具情緒表達能力之社交機器人其面部表情設計與產生之研究

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摘　要

本文探討以具有情緒表達特性之機器人其臉部表情特徵演算與變化之機制。本文討論如何藉由二維情感座標系統分類建立出具有情緒狀態之臉部表情，再定義出各表情變化使用之控制特徵點。如此則可對不同情緒狀態之間其二維情感座標值計算出表情特徵之變化。爲了使情感之表達更爲接近一般人物之特性，此特徵點再經由貝茲曲線運算產生出更爲平順化的表情，此與設計之出情感座標系統結合以生成多樣且細膩之情緒行爲輸出。本文最後以 LabVIEW 模擬情緒狀態之臉部表情特徵輸出，就一般人對其所展現之情緒狀態進行認知實驗以測試分析本研究對於機器人以臉部展現其情緒狀態之有效性。

關鍵詞：社交機器人、臉部表情特徵、情緒分類、特徵控制、貝茲運算、連續表情變化、情感平面。

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Design and Generating the Emotional Facial Expressions of Social Robot

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Abstract

This paper discusses the facial expression generation mechanism of s the social robot . This article discusses how the two-dimensional emotional plane is used in the classification and establishment of facial expressions containing mood information. The algorithm for the expression variation under mood transition is also studied and verified. The smoothness of this transition is vital for the robot to mimic the human communication skill in the time domain history for showing the dynamic characteristics of live mood. The geometric feature control points of robot face are defined. Control points are used to generate the facial expression by the PA coordinate of the emotion coordinate system in the first place. The mood variation can then be mapped to the facial changes directly by the PA parameters. The Bezier curve function is used to generate the geometric shape among control points for more smooth and natural appearance. Finally, LabVIEW simulation of this facial expression and generation model is constructed. The cognitive experiments are conducted. The results demonstrate the effectiveness of this model.

Key words: Social Robot, Facial Expression, Emotional Plane, Mood Categories, Feature Control, Baez Operation

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