Digit recognition using neural networks

ABSTRACT

This paper investigates the use of feed-forward multi-layer perceptrons trained by back-propagation in speech recognition. Besides this, the paper also proposes an automatic technique for both training and recognition. The use of neural networks for speaker independent isolated word recognition on small vocabularies is studied and an automated system from the training stage to the recognition stage without the need of manual cropping for speech signals is developed to evaluate the performance of the automatic speech recognition (ASR) system. Linear predictive coding (LPC) has been applied to represent speech signal in frames in early stage. Features from the selected frames are used to train multilayer perceptrons (MLP) using back-propagation. The same routine is applied to the speech signal during the recognition stage and unknown test patterns are classified to the nearest patterns. In short, the selected frames represent the local features of the speech signal and all of them contribute to the global similarity for the whole speech signal. The analysis, design and development of the automation system are done in MATLAB, in which an isolated word speaker independent digits recogniser is developed.

Keyword: Digits recognition; Feed-forward back-propagation; Linear predictive coding; Neural networks; Speech recognition