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.

在计算层面上，我们只关注模型，我们想知道人对这个世界有什么样的知识，这些知识允许我们做出什么样的推断。

我们把模型的参数当成我们的科学假设，至于怎么得到这些参数的（怎么推断），就不是科学问题而是一个工程问题。

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?

而到了算法层面，我们就开始尝试描述人们是*如何*做出这些推断的。

也就是大脑是MCMC？还是enumerate？

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)