使用模糊分類演算法及遺傳基因演算法於核磁共振造影影像分割之研究

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摘 要

這份研究將探討使用模糊分類演算法(Fuzzy C-means Clustering Algorithm, FCM)及提出使用基因演算法(Genetic Algorithm, GA)來分割人類腦部腦膜腫瘤(Meningioma)核磁共振造影影像(Magnetic Resonance Images, MRI)之績效。模糊分類演算法為：給定分類數目，然後依據模糊歸屬函式矩陣做一次一次反覆循環運算，找出較佳的分類群聚中心，作為遺傳基因演算法的初始原型(prototypes); 遺傳基因演算法為：先指定學習向量量化競爭式類神經網路的比重向量歸屬函數，然後利用此演算法達到模糊目標函式的最低估計，此目標可藉由下列程序達成：1.分辨優勝單位與非優勝單位；2. 決定優勝單位與非優勝單位歸屬程度；3.藉由選擇(selection)、複製(reproduction)、交配(crossover)和突變(mutation)方式進行演化，週而復始地進行一代又一代的演化，且淘汰不良的基因，最後演化出最佳原型，做為分割影像依據。　　經實驗結果，使用基因演算法找出較佳原型，做為進行具腦膜瘤區域影像分割依據，對於正常組織與不正常組織間分類，能有效的區分出。

關鍵詞 : 模糊分類演算法，模糊理論，學習向量量化方法，核磁共振造影影像，類神經網路，基因演算法

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