

磁振影像腦瘤分割與三維重建

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摘要

腦瘤是侵犯中樞神經最普遍的一種疾病，且近年來新增病例數有逐漸增加的趨勢。在醫療磁振造影技術的日進月異，醫師可透過腦部磁振影像，對病理區域作診斷及定位；且隨著電腦科技的進步，及各種影像處理技巧的發展，為醫療影像的分析與影像的三維重建提供直接、精確且有效的工具。本論文集由影像處理和三維視覺化技術開發之電腦輔助診斷系統，執行腦部磁振影像腦組織輪廓與腦瘤分割，來提昇臨床診斷醫療品質。本論文應用Active Contours Without Edges (亦稱Active Contours Using Level Sets, ACLS) 演算法，分割腦部磁振模擬影像腦組織輪廓，並比較ACLS演算法與Bias Corrected Fuzzy C-Mean (BCFCM)、Expectation Maximum (EM) 和Adaptive EM-based Pulse Coupled Neural Network (Adaptive EM-based PCNN, AEBP) 三演算法之分割品質與效率。實驗分析結果顯示ACLS與其他三演算法在分割品質上無顯著差異，但在分割處理的時間上都顯著優於其他三者。論文並應用ACLS演算法對實際腦瘤磁振影像進行腦組織輪廓與腦瘤分割，將分割結果三維重建，提供腦瘤外科手術術前規劃之三維空間資訊，提高醫療品質。

關鍵詞：腦瘤；磁振造影；影像分割；Active Contour；Level Set；三維重建

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