

ABSTRACT

The development of digital technology is driving an increase in medium-scale data, so that an analytical platform is needed that is not only in terms of performance in utilizing resources according to the principles of Green Computing. This study aims to compare the performance of computing resource usage between R (via RStudio) and Python in the context of big data analytics by measuring execution time, CPU utilization, memory usage, and CPU energy consumption. The method used is a comparative approach through standardized benchmarking on the "AI4I 2020 Predictive Maintenance" dataset in the same test environment and repeated three times. The test results show that RStudio recorded an average execution time of 19,916.67 ms, CPU utilization of 0.08%, memory usage of 75.43 MB, and energy consumption of 440.95 J, while Python recorded an average execution time of 270,447.73 ms, CPU utilization of 1.14%, memory usage of 689.67 MB, and energy consumption of 7,178.24 J. The discussion shows that the difference in efficiency is not solely determined by the platform, but is influenced by the characteristics of the workload and the design of the analytical pipeline applied. This study concludes that the evaluation of Green Computing in data analytics needs to consider the trade-off between performance and resource efficiency with ecosystem flexibility, so that the platform selection should be adjusted to the pipeline design and implementation needs.

Keywords - Big Data Analytics, Benchmarking, Green Computing, Python, RStudio.