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Statistical learning theory for scientific applications: an overview

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The statistical learning theory allows the estimation of functional dependency from a given collection of data. It includes discriminant analysis, regression analysis and the density estimation problem. It is used to obtain data-driven models to relate heterogeneous quantities with the aim of making predictions. In science, statistical learning is an essential theory to find relationships among quantities whose formulation cannot be deduced from first principles. This talk summarizes the use of statistical learning methods in scientific problems: from unsupervised techniques to supervised techniques, from simple predictions to probabilistic predictions, from non-parametric estimations to parametric estimations, from real-time needs to off-line needs and from standard datasets of information to privileged datasets of information. Concepts and examples will be given.

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