

Learning-Algorithms from Bayesian Principle

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Abstract: In machine learning, new learning algorithms are designed by borrowing ideas from optimization and statistics followed by an extensive empirical efforts to make them practical. However, there is a lack of underlying principles to guide this process. I will present a stochastic learning-algorithm derived from Bayesian principle. Using this algorithm, we can obtain a range of existing algorithms: from classical methods such as least-squares, Newton's method, and Kalman filter to new deep-learning algorithms such as RMSprop and Adam. Surprisingly, using the same principles, new algorithms can be naturally obtained even for the challenging learning tasks such as online learning, continual learning, and reinforcement learning. This talk will summarize recent works and outline future directions on how this principle can be used to make algorithms that mimic the learning behaviour of living beings.