工程圖掃瞄影像之線向量化

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摘 要

目前為數眾多的工程圖，仍然以紙面的方式保存，不僅浪費龐大的儲存空間，而且在調閱參考時也十分的不便。近年來，隨著電腦儲存空間與運算速度大幅成長，光學掃瞄設備的性能與普及性日益提昇，利用電腦結合掃瞄器將紙面的工程圖建檔儲存，已經廣泛地應用在各個不同的圖籍管理領域。要更進一步發揮工程圖掃瞄影像的效益，最直接有效的方法就是將工程圖影像向量化。　　影像資料向量化一直是工程、測量、資訊等各個領域的重要研究方向。除了已經有大量的文獻發表，也已經有一些影像向量化應用軟體流通使用。但是，不同的工程圖籍例如：建築圖、地籍圖、管線圖、地形圖、手繪圖、航照圖、印刷文件等，線條粗細多寡以及背景紋理特性都不同，在向量化作業時都是各自不同的課題。　　本論文係針對以線條為主的工程圖，探討極為複雜的向量化程序中，較關鍵的二值化、細化與線萃取等三個程序。在二值化的部份，本論文提出了改良的適應性局部臨界值方法，將工程圖灰階影像轉換為黑白影像，實驗結果除了可以有效地過濾雜訊及紋理，並保留線條及交叉點之連續性而不斷裂。在細化的部份，本論文提出了改良的骨架化方法，將二值化影像的線約化為一個像點寬的中軸。在線萃取的部份，本論文提出了鏈碼轉換到弧點資料模式的流程，建立了點與線的鄰接位置和相對關係，也提高了線的精確度降低資料儲存量。　　本論文所提出演算法與流程，改善了現有的技術，而且具有較高的可靠度，以及較佳的成果品質。除此之外，實際開發出新的具有應用價值的軟體，將可提供自動檢驗系統、圖像識別系統、空間資訊管理等領域使用。

關鍵詞 : 適應性局部臨界值 ; 二值化影像 ; 影像分割 ; 細化 ; 鏈碼 ; 向量化 ; 弧點資料模式 ; 線萃取

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