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Reconstruction of brain neuronal pathways in brain from the diffusion tensor MRI data

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Abstract

MRI based fiber tracking is a diagnostic method based on the diffusion tensor MRI data, which allows to find pathways of neuronal bundles in brain in vivo. In this work we propose a method of neuronal pathways reconstruction using A-star algorithm, with the possibility to assess its the effectiveness. One of the criteria is the probabilistic search parameter G, defined by a set of diffusion coefficients in a given volume element. The parameter G obtained trajectory correlated to its length has the meaning of entropy and allows to assess reliability of the found path. The proposed method was tested on simulated data with the characteristic behavior of trajectories of the complex variations, different cases of intersection of the beams passing through the intersection without a common voxels, and obtained characteristics of the corresponding probability.

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