

Some uses of functional analysis in online-learning

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Competitive on-line prediction (also known as universal prediction of individual sequences) is a strand of learning theory avoiding making any stochastic assumptions about the way the observations are generated. The predictor's goal is to compete with a benchmark class of prediction rules, which is typically a proper Banach function space. Metric entropy provides a unifying framework for competitive on-line prediction: the numerous known upper bounds on the metric entropy of various compact sets in function spaces readily imply bounds on the performance of on-line prediction algorithms. After discussing strengths and limitations of the direct approach to competitive on-line prediction via metric entropy I will describe other approaches, paying particular attention to the recently developed method of defensive forecasting.