

# AI技術應用於歷史雷達回波相似性分析

## The Application of AI Technique on Radar similarity Analysis

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### 摘要

本研究利用人工智慧(Artificial Intelligence, 簡稱AI)中的Autoencoder演算法, 結合CNN (Convolutional Neural Network)之CNN-Autoencoder演算法, 將雷達回波即時資料與歷史資料進行相似性比對, 透過演算法的資料訓練建構比對模組。結果顯示, 相較於原始回波圖的空間相關比對, 透過Autoencoder的編碼以及解碼過程, 搭配餘弦相似性比對, 可以找出相似性較高的歷史個案, 其中潛在空間(Latent Space)的處理以及資料庫之建立是影響研究結果之重要關鍵之一。希望藉由該模組的建立與研究, 未來可針對易致災之極端降雨回波進行歷史資料庫搜尋, 找出歷史相似個案以及當時所造成之衝擊與災點, 提供相關之應變情資, 作為後續防災應變策略制定之參考。

**關鍵字:** AI技術、雷達回波、Latent Space

### Abstract

This study aims to make similarity analysis in between the real time observation and historical records by means of Convolutional Neural Network(CNN)-Autoencoder scheme. The scheme combined with the cosine similarity method is constructed to compare the real time radar reflectivity with the historical cases. Based on the preliminary result of spatial coherence analysis, the autoencoder-based scheme is able to find a more similar case from the database. During the process of feature extraction, the setting of Latent Space for Autoencoder and the construction of a database play important roles in similarity comparison. The purer in feature extraction, the more similar events can be obtained from the database. The associated results will be demonstrated in the study. Further investigation is required for the use of similarity analysis on extreme rainfall events.

**Key words:** AI, radar echo