

Department of Information Technology

Communication Systems Lab (IT 2271)

Assignment 5

In this exercise, you will implement a quantizer for a sampled audio stream and see the effects of reducing the number of quantization levels on sound quality.

- a) Use any audio file <file_name>.wav. Use the Matlab function `audioread` to read the audio clip into Matlab. Be sure to capture all the outputs, as you will need these to properly play back the quantized version you will produce. You can play back a vector using the `sound` function.
- b) Create a function called `quantize` that will take as input the sound vector produced from `audioread` and the number of quantization levels, N , as a power of two (an input of 4 would be 2^4 quantization levels). For simplicity, implement a uniform quantizer with the region size, Δ , being evenly spaced across the range of the input sound and x_i being assigned the middle of the region.
- c) The quantizer function should return the following:
 - a. Quantized waveform ready for playback
 - b. Mean squared-error distortion between the quantized waveform and the original input
- d) Run your function for $N = 1, 2, \dots, 8$. Play back the result using `sound` to hear the distortion (remember to use the values returned from `audioread` function). Note: As the number of quantization levels increases, the running time will take longer.

(The values given in the problem are for your reference. You may change the values according to your requirement)