

Efficient algorithms based on optimal decision trees for transparent machine learning

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In recent years the world of machine learning has been revolutionized by the “explosion” of models based on deep neural networks. Such models have proved to be really performing and able to face even very complex tasks. However, these models fail to be interpretable, being based on complex mathematical operations that often include millions of variables. This defect has become more and more important in the scientific community, so much so as to start new ways to search for models that are human readable. The characteristic of transparency can be really important in medical or legal contexts, where knowing how to read the model prediction can really make the difference. In this work we therefore discuss machine learning techniques based on decision tree models, analyzing some of the main construction algorithms for such models and presenting a new method, Tree Genetic Optimization (TGO) which is based on population and it has proved particularly effective when compared to the strategies present in the literature.