

Energy efficient query processing in web search engines

A project report submitted in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE & ENGINEERING

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(2016-2020)

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CERTIFICATE

This is to certify that the Project Report entitled "Energy Efficient Query Processing in Web Search engines " being submitted G.SRAVANI(16811A0525), M.LANKITHA(16811A0545), K.SHIVA KRISHNA(16811A0540), M.SITARAMA RAJU(16811A0548), in partial fulfilment of the requirements for the degree of B.Tech (C.S.E) in Department of Computer Science & Engineering, at AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY affiliated by Jawaharlal Nehru Technological University Kakinada ,is a record of bonafide work carried out by them under my guidance and supervision.

The results embodied in this thesis have not been submitted to any university or institute for the award or any degree of diploma.

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ABSTRACT

Web search engines are composed by thousands of query processing nodes, i.e., servers dedicated to process user queries. Such many servers consume a significant amount of energy, mostly accountable to their CPUs, but they are necessary to ensure low latencies, since users expect sub-second response times (e.g., 500 ms). However, users can hardly notice response times that are faster than their expectations. Hence, we propose the Predictive Energy Saving Online Scheduling Algorithm to select the most appropriate CPU frequency to process a query on a per-core basis. aims at process queries by their deadlines, and leverage high-level scheduling information to reduce the CPU energy consumption of a query processing node. bases its decision on query efficiency predictors, estimating the processing volume and processing time of a query. We experimentally evaluate upon the TREC ClueWeb09B collection and the MSN2006 query log. Results show that can reduce the CPU energy consumption of a query processing node up to 48 percent compared to a system running at maximum CPU core frequency. Outperforms also the best state-of-the-art competitor with a 20 percent energy saving, while the competitor requires a fine parameter tuning and it may incurs in uncontrollable latency violations.