運用機器學習之土石流預警系統設計研究

A Study on Development Early Warning System of debris flow by Using Machine Learning

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摘要

本研究利用 HTML5、CSS、JQuery 和 Asp.net 等動態網頁技術，結合政府開放資料和 NASA 開放資料，並運用 Microsoft Azure 進行機器學習資料分析方法，完成建置一套「TW-FLOW」土石流防災預警系統。透過 Microsoft Azure ML 可預測台灣地區土石流災害發生的機率。本系統中將土石流防災預警分析結果及相關開放資料(雨量分佈、潛勢溪流及其影響範圍等)結合 TGOS Map 及視覺化技術以多種方式呈現，除了讓使用者可以快速了解可能發生土石流災害的地區外，也能讓使用者可以由不同角度來了解土石流致災成因。居住於達到土石流災害警戒預警區的居民可以透過其手機接收到本系統送出之推播，且使用者手機上將會藉由 Google Map 來呈現使用者最適的避難所選擇及提供適性的地圖路線規劃服務。

關鍵字：土石流、TGOS Map、機器學習

Abstract

In this study, an early warning system for debris flow, named TW-FLOW , was developed by using the dynamic web page technology including HTML5, CSS, JQuery and ASP.net. The associated open data from Taiwan government and NASA are used in the Microsoft Azure machine learning procedure. The constructed machine learning model can predict the probability of occurrence of debris flow. The predicted results from Microsoft Azure machine learning procedure are combined with the associated geographic information and visualized by using the TGOS platform in order to help users quickly obtained the information of high risk regions caused by debris flow and quickly understand the reason that cause the debris flow. The registered residents will receive the alarm information through the APP and the best choice of refuge and its guidance path will also be provided through the Google map.

Keywords: Debris flow, TGOS Map, Machine Learning