以輻射轉換為基礎之膝關節軟骨分割

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摘 要

退化性關節炎（Osteoarthritis，OA）是一般常見的慢性關節疾病，其主要症狀是膝關節軟骨變薄，患者通常需要長期的觀察與治療。而磁振造影（Magnetic Resonance Imaging，MRI）是屬於非侵入式的觀測方式，可以讓醫生更精確的觀察膝關節軟骨的變化，因此特別適合需長期觀察的患者。精確的分割膝關節軟骨對於軟骨量測厚度與臨床上的診斷和治療是一項很重要的步驟。目前常見的膝關節軟骨分割方法，如Active Contour Model、B-Spline、GVF等，大都是以較複雜的演算方式進行。

本論文所提出的膝關節軟骨分割之演算法，其特色是先對原始影像，進行輻射轉換（radial transform）後，再利用所獲得的輻射影像，來進行軟骨之初步分割。接著，將初步分割所得到的結果，透過反輻射轉換（inverse radial transform）轉回到原始影像上。最後，在原始影像上進行微調，獲得最終的分割結果。本論文所提出之方法，在進行初步分割時，僅需一維方向之判別，而非二維方向之考慮，因而可以大幅簡化軟骨分割之問題；同時，輻射轉換的過程包含了對於已知膝關節軟骨知識的應用，因而獲得更好的分割效果。

關鍵詞 : 影像分割、退化性關節炎、膝關節軟骨、輻射轉換

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