

Multi-objective evolutionary algorithms have gained a lot of attention in the recent years. They have proven to be among the best multi-objective optimizers and have been used in many industrial applications. However, their usability is hindered by the large number of evaluations of the objective functions they require. These can be expensive when solving practical tasks. In order to reduce the number of objective function evaluations, surrogate models can be used. These are a simple and fast approximations of the real objectives.

In this work we present the results of research made between the years 2009 and 2013. We present a multi-objective evolutionary algorithm with aggregate surrogate model, its newer version, which also uses a surrogate model for the pre-selection of individuals. In the next part we discuss the problem of selection of a particular type of model. We show which characteristics of the various models are important and desirable and provide a framework which combines surrogate modeling with meta-learning. Finally, in the last part, we apply multi-objective optimization to the problem of hyper-parameters tuning. We show that additional objectives can make finding of good parameters for classifiers faster.