Lab no 1:

Removing the background noise from recorded voice signal audio file.

Objective: To remove the background noise from a recorded voice signal using audacity and analyze the result.

Materials: Audacity software, Recorded voice signal audio file (with background noise.

Steps:

1) Import Audio File
   - Go to File > Open and select the recorded voice signal audio file.

2) Select a Noise Profile
   - Identify and highlight the segment of audio that contains only background noise using Selection tool (I-beam icon)
   - Go to Effect > Noise Reduction
   - Click get Noise Profile.

3) Apply Noise Reduction
   - Select the entire track by Select > All (Ctrl+A)
   - Go to Effect > Noise Reduction again (Ctrl+R)
   - Set the Noise Reduction (dB), Sensitivity and Frequency Smoothing. You can start with default and adjust as necessary
   - Click Ok to apply the noise reduction

4) Listen and Fine-Tune
   - Play the audio to check the quality.
   - If necessary, repeat noise reduction process with adjusted setting until desired quality is acheived

5) Save the Cleaned Audio
   - Go to file > Export and choose the desired format (e.g WAV, MP3)

Discussion:

In this lab, we used Audacity to remove background noise from a recorded voice signal. The process involved selecting a noise profile from a segment of the audio containing only background noise and applying noise reduction to entire track.

1) Noise profile Selection
   - We used a silent segment at the beginning of recording

2) Noise Reduction and fine tuning
   - Applied the noise reduction effect using desired settings
   - Fined-tuned settings as needed to balance noise removal with voice clarity

3) Result
   - Before Noise Removal: The waveform showed significant background noise, audible during playback.
   - After Noise Removal: Background noise was significantly reduced, resulting in a clearer voice signal.

Conclusion:

Thus, removing background noise from an audio recording is essential for producing clear and professional-quality voice signal. Audacity provides a straightforward and effective tool for this purpose. Through this lab, we learned the steps to perform noise reduction and importance of fine-tuning the settings to acheive the best results.

Lab no 2:

Mixing the two audio files together

Objective: To mix the two audio files together and analyze the results.

Materials: Audacity software, Two audio files to be mixed.

Steps:

1) Import Audio Files
   - Go to File > Import > Audio and select the first audio File.
   - Repeat the process to import second audio file
2) Align Tracks
   - Use Time shift tool (older version) to align tracks as desired. (In newer version). Hold on top of waveform and drag the clip to align as you need
3) Adjust Volume Levels
   - Use the slider on the leftside of each track to balance the volume levels.
4) Mix and Render
   - Go to Tracks > Mix > Mix and Render. This will combine the tracks into one
5) Export the Mixed Audio.
   - Go to File > Export and choose the desired format (e.g. WAV, MP3)

Discussion

In this lab, we mixed two audio files together using Audacity. The process involved importing both files aligning them, adjusting volume levels, and mixing them into a single track.

1) Alignment
   - We used Time shift tool (hand icon) to align the tracks as desired, either synchronizing them or staggering them.

2) Volume Balance
   - We adjusted the volume of each track to ensures both audio files were audible and balanced.

3) Mixing and Rendering
   - We combined the tracks into single using the Mix and Render function

4) Results
   - Before Mixing: The individual waveforms of the two audio files were distinct and separate.
   - After Mixing: The combined waveform showed the integration of both audio files into a single mixed track.

Conclusion

Thus, mixing audio files is a fundamental skill in audio editing and production. Using Audacity we successfully combined two audio files into a single track, demonstrating the importance of alignment and volume balance for creating a well-mixed audio file.