

Reader Report

Reading: Shalizi (2019) Chapter 24

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While chapter 24 is quite straight-forward, I find it particularly useful. I am started drawing causal graphs for my project. Shalizi suggested three fundamental approaches to get the DAG. 1) use prior knowledge, 2) guessing and testing, 3) discovery algorithms.

Guessing and testing is rather intuitive: we draw a bunch of plausible DAGs, and test each DAG's implications. Specifically, Shalizi suggests to look into conditional Independence, Faithfulness and Equivalence. Conditional independence and faithfulness go hand in hand. Conditional independence asserts that d-separation implies condition independence. Faithfulness suggest that if a distribution is faithful to the graph, then if S does not d-separate U from V , $U \not\perp V \mid S$. Meaning we could check d-separability via conditional independence. While this seems all good and well, Shalizi points out that many graphs may have the same set of conditional independence criteria even for the simplest DAG. When there are multiple DAGs that satisfy requirements. Shalizi urges us to admit that the causal effects are only partially identified.

Shalizi also introduced a few useful algorithms for causal graph discovery: SGS, PC for complete graph or CI and FCI algorithms for ones with some hidden variable. There are actually links to useful packages and tutorials. That's very useful! I should definitely try that with my dataset.