基于随机森林分类优化的多特征语音情感识别

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摘　要：语音情感识别是人机交互的研究热点之一.针对传统随机森林模型（RF）中决策树不分优劣具有同样决策权的不合理性，提出一种差分进化加权优化的随机森林分类模型（DERF）.RF 中样本的选择及每个节点变量的产生都是随机的，因此每次分类结果会有微小波动.为提高系统分类稳定性及识别准确率，集成构建三个相同的 DERF 分类器，按照多数投票原则确定最终决策结果.实验中融合语音的时域特征、频域特征、听觉语谱图特征及非线性 hurst 参数特征，分别选取柏林数据库和 CASIA 中文库中的五种情感进行识别，结果表明，本文所提方法有效提高了系统识别性能.

关键词：语音情感识别；随机森林；差分进化；多数投票

Multi-Feature Speech Emotion Recognition Based on Random Forest Classification Optimization

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Abstract：Speech emotion recognition is one of the research hotspots of human-computer interaction. In view of the irrationality of the decision tree in the traditional random forest model (RF), which has the same decision-making power, a differential evolution weighted random forest classification model (DERF) is proposed. In RF, the sample and each node variable are generated randomly, so there will be slight fluctuations in each classification result. In order to improve the system classification stability and recognition accuracy, three identical DERF classifiers are integrated and constructed, and the final decision results are determined according to the majority voting principle. In the experiment, the time domain feature, auditory language spectrum feature and nonlinear hurst parameter feature of speech were combined. The five emotions in the Berlin database and the CASIA database were selected to identify the results. The results show that the proposed method improves the system recognition effectively.

Key words：speech emotion recognition; random forest; differential evolution; majority voting

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