基於卷積神經網路之智慧型手勢識別技術

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摘要

本論文提出基於卷積神經網路之智慧型手勢識別技術(Design of intelligent gesture recognition based on convolutional neural network, IGRCNN)提升 FIGARIRS(Face identification and gesture answering recognition for interactive response system)系統辨識率，IGRCNN 技術主要是解決 FIGARIRS 所面臨的問題。因 FIGARIRS 遇到手部影像太小企圖放大後來辨識處理，但產生影像模糊問題。另外，手臉影像重疊或背景複雜，也導致 FIGARIRS 降低辨識率。因此本論文提出 IGRCNN 技術，利用影像超解析度(Super Resolution)、影像實例分割(Image Instance Segmentation)及顏色去背技術進行影像的預處理，強化手部影像的清晰度提升 FIGARIRS 系統的辨識率。實驗證明先以影像超解析度技術將影像進行預處理的效能最佳。

關鍵詞：手勢答題、影像辨識、影像超解析度、自動編碼器、影像實例分割

Design of Intelligent Gesture Recognition Based on Convolutional Neural Network

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Abstract

This paper proposes the design of intelligent gesture recognition based on convolutional neural networks (IGRCNN) to improve the gesture recognition rate of FIGARIRS (Face identification and gesture answering recognition for interactive response system) system. The IGRCNN technique focuses on solving the problems the FIGARIRS suffers. First, a small hand images require to enlarge the images when recognizing them. However, enlarged version of images are getting blur. In addition, hand and face are overlapping in an image. Moreover, complex backgrounds exist in an image. These three cases reduce the gesture recognition rate of the FIGARIRS. Therefore, the IGRCNN technique take super resolution based on autoencoder, image instance segmentation, and image matting based on color to promote the image quality before the gesture recognition of the FIGARIRS. Experiments have proved that the gesture recognition adopting the image super-resolution technique is superior to other methods.

Keywords：Gesture Answer、Image recognition、Image super resolution、Autoencoder、Image instance segmentation