

# The Quest for Adaptivity

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Most machine learning classes and textbooks mention that there is no universal supervised learning algorithm that can do reasonably well on all learning problems. Indeed, a series of “no free lunch theorems” state that even in a simple input space, for any learning algorithm, there always exists a bad conditional distribution of outputs given inputs where this algorithm performs arbitrarily bad. Such theorems do not imply that all learning methods are equally bad, but rather that all learning methods will suffer from some weakness. In this talk, I present and contrast the weaknesses and strengths of popular methods such as k-nearest-neighbor, kernel methods, and neural networks.

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