

Modern methods of machine learning: Conformal Predictors

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Abstract

The talk reviews a modern machine learning technique called Conformal Predictors. The technique is based on algorithmic notion of randomness developed by A.N.Kolmogorov and his students. Our work has made it possible to develop practical (in particular, computable) approximations of algorithmic randomness. Conformal Predictors allow us to make reliable predictions with valid measures of confidence for individual examples. This approach guarantees that the overall accuracy can be controlled by a required confidence level. Unlike many conventional techniques the approach does not make any additional assumption about the data beyond the iid assumption: the examples are independent and identically distributed. The way to test this assumption is also described.

The talk presents the basic ideas of Conformal Predictors and outlines several applications, including medicine, drug design, information security, homeland security and other areas. The results have been published in various journals, conference proceedings and monographs.