# 中文摘要

人臉五官抽取(Facial Component Extraction)在人臉資訊處理分析(Facial Information Processing and Analyzing, FIPA)技術的領域是很重要的問題，因為人五官抽取往往是許多人臉相關技術的前處理步驟。在許多人臉特徵點定位方法之中，主動式形狀模型(Active Shape Model)是常被使用的方法。然而，ASM的效果好壞常主要取決於人臉模型的初始化位置以及正確人臉特徵點的搜尋比對上；不好的初始化將導致無法搜尋到正確的人臉特徵點，而人臉特徵點搜尋不正確就無法抽取出準確的人臉五官輪廓，基於此因，本篇論文乃針對傳統ASM提出以下改進：(1)以反覆方式漸進找出較理想的特徵點初始位置、(2)利用動態時軸扭曲(Dynamic Time Warping)演算法搜尋出最佳之人臉特徵點位置、以及(3)改變傳ASM是以整張人臉來做人臉模型訓練與重建的方式，我們改以五官獨立的方式建立各自的形狀模型。本論文針對所提方法以大量經過訓練和未經過訓練的人臉樣本進行測試，實驗結果顯示本論文所提方法獲得了比傳統ASM還更準確的結果，且實驗顯示五官獨立追蹤比整張人臉追蹤更為理想。

關鍵字:人臉特徵點追蹤、主動式形狀模型、動態時軸扭曲

# Abstract

Facial component extraction (FCE) is a key problem in the facial information processing and analyzing (FIPA) because many facial applications require FCE as a preprocessing step. For extracting facial components, the active shape model (ASM) is an option commonly adopted by many researchers. As reported in many studies, the efficacy of ASM significantly depends on the initializing positions of facial landmarks and the finally searched facial landmarks. Badly initialized facial landmarks would not lead to accurate searching of facial landmarks and then cause inaccurate extraction of the contours of facial components. Focusing on the above key problems, the study presents the improvement over the traditional ASM by proposing the following design: (1) an iterative initialization method to incrementally refine the initial facial landmarks, (2) a facial landmark positioning method based on dynamic time warping algorithm, and (3) a component-based modeling of individual facial components, instead of the whole-face modeling used in traditional ASM. By conducting a number of experiments on trained and un-trained faces, the proposed method indeed achieves better accuracies of facial component extraction than the traditional ASM. Moreover, the results show that the proposed component-based approach is better than the common whole-face approach.

Key words ： human facial feature point track、Active Shape Model、Dynamic Time Warping