**Doctoral thesis**

# Employing Parallel Architectures in Similarity Search

## RNDr. Martin Kruliš

The thesis examines the possibilities of employing highly parallel architectures in database systems, which are based on similarity search paradigm. The main objective of the research is utilizing computational power of current GPU devices for similarity search in the databases of images. The author has addressed all the aspects of this domain, such as efficient utilization of the GPU hardware for generic computations, parallelization of similarity search process, and acceleration of image indexing techniques. In the most cases, employing the GPU devices brought speedup of two orders of magnitude with respect to single-core CPUs and approximately one order of magnitude with respect to multiprocessor NUMA servers. The thesis summarizes experience and discoveries from several years of research, related algorithms adopted for the specific conditions of GPU architectures, and the results of empirical experiments performed in order to verify presented claims.

Our research cooperation with the author of the thesis has begun more than five years ago. We started our cooperation with author's master thesis "Algorithms for Parallel Searching in XML Datasets". The student graduated with an exceptional final examination score. He was really enthusiastic for using new technologies and paradigms, like parallel programming or GPGPU, in data oriented problems. Our cooperation has been prolonged as Martin Kruliš started his PhD study under my supervision. He has published several refereed papers as well as some journal articles. He has proved he can make an independent research as well as working in a research team.

Overall, the presented thesis is one of the best I have seen and the scientific record of the student is remarkable as well. The author has demonstrated the ability for creative scientific work therefore I recommend granting the PhD. degree to RNDr. Martin Kruliš.

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