

The aim of this thesis is to design and experimentally implement a complex framework dealing with accelerating and simplifying the development of systems for processing and visualization of medical volume data in C#. Currently, there are application interfaces and their implementations for both, techniques based on image processing, like filtering, registration, segmentation and classification, and also for techniques based on 3D image visualization. But there is no consistent framework for both tasks, which would take advantage of features of modern graphics processing units and multi-core processing units along with features of .NET Framework and of language C#. The thesis presents overview of current free and open source software, design of application interface, and implementation of main API features. One of important differences to other software is that the implementation has been developed natively in the managed environment of .NET Framework, offering a good level of comfort for an end application programmer, but system performance is comparable with natively compiled environments thanks to utilization of all resources.