basque center for applied mathematics

Working Seminar
(MP – Mathematical Physics
Singularity Theory And Algebraic Geometry)

Wednesday, November 28th, 11:00-13:00
BCAM Seminar room

MAXIMAL ENTROPY OF THE IMAGES OF CONVEX SETS UNDER PROBABILISTIC TRANSFORMANTIONS

Bharath Roy Choudury (Indian Statistical Institute, Kolkata)

In classification problems, we often deal with the cases where we cannot define a deterministic function from features to labels. In order to study such problems, we use a generalization of deterministic functions namely probabilistic transformations which are the linear transformations between probability simplexes. In the talk, we will describe the nature of such maps in projective settings and generalize the notion of convexity to projective spaces. The points of uncertainty set corresponding to maximal entropy distributions for 0-1 classification losses are also characterized as the projection of origin on the uncertainty set with respect to infinity norm. We will provide a method to compute such points when the uncertainty set is a convex subset of the probability simplex, and explore their behaviour for the image of convex sets under probabilistic transformations.

SUPERVISED CLASSIFICATION BASED ON MINIMAX PROBABILISTIC TRANSFORMATIONS

Andrea Zanoni (École polytechnique fédérale de Lausanne)

One of the most common and studied problem in machine learning is classification. While conventional algorithms for supervised classification rely on the determination of a function from features to labels, we propose a different approach based on the estimation of a probabilistic transformation from features to labels. Indeed, we determine a conditional probability distribution of the labels given the features and then features are classified as labels following such distribution.

In order to compute the conditional distribution, we follow a robust minimax approach, minimizing the worst-case expectation of the 0-1 loss. By doing so, we find the probabilistic transformation which achieves the minimum risk against an uncertainty set consistent with the training data. We show numerical results obtained by an implementation in python of this method and we compare its performance with state of the art techniques.

ENERGY MANAGEMENT

Samuel Gyamera (Pan African University, Institute of Basic Sciences, Technology and Innovation)

Accurate electricity load forecasting is fundamental to avoid blackouts, power system failures, and extra cost of storage. Probabilistic forecasting methods are used to quantify the uncertainty associated in load forecasting. Distinctively from previous studies, we use a new optimziation metric that gives more weight to under-forecasting compared to over-forecasting of electric load demand.

EUSKO JAURLARITZA GOBIERNO VASCO
HEZKUNTZA SAILA
DEPARTAMENTO DE EDUCACIÓN

EXCELENCIA SEVERO OCHOA

matematika mugaz bestalde