International Journal of Electrical and Computer Engineering
Volume 8, Issue 3, June 2018, Pages 1530-1538

Classification of normal and crackles respiratory sounds into healthy and lung cancer groups (Article) (Open Access)

Abdul Malik, N., Idris, W., Gunawan, T.S., Olanrewaju, R.F., Noorjannah Ibrahim, S.

Department of Electrical and Computer Engineering, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, 53100, Malaysia

Abstract

View references (21)

Lung cancer is the most common cancer worldwide and the third most common cancer in Malaysia. Due to its high prevalence worldwide and in Malaysia, it is an utmost importance to have the disease detected at an early stage which would result in a higher chance of cure and possibly better survival. The current methods used for lung cancer screening might not be simple, inexpensive and safe and not readily accessible in outpatient clinics. In this paper, we present the classification of normal and crackles sounds acquired from 20 healthy and 23 lung cancer patients, respectively using Artificial Neural Network. Firstly, the sounds signals were decomposed into seven different frequency bands using Discrete Wavelet Transform (DWT) based on two different mother wavelets namely Daubechies 7 (db7) and Haar. Secondly, mean, standard deviation and maximum PSD of the detail coefficients for five frequency bands (D3, D4, D5, D6, and D7) were calculated as features. Fifteen features were used as input to the ANN classifier. The results of classification show that db7 based performed better than Haar with perfect 100% sensitivity, specificity and accuracy for testing and validation stages when using 15 nodes at the hidden layer. While for Haar, only testing stage shows the perfect 100% for sensitivity, specificity, and accuracy when using 10 nodes at the hidden layer. © 2018 Institute of Advanced Engineering and Science.

Author keywords

ANN Crackles DWT Lung cancer Respiratory sound

Funding details

Funding sponsor	Funding number	Acronym
Ministry of Higher Education, Malaysia	FRGS16-067-0566	

Funding text

The authors would like to acknowledge the Ministry of Higher Education Malaysia (MOHE) for funding this research project through Fundamentals Research Grant Scheme (FRGS) [Ref.:FRGS16-067-0566]. We also would like to thank Dr. Rozita Abdul Malik and Dr. Adlinda Alip of UMMC for their consultation and advice on lung cancer related issues

ISSN: 20888708
DOI: 10.11591/ijece.v8i3.pp1530-1538
Source Type: Journal
Document Type: Article
Original language: English
Publisher: Institute of Advanced Engineering and Science

References (21)

View in search results format