Winter 2017 Course Announcement

EECS 553 -- Theory and Practice of Data Compression

Data compression (also called source coding) is the process of creating binary representations of data from sources such as speech, images, audio, video or text. This course gives a broad introduction to the theory and practice of lossy compression, where perfect reproductions are not possible or require too many bits (for example for speech, images, audio, video), and some introduction to lossless compression, where perfect reproductions are required (for example for text or other discrete data). Particular attention is paid to compressing images, speech and video.

The lossy compression methods include a number of quantization techniques: scalar, vector, predictive (e.g. DPCM), transform (e.g., JPEG, MPEG, H.26X), subband (e.g., MP3, wavelet, JPEG2000), predictive and adaptive quantizers (e.g., CELP as used in cell phones to compress speech). The theory is mainly high-resolution quantization theory.

The lossless compression methods include Huffman, conditional, run-length, Lempel-Ziv, and arithmetic codes. The theory is entropy theory.

Students gain experience in data compression via a term project.

The course is oriented toward first and second year graduate students. No previous introduction to data compression is presumed.

Time: MW 1:30-3

Room: 3427 EECS Bldg.

Credit hours: 3

Instructor: Prof. D. L. Neuhoff,   3401 EECS

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Prerequisite: EECS 501, Probability and Random Processes

Text: Distributed class notes.