August 15, 2018

To the Editor:

Please find enclosed our jointly authored paper “Inducing Non-Orthogonal and Non-Linear Decision Boundaries in Decision Trees via Interactive Basis Functions” that we wish to submit for publication consideration to Expert Systems with Applications.

A known limitation of conventional implementations of Decision Trees with recursive binary partitions is that orthogonal partitions can lead to suboptimal partitions and in some cases even fail to find partitions at all. Accordingly, over the years numerous modifications have been proposed to induce oblique partitions.

In this paper, we propose an alternative modelling strategy capable of inducing oblique partitions and notably also non-linear partitions. This is achieved via the use of Interactive Basis Functions, which are used to pre-calculate new features for training. This modeling strategy means that there is not a substantial increase in the computational burden of the underlying algorithm. A benchmarking experiment shows that inducing oblique and/or non-linear partitions can improve the performance of DTs and/or lead to more parsimonious models. Three examples illustrate empirical applications of the proposed modeling strategy.

The manuscript is a research article according to the classification of the journal and is a new submission.

We thank you for the attention paid to this submission and look forward to hearing back from you in due course.

Sincerely,

Antonio Páez

(on behalf of the coauthors)