MRSP Seminar Project Group 3

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Task 1: Preparing audios

We will use room impulse responses (RIRs) from the MIT database to simulate different acoustic environments for our original audio files. These environments include a small office, an auditorium, and a movie theatre. Our original audio files are in stereo with 16-bit depth, while the RIRs are mono with 24-bit depth. To apply reverberation, we will perform convolution on the original audio files using the RIRs, effectively transforming the audio to reflect the characteristics of these environments.

Audio source https://github.com/Fraunhofer-IIS/ODAQ.git

RIR source https://mcdermottlab.mit.edu/Reverb/SurveyData.html

Task 2: Perceptual loss

In this task we will be calculating perceptual loss of different audio environments and saving them is a CSV file. We will calculate the perceptual loss using the psycho-acoustic torch loss function.

Losses calculated are saved in a CSV file. Below is the table of calculated losses.

	Audio File	Loss
1	Trumpet_Auditorium.wav	0.719163
2	Trumpet_Movie_Theater.wav	1.072809
3	Trumpet_small_office.wav	0.205078
4	violin_Auditorium.wav	0.104682
5	violin_Movie_Theater.wav	0.1873
6	violin_small_office.wav	0.222369
7	guitar_Auditorium.wav	0.806711
8	guitar_Movie_Theater.wav	0.499256
9	guitar_small_office.wav	0.327114
10	accordion_Auditorium.wav	0.21467
11	accordion_Movie_Theater.wav	0.185658
12	accordion_small_office.wav	0.28277
13	jazz_Auditorium.wav	0.162242
14	jazz_Movie_Theater.wav	0.154417
15	jazz_small_office.wav	0.219969

Task 3: Creating Mushra Test

This task is to create a test to compare original audio with its different audio environments subjectively. We developed this Mushra test using Scale. Scale is a MATLAB application used to create, perform and analyse different audio tests. These audio tests also include mushra test which we developed. It was created in a way that reference audio is compared to it's own reverberated versions

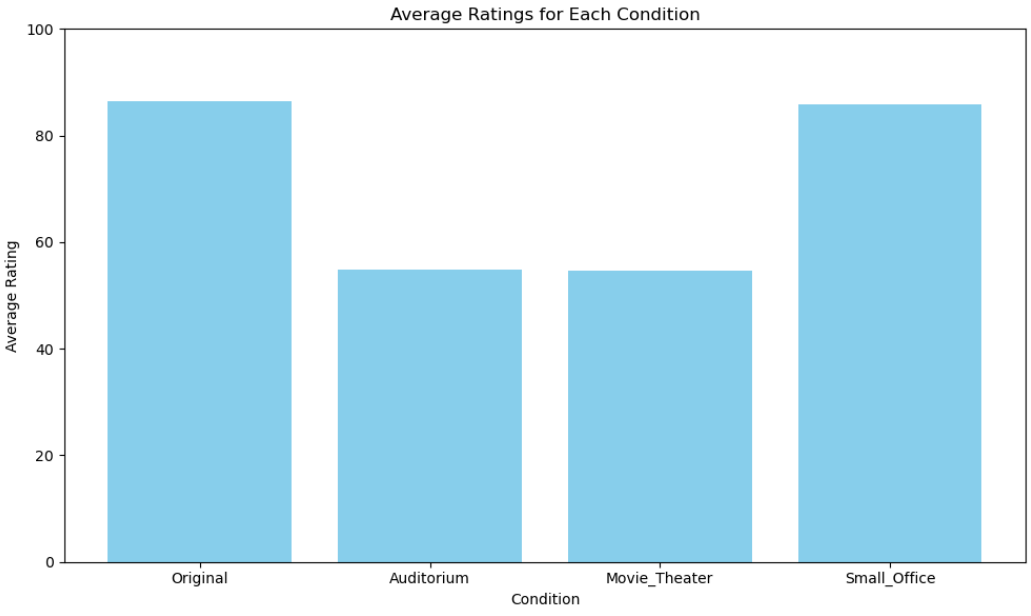
Task 4: Listening Experiment

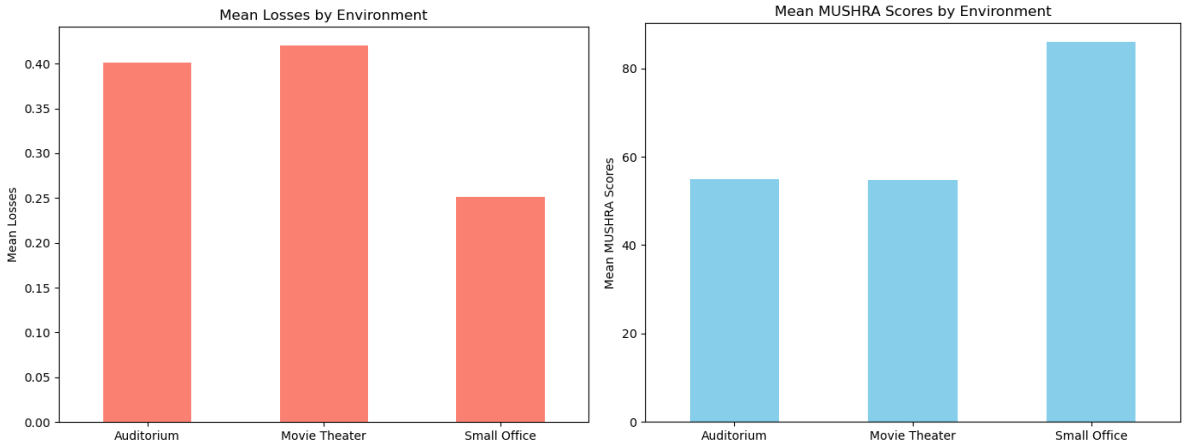
In this task the Mushra test was conducted using the developed mushra test in task 3. In our case there were 20 participants 4 female and 16 males. All the participants were given a small briefing on how to rate the audios. They were told to compare only the original audio or the referenced audio to the other audios. After comparing they must rate how similar both audios were. 100 means completely same and 0 means completely different.

Task 5: Analysis

In this task we will be analysing task 2 results with task 4 results. We will see if there is any relation between subjective measures and objective measures. We will start by importing the .mat file which includes task 4 ratings and losses.csv file which contains objective values of losses.

We will convert .mat file to CSV file so we can easily use it for our analysis. The data stored in .mat file is as in the form of array or list in Scen1, Scen2, Scen3, Scen4 and Scen5. Where Scen1[0] is Accordian_Original. When we will convert it to CSV where Scen1[0] will be scen1_col1 it will be easy to change the name of the header and plot graphs accordingly. Once conversion is done now, we will import Mushra_grp3_renamed.csv and plot average rating of each environment.





The Mean Mushra score graph shows that small office is the most similar audio when compared to original audio. This means that original audio and small office audios are felt the same to the human ears. The Mean losses graph also shows the least loss is of small office. This shows positive relation between psycho-acoustic loss function and Mushra test.