Multi-Granularity Feature Extraction and Optimization for Pathological Speech Intelligibility Evaluation

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Abstract : Speech intelligibility assessment is an important measure to evaluate the functional outcomes of surgical and non-surgical treatment, speech therapy and rehabilitation. The assessment of pathological speech plays an important role in assisting the experts. Pathological speech usually is non-stationary and mutational, in this paper, we describe a multi-granularity combined feature schemes, and which is optimized by hierarchical visual method. First of all, the difference granularity level pathological features are extracted which are BAFS (Basic acoustics feature set), local spectral characteristics MSCC (Mel s-transform cepstrum coefficients) and nonlinear dynamic characteristics based on chaotic analysis. Latterly, radar chart and F-score are proposed to optimize the features by the hierarchical visual fusion. The feature set could be optimized from 526 to 96-dimensions.The experimental results denote that new features by support vector machine (SVM) has the best performance, with a recognition rate of 84.4% on NKI-CCRT corpus. The proposed method is thus approved to be effective and reliable for pathological speech intelligibility evaluation.