



Self-configuration from a Machine-Learning Perspective

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The goal of machine learning is to provide solutions which are trained by data or by experience coming from the environment. Many training algorithms exist and some brilliant successes were achieved. But even in structured environments for machine learning (e.g. data mining or board games), most applications beyond the level of toy problems need careful hand-tuning or human ingenuity (i.e. detection of interesting patterns) or both. We discuss several aspects how self-configuration can help to alleviate these problems. One aspect is the self-configuration by tuning of algorithms, where recent advances have been made in the area of SPO (Sequential Parameter Optimization). Another aspect is the self-configuration by pattern detection or feature construction. Forming multiple features (e.g. random boolean functions) and using algorithms (e.g. random forests) which easily digest many features can largely increase learning speed. However, a full-fledged theory of feature construction is not yet available and forms a current barrier in machine learning. We discuss several ideas for systematic inclusion of feature construction. This may lead to partly self-configuring machine learning solutions which show robustness, flexibility, and fast learning in potentially changing environments.

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