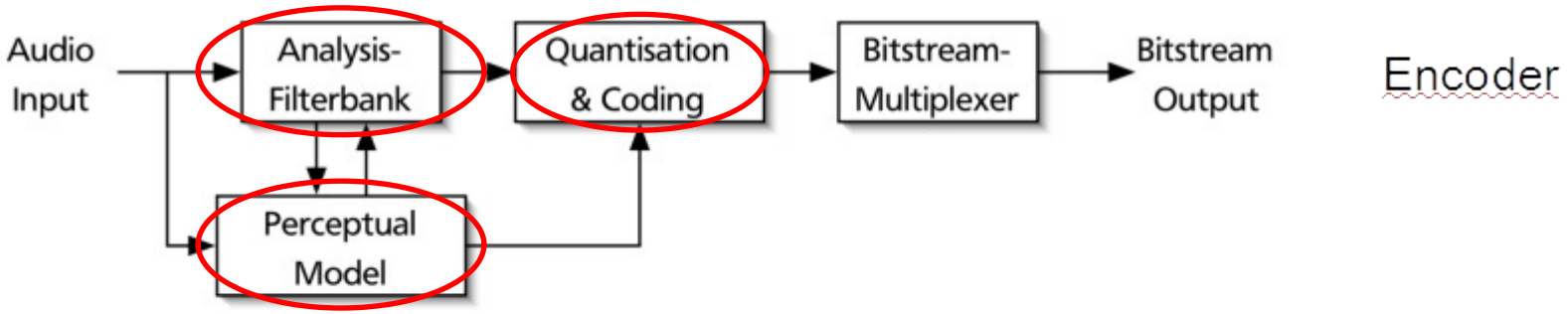
Audio Coding - Practice Lessons

Seminar 5 – Combination of Perceptual Model, Quantization & Coding

Perceptual Audio Encoder



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Homework Assignment 5

Goal:

- Combine the last two seminar tasks, to get a perceptually coded audio signal

How to achieve that:

- Take you perceptual model, with its quantization step sizes or scalefactors (reverse quantization step sizes) from Seminar 4, and apply quantization to your MDCT analysis filter bank output (Seminar 2) in the encoder. Then, apply Huffman coding.
- In the decoder, Huffman de-coding, apply de-quantization with the quantization step sizes or scalefactors from the encoder (side-information), and apply the synthesis MDCT filter bank.

Homework Assignment 5

Part 1:

- Take the psycho-acoustic model of last time and implement it in your coder with the MDCT.
- Then include the quantizer and the de-quantizer in the decoder and control them both with your psycho-acoustic model.
- Transmit the side-information of your psycho-acoustic model (the scalefactors or quantization step sizes for the scalefactor bands) from the encoder to the decoder, so that the decoder has the suitable de-quantizer.
- To avoid too much bitrate from the scalefactors or quantization step sizes, transmit them only once per scalefactor band

Homework Assignment 5

Part 2:

- **Save encoded audio to „encoded.bin“ file with scalefactors (quantization step sizes)**
- **Open „encoded.bin“ file in the decoder**
- **Listen to the decoded sound signal**
- **Plot quantization error with your masking threschold to ensure that your quantization error is hidden**
- **Apply to the same audio signal MDCT – quantization – coding from HW 3 save it to „encoded_hw3.bin“**
- **Compare file sizes of „encoded.bin“ and „encoded_hw3.bin“**
- **Encoder and Decoder – 2 different python files!!**
- How does it sound?
- If it sounds bad, try to improve (fine-tune) your coder.