

Optimization of Transformation and Storage of Images Using the Principle of the Polar Coordinate System

Dmytro Fedasyuk, Taras Klymash

Abstract – In this work was considered the method of image representing on the principle of the polar coordinate system to optimize the process of storage and transformation on the plane.

Keywords – image, conversion, transformation, optimization.

I. INTRODUCTION

Nowadays the most common means of storing image information based on the use of the raster, ie, by points a certain value. With it you can represent any images and of all sizes. One of the most intensive processes while processing the images is its transform (rotate, move, shift, etc.). It uses both arithmetical and transcendental operations. For modern processors the most resource-wasteful operations are transcendental. Therefore, the optimization problem transformations of images are important in the processing of digital information.

II. PRINCIPLE OF THE POLAR COORDINATE SYSTEM AT THE IMAGE CONVERSION

Images are presented in the form of a bitmap is stored as a matrix size $N \times M$, where N - length of string, M - the length of the column. Therefore it is proposed to store images in a row of pixels to be a kind of rays of the polar coordinate system. This will provide images as a set of intervals over which operations will be made into a plane. In Fig. 1 shows the method of image representing and possible conversions.

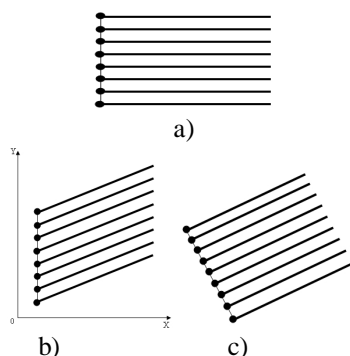


Fig. 1. Method for representing images (a), shift images along the axis Oy (b), image rotation (c).

Optimization with this approach is that the conversion of images happens only when they are reproduced. Rotation and other parameters of the transformation are written to a file, such as meta data.

III. PREFERENCES OF THE PROPOSED METHOD

The process of converting images when they are encoded, for example, in jpeg format made as follows:



Fig 2 The process of converting images in jpeg format

This figure can be seen that at each step the operation is resource-costly. Therefore, the following scheme actually allows one step to reduce the number of operations:

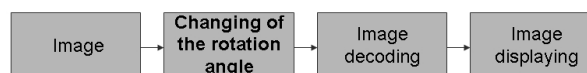


Fig 3. Process of the image transformation with proposed method.

This method actually rejected one step, in particular - convert images, because it is made during decoding.

Another advantage of this method is that, as a result of transformation of the image are not formed areas of white color. In Fig. 4 is an example of such plots after rotating the image. In addition, image rotation, as well as other operations, increases its size, in this case - to the value of diagonals.

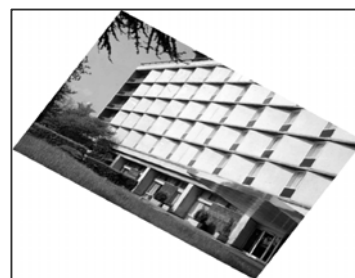


Fig. 4. The formation of white areas due to rotation of images.

IV. SCOPE OF APPLICATION OF THIS METHOD

This method of presenting graphical information can be used in areas where storage is required as the original image and of his conversion. First of all, this system of video watching systems, pattern recognition, system control and accounting personnel, etc.

V. CONCLUSION

In this paper was considered the method by which it is possible to speed up the process of converting images on the plane. It is based on the use of polar coordinate system to represent graphic information. In addition, he is using the opportunity to leave unchanged the original image, but change rotation angle

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