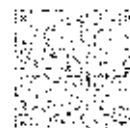


一種新穎性的特徵點雙向人臉 辨識方法

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摘要

本文提出一種以特徵點為基礎的新穎性人臉辨識演算法，稱為特徵點雙向辨識演算法，係藉由人臉上紋理明顯的特徵點資訊，根據特徵點的區塊匹配程度與彼此間的幾何分布關係，在輸入影像和訓練資料庫影像當中綜合判斷出人臉辨識結果。此演算法主要分成兩個部分，第一部分稱為順向辨識模組，它以測試影像做為參考影像、資料庫影像做為匹配影像的方式來進行辨識；而第二部分稱為反向辨識模組，是以資料庫影像做為參考影像、測試影像為匹配影像。對單一順向或反向辨識模組而言，它們都是先針對參考影像進行特徵點偵測，找出參考影像上具有明顯紋理特性的所有特徵點，並以這些特徵點來形成一組參考幾何模型；接著對每一個偵測到的特徵點，利用區塊匹配演算法，於匹配影像中找出與它最近似的最佳匹配特徵點，並以這些匹配特徵點來形成另一組匹配幾何模型，然後計算出這2組幾何模型的差異距離，產生辨識分數。最後，結合順向和反向的辨識分數，即可得出最終的辨識結果。為了達到即時處理的速度，本文進而提出先以廣義鑑別分析法對資料庫進行篩選，選出少數的候選人，再以所提出的雙向辨識演算法，來產生最後的辨

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識結果。針對3套公共人臉資料庫進行效能驗證，並與其它辨識方法做比較，實驗結果顯示，本文所提出的雙向辨識方法具有優異的辨識效果。

關鍵詞：人臉辨識、特徵點、區塊比對、幾何模型、辨識模組



A Novel Feature-Point Bilateral Face Recognition Method

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Abstract

A novel feature-point bilateral recognition (FPBR) method for recognizing human faces is proposed in this paper. According to the block matching score and the geometrical distribution of the facial distinct feature points, recognition is made for each input face image from the enrolled face database. This method mainly contains two modules, the first is the forward recognition (FR) module and the second is the reverse recognition (RR) module. FR regards each input face image as the reference image (RI) and each enrolled face image as the matched image (MI); and RR regards each enrolled face image as RI and each input face image as MI. Both FR and RR extract a set of distinct feature points from RI, and search the best matched position of each extracted feature point from MI through a block matching operation. Then according to the detected feature points and their matched ones, two geometrical models for describing their individual structure are constructed respectively. With a model comparison, the difference of the two geometric models is computed. Then, by associating the average matching strength of the feature points and the difference of geometric models, the scores of FR and RR are produced in term. Finally, by combining the scores of FR and RR, we can get the final result. To be on the speed of immediate processing, it is further suggested that we use the generalized

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discriminant analysis to screen the database first, find few subjects, and finally get the result through FPBR method. The experimental setup is performed on three famous face databases (Feret, Bancaand, Cas-Peal). Compared with other recognition methods, the result shows that the FPBR method has better effects than others do.

Keywords: face recognition, feature point, block matching, geometric model, recognition model