Intelligence in the Cloud

We need a lot of it

Artificial intelligence (AI) has been progressing nicely in the last few years—not only because of higher computation power, graphics processors, custom hardware such as neuromorphic chips, and advances in data and computer sciences but also because of the cloud. I have said in my many keynote speeches that the cloud is becoming, if not already, the de facto hosting platform for all innovations, whether social, industrial, or services of any kind. The cloud has helped extensively here by providing not only computational power but also flexibility to experiment as broadly as required without costing an arm or a leg.

The umbrella term AI includes many specific categories of intelligence, such as machine learning (ML), deep learning (DL), natural language processing (NLP), and computer vision. It has been deployed in almost all industry verticals: financials, health care, manufacturing, automotive, insurance, marketing, and many others, including military and adversarial settings. The associated use cases are also diverse and can range from predicting a future event, to describing what insights data may have, to suggesting the optimal course of action to follow. You can search the web and see tons of use cases in which AI is mentioned somewhere in the description of that use case. Sometimes AI has a role in that use case; in other instances, it is a simple marketing ploy. That said, companies are seriously looking at developing their AI strategies. Regardless, AI is expected to be disruptive, because we may see it play a role in every aspect and corner of our lives.

The industry is awash with names like intelligent cloud, intelligent edge, and variations of them. The basic premise behind the names is a cloud or edge deployment will have enhanced capabilities through AI that will allow users to do more than computation. What the major cloud providers are doing is adding specific functions in their cloud offering that allow users to use intelligence to perform cognitive tasks such as analysis, gaining insights from data, computer vision, or language comprehension. This is
basically AI as a service (AIaaS). This is a natural fit, because AI often requires massive volumes of structured and unstructured data and massive computational power that only the cloud can provide. Cloud providers will continue to extend their AIaaS as soon as they realize technologies to enable users to do more, so expect to see a continuous flow of AI enhancements from cloud providers in the next few years. An intelligent edge will include intelligence to analyze captured data from whatever sensors are deployed at the edge or far edge.

Cloud providers will also be able to rely on intelligence to improve the efficiencies of their operations and in many other ways. For example, a cloud provider could use intelligence to extract patterns of usage among a large number of users and use the outcome to improve efficiencies and reduce cost. A second example is a cloud provider establishing the use patterns of a customer and suggesting the lowest cost deployments for that customer. Some cloud providers are already optimizing datacenter energy usage by exploiting AI.

As you may have guessed, this last issue of 2017 is a special issue on intelligence in the cloud. It is led by three guest editors: Victor Leung from the University of British Columbia, Song Guo from the Hong Kong Polytechnic University, and Xin Yao from the University of Birmingham. I urge you to read their introduction, because it provides an informative and detailed overview of the role of intelligence in the cloud.

The columns in this issue, such as Cloud Tidbits, cover not only intelligence in the cloud but also other topics.

NEW EDITORIAL BOARD MEMBERS

Welcome to Joanna Kołodziej and Luiz F. Bittencourt, the newest members of the IEEE Cloud Computing Editorial Board.

Joanna Kołodziej is the Professor in Research and Academic Computer Network (NASK) Institute. She is also the Head of the Department of Computer Sciences at Cracow University of Technology. Prof. Kołodziej serves as the President of the Polish Chapter of IEEE Computational Intelligence Society. She participated in several international and national projects including ECONET, 7FP and PARAPHRASE 7FP Grants. Currently, she is the Chair of the cHiPSet Cost Action IC1406 (chipset-cost.eu). Her research is focused on security aspects and energy awareness in resource management and data scheduling in clouds. For more information please visit www.joannakolodziej.org.

Luiz F. Bittencourt is currently an Associate Professor at the University of Campinas (UNICAMP), Brazil. He received his Bachelor’s degree in Computer Science from the Federal University of Parana, Brazil, in 2004, and his Masters degree in 2006 and Ph.D. degree in 2010 from (UNICAMP), Brazil. Luiz has been awarded with the IEEE Communications Society Latin America Young Professional Award 2013. He has served in the organization of international events (MGC 2012, CloudAM 2013-2017, IEEE LATINCOM 2017) and participates in several technical program committees (e.g., CCGrid 2014-2015, UCC 2016-2017, LatinCloud 2012-2014, CLOSER 2014-2017, Euro-Par 2016-2017). In addition to the IEEE Cloud Computing editorial board, he serves as associate editor for the Computers and Electrical Engineering journal and for the International Journal of Grid and Utility Computing. His main interests are in the areas of virtualization and scheduling in grid, cloud and fog computing.
For example, Blue Skies looks at deploying DL in osmotic computing. The Cloud Economics column provides the first delineation of the 10 laws for the economics of fog computing—fogonomics. AI also has an important role in the provision of context-aware ubiquitous biometrics in the edge of military things, explored in the Cloud and the Law column.

I would also like to take the opportunity in this letter to introduce two additions to the editorial board of the magazine, Dr. Joanna Kołodziej from the Cracow University of Technology in Poland and Dr. Luiz F. Bittencourt from the University of Campinas (UNICAMP) in Brazil. Drs. Kołodziej and Bittencourt bring extensive background in cloud computing and its many associated disciplines. Please see their bios attached to this letter. ***