

Call for Paper: ACM TECS Special Issue on “Effective Divide-and-Conquer, Incremental, or Distributed Mechanisms of Embedded Designs for Extremely Big Data in Large-Scale Devices”

As the size of data grows at a rapid speed, the demand for big data analysis increases. Big data usually come with two types. One has an excessively huge volume of samples, and the other exhibits extremely large dimensions. Both of them jeopardize the performance of embedded systems. Data analysts usually have to deal with limited storage, processing speed, communication bandwidth, and power consumption, especially when they design an embedded system. What is worse, in the era of big data, the scale which engineers are handling is beyond billions. Moreover, when an enormous quantity of embedded devices interact with each other, e.g., mobile devices, and wearable gadgets, they will form a large-scale network. This has relatively deepened the difficulty of embedded designs as the problem is not merely constrained to data, but also devices.

In view of this problem, many famous and off-the-shelf tools, such as Apache™ Hadoop® and Apache™ Spark®, are developed to handle large-scale analysis by using distributed processing. These tools usually employ divide-and-conquer architectures in their implementations. With such architectures, when a large-scale dataset is segmented into subsets, the original problem can accordingly be divided into subproblems, separately processed in each machine. Despite the convenient framework, there is still no embedded version. Besides, not every algorithm can be converted into a divide-and-conquer version and gives optimal solutions.

In contrast to divide and conquer, incremental processing does not have to rely on distributed processing. The entire set of data can be divided into several batches, subsequently processed by a single machine. The combination of incremental and divide-and-conquer mechanisms yields more flexible solutions than an individual one. Therefore, how to take advantage of such a combination to resolve embedded designs for big data analysis is of priority concerns.

In response to the aforementioned problem, this special issue particularly focuses on divide-and-conquer, incremental, or novel distributed mechanisms of embedded designs for large-scale data. Meanwhile, the embedded version of Apache™ Hadoop® is also highlighted in this special issue.

Via this issue, we call upon specialists in the science and engineering domains, which will advance the state-of-the-art technologies in embedded

designs for, to contribute their creativity to this domain. Research areas relevant to the special issue include, but are not limited to, the following topics.

- Embedded designs for advanced machine learning approaches based on divide-and-conquer, incremental, or distributed mechanisms
- Embedded designs for advanced communication based on divide-and-conquer, incremental, or distributed mechanisms
- Embedded designs for sensor networks based on divide-and-conquer, incremental, or distributed mechanisms
- Embedded version of Apache™ Hadoop® applications

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Previously published conference papers may only be submitted if the paper is substantially extended with at least 30% new material. The extension requirement of 30% is not in textual volume but in novelty. Papers should be submitted via the Manuscript Central website and should adhere to standard ACM TECS formatting requirements (where page count limit is 25, including figures and references).

Moreover, please indicate that you are submitting to the Special issue on “Effective Divide-and-Conquer, Incremental, or Distributed Mechanisms of Embedded Designs for Extremely Big Data in Large-Scale Devices” on the first page and in the field "Author's Cover Letter" in Manuscript Central. Any questions on this special issue should be addressed to Daniel Bo-Wei Chen at dennisbwc@gmail.com.

Proposed Schedule:

Submission deadline: January 1, 2016
Notification of acceptance: February 1, 2016
Final manuscript due: March 15, 2016
Tentative publication date: April 15, 2016

Lead Guest Editor:

Daniel Bo-Wei Chen (corresponding editor) (dennisbwc@gmail.com)

Chair, Signal Processing Chapter, IEEE Harbin Section

Department of Electrical Engineering, Princeton University, USA

Guest Editors:

1. Wen Ji (jiwen@ict.ac.cn)

Vice Chair, Signal Processing Chapter, IEEE Harbin Section

Institute of Computing Technology, Chinese Academic of Sciences,
China

2. Zhu Li (zhu.li@ieee.org)

Multimedia Core Standards Research Lab, Samsung Research, USA

Department of Electrical and Computer Engineering, Northwestern
University, USA