Artificial Intelligence Methods in Discrete Tomography

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Tomography is an imaging procedure to examine the internal structure of objects. The cross-section images are constructed with the aid of the object's projections. It is often necessary to minimize the number of those projections to avoid the damage or destruction of the examined object, since in most cases the projections are made by destructive rays.

Sometimes the number of available projections are so small that conventional methods cannot provide satisfactory results. In these cases *Discrete Tomograpy* can provide acceptable solutions, but it can only be used with the assumption the object is made of only a few materials, thus only a small number of intensity values appear in the reconstructed cross-section image.

Although there are a lot of discrete tomographic reconstruction algorithms, only a few papers deal with the determination of intensity values of the image, in advance. In our work we try to fill this gap by using different learning methods. During the learning and classification we used the projection values as input arguments.

In the second part of our talk we concentrate on *Binary Tomography* (a special kind of Discrete Tomography) where it is supposed that the object is composed of one material. Thus, there can be only two intensities on the cross-section image - one for the object points and one for the background. Here, we compared our earlier presented binary tomographic evolutionary reconstruction algorithm to two others. We present the details of the above-mentioned reconstruction method and our experimental results. This paper is based on our previous works [1, 2].

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References

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