

Dissertation assessment

Author: Bc. Jan Kůrka

Title of thesis: Optimization of admission of patients to a hospital by using parallel algorithms on Intel Xeon Phi

Opponent: Dr. Didier El Baz H.D.R.

The Diploma Master thesis of Jan Kůrka is dedicated to the implementation on Many Integrated Core computing accelerator Xeon Phi of parallel algorithms for the optimization of the patient admission to hospitals. The main goal is to adapt a state-of-the-art simulated annealing sequential algorithm to parallel computing.

The manuscript is well structured and readable. The first chapter briefly describes the problem and gives a motivation for using parallel hardware. The next chapter deals with the mathematical model of the problem and notations. Afterwards, an entire chapter is devoted to Intel Xeon Phi accelerator, to be more particular, an architecture is sketched and a setup guide for Gentoo Linux is provided. The following three sections constitute the core of the work as the sequential and two parallel versions of optimization algorithms are proposed. The sequential version is a successful replication of Ceschia and Schaerf's algorithm. Jan Kůrka carried out many modifications to the original algorithm to make it more suitable for parallel hardware. The chapter with experimental results, however, reveals that although the number of evaluated assignments significantly increases by using many threads, the time to the same quality solution decreases only slightly since the author was unable to find appropriate parameters for the first version of the parallel algorithm and the second version was less effective in terms of the number of evaluations. Author compares the Intel Xeon Phi with Intel Xeon CPU and comes to a conclusion, which I also agree with, that Intel Xeon Phi cannot solve efficiently the problem when the vectorization is not effectively used. Final chapter concludes the work and recapitulates the results. I note that programming the Xeon Phi is tricky and that relatively few authors obtain speedups. With the aim of using Intel Xeon Phi, I believe that the student should have concentrated from the very beginning on an algorithm that can be vectorized easily. Nevertheless, I appreciate the efforts the student put into the implementation of the algorithms. Taking into consideration the difficulty of the subject and the manuscript, which meets both the technical and formal requirements, I recommend the work for the defense and evaluate it by grade Good (B)

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A handwritten signature in black ink, consisting of a large, stylized loop with a vertical line through it, followed by a horizontal stroke.