A RECURSIVE PARTITIONING PROCEDURE TO EXPLORE SHORT TERM EFFECTS OF WEATHER ON HEALTH

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In applied regression problem it could be interesting modelling a non linear functional relationship between a response variable and a continuous variable with linear splines. An important and crucial aspect regards the location and number of the cut points that should be estimated. This problem could be even more complicated when the relationship differs among subgroups and robust analytical methods that can disentangle complex effects are required. We extend a procedure like MARS (Friedman, 1991) that utilizes a recursive partitioning scheme to estimate knot location and select the most relevant predictor variable in a conditional regression context. The optimal sized model is selected by a generalized cross-validation index that penalizes for model complexity.

We applied the proposed procedure to investigate the short term relationship between temperature and all-cause mortality. Several studies have found a"J" shaped relationship between daily temperature and mortality, with an immediate time lag (same day or previous day) for the heat effect. The proposed procedure allow us to study this relationship in a flexible way and, in the meanwhile, to evaluate the effect modification in population subgroups defined by demographic characteristics, socioeconomic status and pre-existing disease alone or toghether considered. The data derive from a case-crossover design study with a time-stratified selection of control period in the city of Bologna.