Empirical Characterization of Power Efficiency for Large Scale Data Processing
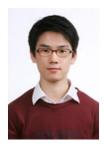
Yongbin LEE *, Sungchan KIM *

Division of Computer Science and Engineering, Chonbuk National University, Korea

forever1363@chonbuk.ac.kr, sungchan.kim@chonbuk.ac.kr

Abstract—**It becomes popular to equip CPU and GPU on a single computer system because of its performance and energy benefits, constituting a heterogeneous system for processing big data workloads. However, the optimal exploitation of such a heterogeneous system requires us to know the power consumption characteristics of the applications for difference processing units. To this end, this paper aims at characterizing the power efficiency of CPUs and GPUs for big data processing through empirical measurements. We take three recent computing units, high-end CPU, and GPU, and mobile embedded GPU as target platforms. We first show the performance and power consumption measurements on each computing platform using the Rodinia benchmarks as representative big data workloads. Then, we discuss how performance-per-watt of each computing platform is associated with different characteristics of the workloads.**

Yongbin Lee received the B.S. degree in 2014, and now has been studying for a master's degree since March, 2014 in computer science and engineering from Chonbuk National University, Korea. His research interests include embedded system, big data computing, and GPU.

Sungchan Kim received the B.S. degree in material science and engineering, the M.S. degree in computer engineering, and the Ph.D. degree in electrical engineering and computer science from Seoul National University, Seoul Korea, in 1998, 2000, and 2005, respectively. He is currently Associated professor at Chonbuk National University, Korea. His research interests include various aspects and emerging technologies for parallel computing such as reliable multiprocessor system, non-volatile memory-based storage, and Big Data processing.