Methods of interpolation for whole slide image processing

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Histological and cytological samples are evaluated by pathologist. Nowadays, they can use computers to aid they work. Tissue samples are scanned and then can be evaluated on regular workstations instead of a microscope. Unfortunately, scanned tissue samples are enormous images, so often it is necessary to lower their size. One of the most commonly used method for that is interpolation. In this paper, we collect the advantages and drawbacks of nine interpolation methods, and as a result of our analysis, we try to select one interpolation method as the preferred solution.

Tissue sample extraction    Digitalization    Interpolation    Sample evaluation

MATERIALS AND METHODS

We tested interpolation methods by scaling and reversing the size of 16 different test images. The modified images were compared to the originals in various aspects. One of the most crucial factor is time of calculation.

Nearest neighbor    Bilinear    Bicubic    Cosine    Sinc    b-splines    Hermite    Lagrange    Catmull-Rom splines

RESULTS

We tried to decide which method of interpolation is the best to resize whole slide images. As a result, the interpolation method has to be selected depending on the task involving the samples.

CONCLUSIONS

Based on this study the Sinc, Catmull-Rom and Lagrange interpolation methods are the best. Generally, slower methods of interpolation give better results. For the purpose of interpolation of whole slide images we propose the use of Lagrange polynomial interpolation.

The results of this study are published as:

Acknowledgements:

This study was supported by the National Centre for Research and Development, Poland (grant PBS2/A9/21/2013).