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ABSTRACT

NOVEL CLASSIFICATION METHOD OF NORMAL AND SICK PATIENTS WITH CRACKLES USING WAVELET PACKETS AND SUPPORT VECTOR MACHINE

Author: Lt Paweł Stasiakiewicz MSc Eng.
Supervisor: Prof. Andrzej P. Dobrowolski PhD Eng.
Co-supervisor: Robert Olszewski PhD MD, Professor of National Institute of Geriatrics, Rheumatology and Rehabilitation

Aim: elaborating of artificial neural network for classification of normal and sick patients with crackles based on lung sounds analysis.

Motivation: application of the system to support inexperienced doctors, during telemedicine consultations as well as to observe patients during convalescence at home.

Thesis: *it is possible to elaborate automatic classifier of normal and sick patients with crackles having sufficient accuracy for medical purposes.*

Methods: feature generation was conducted using packet decomposition. Owing to respiratory phase detection algorithm, wavelet coefficients or reconstruction samples statistics were extracted. Selection process was conducted with wrapper method, i.e., genetic algorithm coupled with SVM network. Classifiers' ensembles using different features sets obtained by Bayesian optimised SVM networks were performed.

Results: linear system with proved generalisation ability of 92,8 % accuracy as well as nonlinear with accuracy amount to 98,0 % were presented. Cross-validation with object crossing was used as to evaluate the methods in 353 biomedical signals database. Achieved results prove the doctoral dissertation thesis.

Keywords: lung sounds, crackles, wavelet packets, support vector machine, genetic algorithm.

Paweł Stasiakiewicz
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