INFORMATION THEORY, INFERENCE AND LEARNING ALGORITHMS (200 LEVEL : AUG-DEC)

INSTRUCTOR: AMBEDKAR DUKKIPATI

Description of the Course

Information theory has many established applications in statistics. Considering that machine learning has become one of the central area of research in computer science departments, this course expose students to fundamental results in information theory and its applications to machine learning. This course also emphasizes rigorous reasoning.

Syllabus

Data compression and Kraft's inequality, source coding theorem and Shannon entropy, Kullback-Leibler divergence and maximum entropy, I-projections and Sanov theorem, Kullback-Csiszar iteration and iterative scaling algorithms, Fisher information and Cramer-Rao inequality, quantization and introduction to rate distortion theory, generalized information measures and power-law distributions.

References

Elements of Information Theory, by T. M. Cover and J. A. Thomas, John Wiley & Sons, 2nd edition, 2006.

Information Theory, Inference, and Learning Algorithms by D.J.C. MacKay, Cambridge University Press, 2003.