Introduction

• Undesirable side effects of digital processing of speech signals are:
  • Amplification/attenuation of the target speech
  • Changes in coloring and loudness

• The goal for this project is to develop an automatic volume leveling algorithm which will, under real time constraints,
  • Fix any incorrect attenuation/amplification of the speech signal
  • Ensure there is no clipping in the scaled signal

Motivation

• The type of processing algorithms focused on for this project were noise reduction algorithms
  • While attenuating the noise, these algorithms often attenuate speech as well

Results (continued)

K(i) = \alpha \cdot K(i - 1) + (1 - \alpha) \cdot R(i)

SNR, TNL, and NPL Increase for Volume-Leveled Signal as Compared to Noise-Reduced Signal

Using Ideal VAD

• Using an ideal VAD, the volume-leveled signal attains a greater SNR increase than noise level increase
• Unfortunately, using a real VAD, the noise level increased more than the SNR

Results

• For all SNR’s, the volume in speech regions was restored, on average, to about 100% of the volume in the original signal

Conclusions and Future Work

• Demonstrated an algorithm to restore speech volume and correct attenuation/amplification problems that have been introduced during processing
• Future work:
  • Find a way to remove VAD from the algorithm
  • Implement the system for use in C programming
  • Restore coloring of speech in addition to volume

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