CNN 自動化擷取洪水情境之研究

Research on CNN Automatic Capture of Flooding Situation

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摘　要

傳統水理模式需要有龐大真實環境資料、演算過程複雜且計算時間較冗長，數據驅動模式(人工智慧、機器學習、深度學習)具有快速、高精度的演算特性。因此，本研究使用 355 場氣候變遷情境下的雨量事件進行台南地區淹水情境模擬，由雨量與淹水情境結合 Google 開發卷積神經網路(Convolutional Neural Network) Inception-v3 遷移學習的技術進行雨量影像分類，經由應用影像分類結果可對應到淹水情境。

目前測試結果顯示，梅姬颱風造成台南 20 個鄉鎮有淹水災點，Inception-v3 挑出 18 個鄉鎮有淹水情境。這樣方法可以建構出當有豪大雨來臨時，可於資料庫自動且快速擷取出可能的淹水情境。

關鍵詞: Inception-v3，影像分類，淹水，氣候變遷，雨量影像

Abstract

The traditional hydraulic model requires huge real environmental data, complex calculation processes and long calculation time. In the contrast. The data-driven model (artificial intelligence, machine learning and deep learning) have rapid and high-accuracy calculation characteristics. In this study, rainfall events under 355 climate change scenarios were used to simulate the flooding situation in Tainan. The database of rainfall and inundation scenarios combined with Convolutional Neural Network (CNN) Inception-v3 migration learning technology was used to classify rainfall images and apply them to the rainfall-inundation relationship.

According to the simulation results, Typhoon Megi (2016) caused flooding in 20 townships in Tainan, and CNN Inception-v3 identified 18 townships with flooding. This method can be constructed to automatically and quickly retrieve possible flooding scenarios from the database when there is a heavy rainfall.

Keywords: Inception-v3, Image classification, Flooding, Climate Change, Rainfall Imaging