LAB-7

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7.1 Quantisation

7.1 d:

Comparison between histograms for B=4 and B=3

- The histogram for B=4 is symmetrical and uniformly spread while for B=3, it has non-uniform distribution.
- This Is because when B=4, B being an even number, causes even distribution of the samples.

7.1 e:

Observation:

- On increasing the value of B, number of level increases.
- Quantized signal tends close to the sampled signal i.e. deviation between sampled and quantized signal decreases.

- Maximum absolute error decreases on increasing the value of B.

7.1 f:

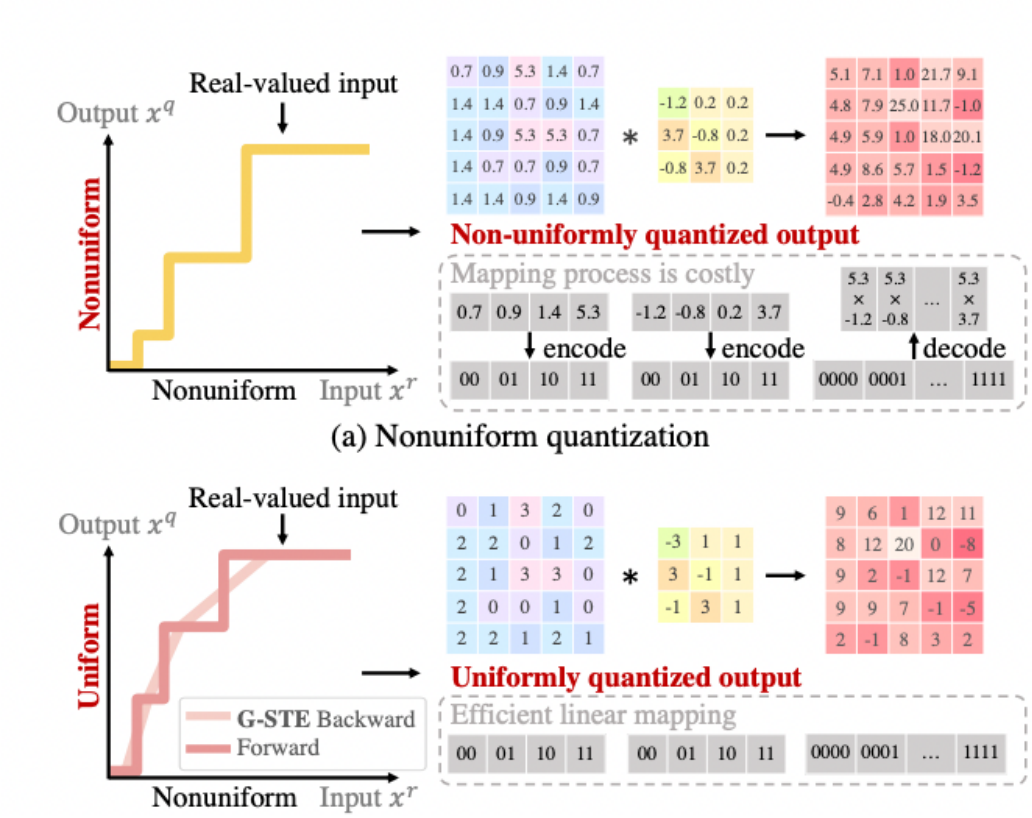
Observation:

As SQNR=$\frac{\sum_n |x[n]|^2}{\sum_n |eq[n]|^2}$

- On increasing the value of B, Maximum absolute error decreases i.e. quantization noise power decreases and hence SQNR increases.

7.1 g:

- The accuracy of non-uniform quantizer is higher at the end and start than in the middle following sort of Gaussian distribution
- This non-uniform quantizer is more accurate than uniform quantizer where the error keeps increasing as we go right in interval.
- Also the variance between mapped values and actual values is lower in non-uniform quantizer than uniform quantizer



7.2 Quantisation of Audio signal

Comparison between sound quality quantized signal and original signal

- Sound quality of original signal is better than quantized signal as there is always some loss of information while quantisation.
- The sound becomes more clear as the number of level increases as it replicates the sample better reducing the error in the signal.
- As number of bits(B) increases, number of level increases and hence frequency content of quantized signal decreases as level is changed.