# The Development of efficient Algorithms for multi-threaded parallel Processing in the Module Scaling digital Images

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**Abstract.** Scaling of images finds wide application it many tasks. The object of the research in this work is the methods for scaling digital raster images.

The main aim of this work is to develop efficient multithreaded parallel algorithm bicubic interpolation raster image to implement this algorithm as a program in C++.

The main aim of this work is to develop an effective parallel algorithm bicubic interpolation raster image to implement this algorithm as a program in C++.

Also the aim of this work is to develop applications with a graphical user interface for the operating system Window for demonstration of the algorithm and study the relationship between algorithm performance and the degree of parallelization.

In the progress of the work was designed and implemented parallel algorithm bicubic interpolation of raster images in C++.

In the process, arose the need to carry out comparative analysis to examine and to analyze the methods the nearest neighbor method, bicubic interpolation, bilinear interpolation, method of supersampling and method of directional interpolation for image scaling.

Also implemented algorithms for step and bilinear interpolation, directional interpolation and their concurrent modification in C++.

The result created an application with a graphical user interface and implemented all the required functionality. The application allows you to perform forward and reverse scaling of the image by various methods of interpolation and save the result.

During testing on a multi-core General-purpose processors confirmed the assumption about the feasibility of parallelization of the algorithm is bicubic interpolation. Use just a few threads of computation provides a significant acceleration of this and other implemented algorithms.

Developed multithreaded parallel algorithms have demonstrated their effectiveness and can be applied in practice in the processing of digital images. A method of bicubic interpolation is the most preferred from the viewpoint of smoothness of the resulting image.

Comparative evaluation of the effectiveness of the methods on the criterion of time and acceleration. It was found that for large amounts of initial data and large coefficients for the direct and inverse scaling of multithreaded parallel algorithms are more efficient than sequential algorithms.