

Parallel Implementation of BM3D Filter on Intel Xeon Phi Accelerators

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Abstract

In this paper parallel implementation of Sparse 3D Transform-Domain Collaborative filter (BM3D) on Intel Xeon Phi accelerators is presented. Effectiveness of the implementation in terms of speed up comparing to serial and parallel CPU implementations of filter is demonstrated on denoising of large number of biomedical images. Denoising of medical images is the first, but one of the most time consuming steps in image pre-processing, before image segmentation and creation of 3D virtual models of human organs are carried out. Virtual models of human organs are more and more used by doctors for diagnostic purposes and planning of patient treatments. For surgeons such models can be of high importance when very complicated surgical operations are planned. Existing serial implementation of BM3D filter is very time consuming task when large number of images is processed. This is an issue when filtering images to reconstruct individual organs in the whole human body or when dealing with large image series covering only particular part of the body. We provide effective parallel implementation of BM3D filter to reduce processing time. To decrease the image denoising time even further Intel Xeon Phi accelerators are utilized.

References

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