A Critical Performance Study of Memory Mapping on Multi-Core Processors: An Experiment with k-means Algorithm with Large Data Mining Data Sets

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Authors:
S. N. Tirumala Rao
E. V. Prasad
N. B. Venkateswarlu

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Abstract

Increased availability of Multi-Core processors is forcing us to re-design algorithms and applications so as to exploit the available computational power from multiple cores. It is not uncommon to employ memory mapping of files in applications involving huge I/O bandwidth to improve the response/service times. This paper mainly focuses on performance of memory mapped files on Multi-Core processors. Experiments are carried out with k-means algorithm, a popular Data mining (DM) clustering algorithm, to explore the potential of Multi-Core hardware under OpenMP API and POSIX threads. Observations are made both with static and dynamic threads of OpenMP. Experiments are also conducted with both simulated and real data sets. Experiments indicate that memory mapping of files gives considerable benefit on Multi-Core processors also. In addition, the benefit increased with increased physical memory size. Also, the benefit of memory mapping with the selected algorithm is increasing with number of cores.
Reference

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Index Terms

Computer Science

Processor

Architectures
Key words

OpenMP
fread()

mmap()

POSIX threads

scalability
Multi-Core and k-means