What constitutes a viable statistical guarantee?

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For many means of object detection, object classification, and intent interpretation currently discussed, our understanding of the full set of origins of and reasons for failures as well as the pertinent modes of error propagation remains fragmentary. Rigorous modeling of conditions likely leading to critical error as well as formal analysis of potentially hazardous causal chains based on such modeling thus seem elusive goals, at least for the time being. Statistical verification methods based on exhaustive physical or virtual testing provide a seemingly straightforward alternative. But are they conceptually as simple as they seem? In the talk, we address major issues encountered on the way to viable statistical guarantees for complex, only partially understood functionality, like situation awareness in dynamic environments.