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na přednášku v rámci

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The $DD\alpha$-classifier

Abstrakt

Data depth is a general name for functions measuring centrality of a point w.r.t. a given distribution or a sample. It describes data's location, shift and scatter, trims it with the upper-level sets — central regions. In this talk, one of numerous applications of the statistical data depth is regarded — construction of classifiers.

The proposed methodology for supervised learning is based on the idea of Li et al. (2012): it first maps the data into the depth space, and then applies a separator in this space. The so-called *depth-vs-depth plot* (DD-plot), a subset of $[0,1]^2$, is constructed of the training points with their coordinates being depths w.r.t. each of the classes. Then, in this depth space, the *α-procedure* is employed, which is a very fast heuristic that minimizes empirical risk. We call the resulting technique the *DDα-procedure*.

When employing the *DDα-classifier* a practitioner has several decisions to make. First, the depth notion has to be chosen. Here one should compromise between symmetry of the depth contours, robustness and speed of computation. Another issue is presence of *outsiders* — points having zero depth w.r.t. each of the classes in the classification stage, which can be the case for the depths vanishing beyond the convex hull of the data. To resolve this issue, an additional *outsider treatment* is used. Several variants of the *DDα-classifier* differing in the used depth notions and treatments are contrasted in an empirical study, which involves 50 real-data classification problems. Further experiments consider fat-tailed and asymmetric distributions.

The *DDα-classifier* possesses a natural extension to more than 2 classes and to functional data.

K účasti jsou srdečně zváni všichni učitelé, vědečtí pracovníci a studenti,
kteří mají zájem o danou problematiku.

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