

類神經網路結合GIS技術應用於坡地社區邊坡潛勢災害 環境風險評估準則之研擬與分析模式之建置

Neuron Network Analysis Applied on the Establishment of Slope Failure Risk Model for the Community on Hillslope at Kaohsiung City in Taiwan

主管單位： 行政院國家科學委員會 計畫編號：NSC 93-2625-Z-020 - 001

蔡光榮

陳昆廷

許逸祥

Tsai, Kuang-Jung

Chen, Kun-Ting

Hsu, Yi-Hsiang

國立屏東科技大學土木工程系

摘要

高雄位處台灣西南方，總面積高達2946.27Km²，依據山坡地保育利用條例所劃定之山坡地面積廣達1976.81Km²，約佔高雄地區之67%。另經由內政部2003年之統計資料，獲知全區人口已超過260萬人，此將促使邊際山坡地易受人為密集開發活動，造成坡地社區環境災害。且自921地震以來，每逢颱風季節，因降雨強度大而集中，更加劇坡地土砂災害之危害程度。鑑於此，本研究乃選定高雄市壽山里與高雄縣旗山鎮等二處具代表性之中型坡地社區進行現地調查與潛勢環境災害危險度評估，共計調查75處坡地社區邊坡，並選定相關致災因子進行各因子間之相依性、獨立性與交互性統計檢定，再結合倒傳遞類神經網路與GIS技術進行各因子間之複相關非線性迴歸分析及其風險評估模式之推導與實地案例驗證，進而建立高雄坡地社區邊坡潛勢災害風險評估準則與分析模式，俾期提供未來相關單位納入坡地社區防救災體系中運作。

關鍵詞：類神經網路、地理資訊系統、風險評估模式

Abstract

The administration of Kaohsiung metropolitan region covering the area of 2946.27 Km². Most of slopeland area are located at Kaohsiung county with 1976.81 Km². According to the statistical information from Ministry of Internal Affairs in 2003, the large population of Kaohsiung area has been recognized to be more than 2,600,000 people. Highly weathered geological formation, uneven distributions of rainfall intensity and intensive human activities have been identified as the predominated factors contributing to the environmental disasters of community on Kaohsiung slopeland in southern Taiwan. The Neuron Network System was introduced to establish the environmental disaster risk model by collecting the data investigated from 75 potential sliding sites located at community on hillslope. GIS technology integrated with Back-Propagation Neuron Network Analysis was used to extract major factors related to the environmental disaster occurred at studied area. This research would also be critical to set up both risk assessment model and

environmental disaster database system for the investigated communities on hillslope in Kaohsiung area. It is expected that the establishment of this model can be used to help well development of community on urban planning and hazard mitigation of Kaohsiung area in the near future.

Key words: Neuron Network System, GIS, Risk Assessment Model