CDI/DIC 2015/Spring TEACHING GUIDE

General description

Overall, the course is aimed at understanding the importance of compression, such as before storing or transmitting data; to distinguish between lossless or lossy compression and acquire criteria to decide which one to use in each case; and to become familiar with the corresponding theoretical, algorithmic and computational aspects.

Objectives

1. To know the basic principles of information theory and the ways they are applied in relation to compression: Introduction to Shannon information theory. Sources of information, communication systems, uncertainty and entropy, limits of compression.
2. To understand what is lossless compression, the circumstances in which it is applicable, and the most important methods to achieve it: Source coding; Huffman algorithm; Arithmetic coding; Transform coding; Cosine transform.
3. To become familiar with the concepts of lossy compression, the way the degree of compression and its fidelity are measured, and the most important methods used in practice: Signal sampling; Haar compression; Daubechies compression; Special features of image compression.

Evaluation procedures

T: attendance to classes (up to 10 points)
L: in-class labs (up to 10 points)
Lw: extra credit for quality of lab work (up to 5 points)
Aw: weekly assignements (up to 15 points)

Wp: presentation of paper project (up to 10 points)
Wf: final written paper (up to 20 points)

The final exam consists of Tf and LPf:
Tf: explain one of the topics of a list (up to 15 points)
LPf: lab/problem in final exam (up to 15 points)

Final mark: sum of points divided by 10

The basic idea is: work regularly in the class hours.

References: see the class materials.