序列影像分析於土石流事件判釋之研究

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摘　　要　爲能有效監控土石流事件發生，水土保持局於全省各觀測站架設數位攝影機，期能透過數位攝影機傳回各觀測站即時影像資料，以提供主管人員於颱風、豪雨期間即時掌控各處災情現況。然而，經由觀測站傳回之影像資料需要大容量之儲存空間且其資料成長速度驚人；再者，現有觀測站數量已愈來愈多，雖然可以有效輔助單位主管人員即時監控各地災情，但是，完全仰賴水保專家人工判斷是否發生土石流，已不具行政效率。因此，本研究利用影像之形狀、紋理、色彩等特徵，使用 Sobel 之邊緣偵測、灰階共立矩陣萃取紋理特徵及考慮影像亮度及前後時間序列關係，分析無災害及土石流事件影像之特徵，並據以建立土石流事件判釋準則。本研究經實例驗証，土石流事件判釋準確率可達到 91%且無漏判。整體而言，本研究成果可提供各觀測站於擷取影像資料時判斷影像資料是否需要儲存之依據；同時，可輔助水保專家人員以更可靠的方式監控土石流事件的發生，並使監控更具效率。

關鍵詞：土石流事件、影像特徵、邊緣偵測、灰階共立矩陣、序列影像。

The Study of a Sequence Image for Debris Flow Events Identification

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ABSTRACT　Because debris flow disasters are the most significant hazards in Taiwan mountain areas, the Water and Soil Conservation Beareu of Taiwan, R.O.C. has been using digital remote monitoring technology for monitoring possible debris flow events since 1999. Several CCTV monitoring stations have been established all over these monutain areas. As the number of stations markedly increased the traditional approach has become less efficient.

This research tries to develop a fully automated method for detecting debris flow event from a series of video images. Several image processing and time-factor analyzing techniques are used for analyzing the texture, color, and other characteristics in images with possible debris flow events. By comparing the images recorded when debris flows occurred with the images recorded in regular days, we built a set of rules for identifying debris flow events. In our experimental results, 90% accuracy in identifying debris flow events can be achieved. In addition, our system is more sustainable because the storage requirement is very economical by only

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keeping useful images.

Key Words: debris flow event, image features, Sobel operator, GLCM, sequence image.