# General Discussion

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## General Discussion

MAP estimate and Bayesian

Sandipan Dey General Discussion · 2 days ago

In many of the machine learning algorithms, over-fitting with MLE is reduced with regularization, e.g., Ridge / Lasso with L2/L1 penalties respectively. Can these penalty terms be considered as priors? If we just add such a regularization term can we convert a Frequentist's MLE to Bayesian MAP estimate? How is it related to sequential Bayesian updates?

As pointed out in the lectures, frequentist approach in general need the entire data to compute an MLE for a parameter, as opposed to Bayesian which is inherently sequential (by changing posteriors to priors when new data comes). If we add a regularization term in the MLE optimization objective, can we safely do sequential computation without errors as Bayesian?

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Herbie Lee Staff · 5 hours ago

Penalty terms can usually be viewed as equivalent to using a particular prior. In fact, you can examine the equivalent prior to understand what information you are imposing with a particular penalty term. A Frequentist using a penalized/regularized approach is actually being subjective, but typically without fully understanding what subjective information is being imposed.

A Frequentist using regularization sequentially would only be viewed as without error if the penalization is coherent in a Bayesian sense, i.e., if they are doing a Bayesian analysis. There is no free lunch here.

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