Vessel Boundary Detection Using 3D Expansion of Dynamic Programming

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In this paper we propose a 3D expansion of DP (dynamic programming) to find a near optimal surface in a 3D matrix. This algorithm can detect boundaries in an image sequence such as B-mode sonographic images and MRI sequences. We test this algorithm using real B-mode CCA (common carotid artery) dynamic sonographic image sequences and FA (femoral artery) MRI sequences. The automated results are compared with experts' manual tracing results. The average error of intima detection is around 0.5 pixel (two sequences, 164 total images) and the relative error rate for vessel cross-sectional area computation in MRI is 2.8% ± 2.2% on 6 MRI sequences (300 total images). The results demonstrate the better qualitative performance than the 2D DP.