BM3D (Block-Matching and 3D Filtering) is one of the state-of-art image denoising methods.
Efficient implementations of this method exist for the CPU; however, these implementations are time demanding. On common desktop computers, denoising of high-resolution images can reach several minutes.
The main objective of this thesis is to design an implementation of the BM3D method that utilize raw computational power of the GPU. GPU offers significantly more computational cores than the CPU; however, due to the specific execution and memory model, algorithms for the GPU are very different from algorithms for the CPU. Therefore, this thesis presents both: the basic aspects of the GPU computing and the BM3D method itself. Last but not least, the final implementation is empirically evaluated against the existing implementations by a set of performance tests.