Model based trees for ordinal response: a proposal and some applications

Carmela Cappelli

Abstract

Model-based trees are particularly appropriate to grow reliable tree structures as they combine the advantages of automatic learning with rigorous justification of statistical modeling and inference. This talk focuses on the case of ordinal responses arising from judgements, perceptions and evaluations, illustrating a novel approach that grows model-based trees on the basis of the local estimation of CUB models. This class of mixtures is particularly appropriate as it designs the response process as the combination of two components: a personal feeling which expresses substantial likes/dislikes, satisfaction/dissatisfaction or agreement/disagreement, and an inherent uncertainty that accounts for nuisance effects and heterogeneity in the responses. The proposed method is called CUBREMOT (CUB Regression Model Trees). The partitioning process is tailored to identify responses profiles in terms of feeling and uncertainty conditional to the splitting variables. Alternative splitting criteria are implemented, featuring both inferential and fitting issues. Moreover, the chosen modelling framework allows for advantageous visualization of the classification results. The proposal is illustrated with applications to real data also comparing CUBREMOT to other recursive partitioning methods.