

Converting information into probability measures with the Kullback–Leibler divergence

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Abstract This paper uses a decision theoretic approach for updating a probability measure representing beliefs about an unknown parameter. A cumulative loss function is considered, which is the sum of two terms: one depends on the prior belief and the other one on further information obtained about the parameter. Such information is thus converted to a probability measure and the key to this process is shown to be the Kullback–Leibler divergence. The Bayesian approach can be derived as a natural special case. Some illustrations are presented.

Keywords Bayesian inference · Posterior distribution · Loss function · Kullback–Leibler divergence · g -divergence