

Abstract

This thesis focuses on the removal of impulse noise, Gaussian and speckle in color images and grayscale. As a particular case we can mention the elimination of noise in medical images.

Some filtering methods are computationally expensive and even more so, if the images are large. In order to reduce the computational cost of such methods, in this thesis we use hardware that supports parallel processing such as CPU cores with *multicore* processors and GPUs with *manycore* processor, In CUDA parallel implementations, some features are set in order to optimize the application processing on GPUs.

This thesis studies on one side the computational efficiency obtained by the process of elimination of impulsive and uniform noise. On the other side the quality is evaluated after performing the filtering process. The computational performance is obtained with the parallelization of the algorithms in CPU and/or GPU. In order to obtain good quality in the filtering image, first the corrupted pixels are detected and then only the corrupted pixels that have been detected as corrupted are filtered. From which concerns to the removing of the Gaussian and Speckle noise the analysis of the nonlinear diffusive filter has proved to be effective in this case.

The algorithms used to eliminate impulsive noise and uniform images, and their sequential and parallel implementations have been evaluated experimentally runtime (speedup) and efficiency in three computers of high performance computing. The results have shown that the parallel implementations considerably reduce the execution times regarding sequential implementations.

Finally, in this thesis we propose a method to efficiently reduce noise in images without initial information on the type of noise contained in them.