Abstract

What is the appropriate notion of the dimension or complexity of a signal that is being subsampled? The answer can depend on the kind of measurements being taken. For example, a signal belonging to a smooth manifold may always be reconstructed from a number of noiseless linear measurements proportional to the manifold dimension. However, if one adds a small amount of noise, the manifold dimension can be far too optimistic and must be replaced by a more global measure of complexity. Non-linear measurements add a new layer with interesting surprises. For example, noise can help to reveal the signal rather than obfuscate it. We explore the interplay between these concepts in high-dimensional inference.