

# Multi-objective Neural Architecture Search

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## **Abstract**

Neural architecture search is a promising approach to automatic neural network architecture design, which can save a designer's work. The real world contains a lot of problems, which are time-consuming to solve even by neural architecture search techniques. A lot of these problems require architectures optimized according to different criteria such as quality, time of search, etc. In this work, we present two methods extending the CoDeepNEAT, a state-of-the-art neural architecture search algorithm. The Lamarckian CoDeepNEAT is the CoDeepNEAT enriched with weight inheritance implementation inspired by the Lamarckian theory of evolution. The Multi-objective CoDeepNEAT performs a multi-objective minimization of two chosen neural network objectives - the error rate and the number of floating point operations. Thanks to the base NSGA-II algorithm, the Multi-objective CoDeepNEAT searches for well-performing and fast networks. The methods are evaluated on the MNIST and CIFAR-10 datasets.