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图形、图像、模式识别

管状器官轮廓的快速提取

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摘要 利用最小作用曲面提取狭长的管状器官轮廓时，常常出现边界泄露问题。为此提出一种基于传递波（演化曲线或曲面）的平均能量准则来控制传递波传递。将处于尾部、能量低于平均能量的传递波“冻结”，仅让具有较大能量，处于首部的传递波继续传递，最终提取管状器官的整个轮廓。运用基于该准则的Fast Marching 算法快速有效地提取出结肠轮廓。该准则结合传递波的全局能量信息，对图像的噪声及低对比度有鲁棒性。

关键词 最小作用曲面 Fast Marching 算法 管状器官 平均能量准则

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Fast extraction of tubular structures surfaces

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Abstract

When the tubular structures surfaces are extracted by the minimal action surface，edges leakage problem could not avoided.So a front propagation freezing criterion is developed based on the average energy of the front propagation.Freeze the “tail” of the front and its energy less than the average energy of the whole front propagation，and continue propagate the “head” of the front and its energy larger than the average energy of the whole front propagation.While the“head” front gets the end of the objects，the whole surfaces of the object are extracted.Experimental results show the freezing criterion of fast marching method avoids the edges leakage problem effectively.The criterion is based on the global optimum，so can enhance the robustness to the noise and low contrast medical images.

Key words

minimal action surface fast marching method tubular structures surfaces average energy criterion

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