

Info-Gap Theory: Concepts and Applications

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Abstract

Info-gap theory is a method for strategic planning, risk management, decision and design under uncertainty. The future may differ from the past, so our models may err in ways we cannot know. Our data may lack evidence about surprises: catastrophes or windfalls. Our scientific and technical understanding may be incomplete. These are info-gaps: the disparity between what we *do know*, and what we *need to know*, in order to make responsible decisions. Info-gap theory provides decision-support tools for modelling and managing severe uncertainty.

We begin by discussing the basic intuition behind info-gap uncertainty and its distinction from probability. We explore insights for decision-making that are obtained from info-gap analysis of robustness to uncertainty. Uncertainty may also entail favorable surprises so we also examine opportuneness from uncertainty. We consider a simple illustrative example of system design for rapid recovery of functionality after adverse events. We conclude by briefly reviewing a wide range of applications of info-gap theory.