, and all reviewers for helping us to guarantee high quality of the manuscripts included in this special issue. We also thank the managing editor-in-chief of Memetic Computing, Meng-Hiot Lim, for his important and valuable support.