

本論文提出基於卷積神經網路發展影像內容檢索技術(Content-based image retrieval, CBIR)系統，首先利用卷積神經網路設計 Auto Encoder (AE)提取影像特徵，再利用 Approximate Nearest Neighbors Oh Yeah(Annoy)建置影像特徵索引檔，並快速進行相似影像檢索。本論文利用各種影像處理功能後的影像增加訓練數據，提升卷積神經網路提取影像特徵的準確率，如：旋轉、平移、錯切、縮放及翻轉方式模擬影像拍攝時不同情況，此方法在本論中簡稱 RAEA-CBIR(Robust AE with Annoy for Content-based image retrieval)，觀察實驗結果得到使用影像增強確實能提升影像檢索效能，並與傳統方法進行比較，本論文提出的影像檢索方法確實勝過傳統方法。

This paper proposes a content-based image retrieval (CBIR) system based on convolutional neural networks (CNNs). First, a convolutional neural network is utilized in the design of an automatic encoder (AE), which extracts image features. Then, the approximate nearest neighbor Oh Yeah (Annoy) is employed in the construction of an index file for image features, which can quickly search for similar images for a query image. This thesis adopts image augmented (IA) approach, which consists of various image processing functions to generate different resulted images which are used to increase the number of images in the training set. The IA approach contains rotation, translation, mis-cutting, zooming and flipping schemes, which can simulate image generators to generate various image versions during the training of an CNN. The experimental results show that the use of the image augmented approach can indeed improve the image-retrieval performance. Hereafter, it is called Robust AE with Annoy for Content-based image retrieval (RAEA-CBIR) method. Also, the performance of proposed method is compared with that of traditional methods. The results exhibit the proposed method is definitely superior to traditional methods under consideration in the paper.