97. Identification Of Individuals Using Voluntary Cough Characteristics

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Currently, there is a great deal of interest in identifying persons by their speech characteristics. The purpose of this study was to determine if the sound and airflow patterns during a cough have potential for identifying individuals. In a preliminary study, 14 volunteers (13 men and 1 woman) were asked to perform three voluntary coughs over a 2 month period using the system and procedure previously described (Goldsmith et al., Proc. 3rd Int. W. of Biosig. Interp. 1999). Between 6 and 110 coughs were recorded for each subject. A series of 60 cough sound pressure wave and airflow parameters were calculated for each cough. Three percent of the coughs exhibited deviations greater than two standard deviations from the mean and were discarded from the study. A principal component analysis of the data was performed, and the 20 most significant components were selected as inputs to a quasi-Newton back propagation neural network classification system. The neural network was trained with half the coughs from all subjects. The remaining individual coughs of each subject were identified based on the training set. Results were used to construct Receiver Operating Characteristic (ROC) curves to evaluate the ability of cough parameter analyses techniques to identify individuals. The sensitivity and specificity of the identification procedure were equal at 0.997 and the test discrimination or area under the ROC curve was 0.999. Cough parameter analysis appears to have great potential for identifying individuals.

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