



Advances in Signal and Data Processing, pp 157-168 | Cite as

# A Robust Approach of Estimating Voice Disorder Due to Thyroid Disease

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Conference paper

First Online: 12 January 2021

131 Downloads

Part of the Lecture Notes in Electrical Engineering book series (LNEE, volume 703)

## Abstract

Thyroid is butterfly-shaped gland present in the lower anterior of the neck. The main root of thyroid disease is the improper working of thyroid gland. Thyroid disease is mainly categorized into two types, i.e., hypothyroidism and hyperthyroidism. In this study, voice samples for two disorders—hypo and hyper along with normal voice samples are considered. A databank is created for three classes—normal, hypo, and hyper. The structure of the robust approach of diagnosing thyroid disease contains four stages. In the first stage, preprocessing is performed by considering framing, windowing, and filtering. In the second stage, feature extraction is performed by using mel-frequency cepstral coefficient (MFCC) method. In the third stage, classification is achieved by using combined classifier, i.e., support vector machine (SVM), and hidden Markov model (HMM). In the fourth stage, performance evaluation for diagnosing thyroid disease is achieved by estimating accuracy, confusion matrix, and precision. The classification accuracy of a robust approach for diagnosing thyroid disease is obtained about 97.28%.

## Keywords

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