Rational process models

Process-level cognitive modeling

As we noted in an earlier chapter, there is an interesting parallel between the `Infer` abstraction, which separates model specification from inference method, and the idea of levels of analysis in cognitive science David Marr (1982) (https://scholar.google.com/scholar?q="Vision"). For most of this book we are interested in the *computational* level of describing what people know about the world and what inferences that knowledge licenses. That is, we treat the model argument to `infer` as the scientific hypothesis, and the options (including 'method') argument as a engineering detail needed to derive predictions. We can make a great deal of progress with this level of abstraction.

The *algorithmic* level goes further, attempting to describe the process by which people draw these inferences, and taking the options to `Infer` as part of the hypotheses. While `Infer` specifies an ideal, different methods for inference will approximate this ideal better or worse in different cases; they will also do so with different time and space tradeoffs. Is it reasonable to interpret the inference algorithms that we borrow from statistics as psychological hypotheses at the algorithmic level? *Which algorithm* does the brain use for inference? Could it be MCMC? Enumeration?

If we take the algorithms for inference as psychological hypotheses, then the approximation and resource-usage characteristics of the algorithms will be the signature phenomena of interest.

Test your knowledge: Exercises (/exercises/process-models.html)

Reading & Discussion: Readings (/readings/process-models.html)

Next chapter: 9. Learning as conditional inference (/chapters/learning-as-conditional-inference.html)