A Mathematical Approach to Speech Enhancement for Speech Recognition and Speaker Identification Systems

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Abstract In order to cope with acoustic degradation where clean sample of speech, free of interference and noise, prior to recognition stage, and identification–verification system, an efficient recognition and authentication of a particular speaker are necessary. In this paper, an approach for enhancement of speech is implemented using Fourier transform followed by spectral subtractive principle in upgrading speech signal contaminated due to noise. This methodology is employed in efficient recognition system for speech and identification–verification system of speaker as the degraded signal complicates hearing and understanding of speech signal. A Fourier transform approximates and derives spectrum of corrupted speech, and the spectral subtractive algorithm suppresses the amount of noise from noise spectrum to achieve clean signal.

Keywords Additive white Gaussian noise · Fourier transform · Spectral subtraction · Speaker identification · Speech enhancement · Speech recognition · Temporal convolutional neural network · Machine learning

1 Introduction

As we reside in native surroundings filled with noise and disturbance, there is generally unwanted noise associated with the signals particularly speech that hinders the processing of signals in original form. Noise and unwanted interference affect human–human and human–machine communications among varied fields which include degrading the properties of speech involving intelligibility together with

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A. Iqbal et al. (eds.), *Renewable Power for Sustainable Growth*, Lecture Notes in Electrical Engineering 723, https://doi.org/10.1007/978-981-33-4080-0_62