Bispectrum pattern analysis and quantization to speaker identification

Mohamad Ivan Fanany, author

Abstrak

ABSTRACT
This study describes bispectrum pattern analysis and quantization for identifying speaker in noisy environment. Direct, non-parametric, bispectrum analysis and estimation was performed before quantization and classification process. As for reliable quantization approach this study applied an algorithm of vector quantization method using combined Self Organizing Feature Map (SOFM) and Learning Vector Quantization (LVQ) neural network, to quantize bispectrum of speech data. Since there is no prior knowledge on bispectrum data distribution to determine class information, we used an adaptive codebook generation method, which is a hybrid of SOFM to generate the codebook internally and LVQ algorithm to improve the cluster distribution in the classifier decision. In addition with the SOFM+LVQ algorithm, a nonlinear vector quantization method (NLVQ) is introduced in dealing with a case where there is a low-separability problem of codebook data obtained from one speaker. This new NLVQ technique employs a nonlinear third order hyperbolic tangent function which combines noise suppression effect with a dynamic range limitation, in or-der to transform the bispectrum input data to be used for making the codebook. Nearest-neighbor rule statistical analysis was used to estimate the recognition performance of the system before classification.