

Assessment of the master thesis by Vojtěch Cvrček

Parallelization of Minimal Problem Solver Generator

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The goal of the thesis was to investigate the possibilities of parallelizing minimal problem solver generator and using GPU processing. After investigating the potential of CUDA programming and GPU processing, it has been decided to concentrate on parallelizing the on-line part of the solver.

Analysis and benchmarking of one of the most common minimal solver has shown that there is a large potential for speedup in the data scoring step that evaluates the support of individual models proposed in RANSAC optimization. The speedup obtained by parallelizing this step dominates other potential speedups for simple and most common minimal solvers. This is a practical result.

Further analysis of the minimal solver itself confirmed that the most time consuming part of that solver was the eigenvalue/eigenvector computation. This is in agreement with general knowledge in computer vision community. The thesis thus concentrates on GPU implementation of eigenvalue computation for matrices of small sizes. This is an interesting new problem that has not been solved before. Existing GPU implementations of eigenvalue computation most often address large and sparse problems. Here we need to solve many small problems again and again. Vojtěch Cvrček studied the literature, suggested a new solution and implemented it on GPU. I believe that this is a very interesting piece of work, which is truly new and Vojtěch demonstrated very good approach to solving a research problem.

Unfortunately, the text of the thesis does not really show any strength of the work. In fact, it is almost unreadable with numerous mistakes, imprecisions and very chaotic structure. I almost can't believe that it came out so bad after seeing some fragments of the test that did look rather well written.

Vojtěch Cvrček has been working with me since his bachelor studies. I have to positively value his interest in research work, ability to study non-trivial material, adjust it and implement it. This is a very positive capacity so much needed for doing research. On the other hand, his writing is still terrible and must be radically improved.

To conclude, Vojtěch Cvrček has presented a useful work, which technically fulfilled the goals set in the assignment. In fact, I believe that his work has great potential of being used by others. Unfortunately, the text of the thesis is almost unreadable. Therefore, I recommend grading the thesis by the C (*good*) grade.

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