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应用

采用特征分类直方图均衡化的鲁棒性语音识别

姜莹, 俞一彪

苏州大学电子信息学院

摘要:

大部分噪声会引起语音倒谱域特征参数的非线性失真, 导致识别系统性能下降。直方图均衡化方法是一种非线性补偿变换技术, 较传统的基于线性变换技术的抗噪声方法进一步提高了系统的鲁棒性。但实际识别系统中, 除了噪声引起语音特征的非线性失真外, 还存在训练和测试数据的语音特征类分布不一致问题, 从而难以保证传统的直方图均衡化方法发挥其优势。本文提出一种基于特征分类的直方图均衡化方法, 首先对初步均衡化后的含噪语音特征矢量进行K均值分类, 然后对各类别下的特征矢量再进行直方图均衡变换。实验结果表明, 低信噪比时无论在平稳噪声还是非平稳噪声环境下, 与传统的直方图均衡化方法相比都进一步增强了识别系统的鲁棒性。

关键词: 语音识别; 直方图均衡化; 特征分类; 鲁棒性

Robust Speech Recognition Using Histogram Equalization of Classified Features

JIANG Ying, YU Yi-Biao

Soochow University, Suzhou

Abstract:

Noises cause feature distortion of speech and make the performance of speech recognition system seriously poor. Comparing with classical methods, the histogram equalization can reduce non-linear distortion and improve the robustness of speech recognition system quite well. However in many applications, the feature distribution between training and test speech is usually not identical because of their difference in phonetics or acoustics, then the validity of HEQ can be weaken. The proposed algorithm in this paper utilizes K-means clustering to classify the pre-equalized noisy features into several classes, then further equalizes the features belong to the same class. The experiments show the proposed method improves the performance of system with comparison of usual histogram equalization.

Keywords: Speech recognition Histogram equalization Feature classification Robustness

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通讯作者:

作者简介:

作者Email: jiangyingawu@163.com

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