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Clinical Decision Making Under Severe Uncertainty

§ **Strategy in Patient-Physician decision:**
  • Involve patient in decision process. • Provide professional advice and guidance. • **Manage info-gaps.**

§ **The problems of uncertainty:**
  • Design or decide.   • Robustness to noise and info-gaps.   • Opportuneness: exploit windfall.
  • Satisfice or optimize.

§ **Information-gap uncertainty:**
  • Uncertainty is a limitation of knowledge.
  • Uncertainty is a gap between what is known and what could be known.
  • Surprises and ignorance.

§ **Models:**   • Characterize reality.   • Attributes of model correspond to attributes of reality.

§ **Model-based decision:** adapt decision to attributes of model.

§ **Optimal model-based decision:** Use best model to choose decision with best outcome.

§ **Fallacy of optimal model-based decision:**
  • Severe uncertainty:
○ Best model errs seriously. ○ Some model attributes are **correct.** ○ Some model attributes **err greatly.**
  • Best-model optimization:
  ○ Exploits **all model attributes** to the extreme.   ○ Vulnerable to model error.

§ **Resolution:** robust-satisficing
  • Trade performance for robustness.
  • Satisfice performance.   • Optimize robustness to uncertainty.

§ **Robust-satisficing syllogism:**
  • Adequate performance must be attained.
  • High reliability of adequate performance preferred over Low reliability of optimal performance.
  • Max reliability of adequate performance is best.

§ **Trade-off:**   • Robustness vs. performance.   • Pareto efficiency.

§ **Preference reversal:** crossing of robustness curves.

§ **Opportune windfalling:** • Facilitate wonderful outcome. • Antagonistic or sympathetic to robustness.

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