

Let's start from what I call the general¹ prediction problem $p(\mathcal{E}_P; \mathcal{E}_F)$: to assess the chance of future evidence given past evidence. \mathcal{E}_P could be a time series and it represents all our past experience: no other available information on the data. For instance, we want to achieve results such as $p(\square) \equiv p(\square, \blacksquare, \square, \blacksquare, \square, \blacksquare, \square, \blacksquare, \dots, \square, \blacksquare, \square, \blacksquare; \square) = 1$.

So, we are at time t , having received \mathcal{E}_P and we want to determine $p(\mathcal{E}_F)$. Now suppose that we've got some theory/expert \mathcal{T}_i , with i as an index, each of which gives a different $p^t(\mathcal{E}_F|\mathcal{T}_i)$: the value of probability of the evidence \mathcal{E}_F "predicted" by \mathcal{T}_i . Which is the right one? And what is *our* prediction? Writing the expression

$$p^t(\mathcal{E}_F) = \frac{\sum_i p^t(\mathcal{E}_F|\mathcal{T}_i) \cdot V_{\mathcal{T}_i}^t}{\sum_i V_{\mathcal{T}_i}^t} \quad (1)$$

doesn't constrain the problem so long as the weights $V_{\mathcal{T}_i}^t$ are not constrained.

How does Bayesianism solve this problem? $V_{\mathcal{T}_i}^t \equiv \hat{p}(\mathcal{T}_i) p^t(\mathcal{E}_P|\mathcal{T}_i)$, $\hat{p}(\mathcal{T}_i)$ being the prior probability of \mathcal{T}_i assigned before knowing \mathcal{E}_P , and $p^t(\mathcal{E}_P|\mathcal{T}_i)$ the likelihood of \mathcal{T}_i after \mathcal{E}_P . How have I solved this problem independently? Inspired by a verificationist feeling:

$$V_{\mathcal{T}_i}^t \equiv T_{\mathcal{T}_i}^t p^t(\mathcal{E}_P|\mathcal{T}_i) \quad (2)$$

where $p^t(\mathcal{E}_P|\mathcal{T}_i)$ is again the likelihood of \mathcal{T}_i at time t and $T_{\mathcal{T}_i}^t$ is the total number of cases/instances/data/pieces of the evidence \mathcal{E}_P on which the theory \mathcal{T}_i has applied. It is the absolute number of data on which the likelihood has been computed (and therefore the quantity that appears in the numerator of the multinomial coefficient of the likelihood)². Moreover $V_{\mathcal{T}_i}^t$ has a great philosophical importance as it quantifies the absolute number of (non-conclusive) verifications of a theory \mathcal{T}_i (or a model or hypothesis) at time t . Therefore it naturally follows that the probability *PDC* of \mathcal{E}_F considers all the theoretical chances of \mathcal{E}_F and weigh them according to how much every theory has been verified.

At this point, what is the correct formulation of $V_{\mathcal{T}_i}^t$?

I have three prescriptive principles that generate my verifications of (2), which are quite cogent, while Bayesianism doesn't really have anything like this. And apart from a philosophical judgment, there is another compelling sense in which one of the two is the correct: the one that makes you to earn more money. And how to test it, for example, on 40 years of stock-market data?

Iff the very same utility is associated to the prediction of different data, then predict the datum of the largest *PDB*; otherwise use a proper expectation rule in general.

¹General as no information at all is given about the types of distributions of the random variables.

²This formulation holds for "same-chance" cases, however also the general formulation has been found.