

Mitigating the Curse of Horizon in Monte-Carlo Returns

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Financial Analysts

Goal: We want $\mathcal{R} : \tilde{X} \rightarrow \mathbb{R}$ that represents the "hazard" for $\tilde{X} : \Omega \rightarrow \mathbb{R}$

Insurance Providers

Goal: We want $\mathcal{D} : \tilde{X} \rightarrow \mathbb{R}$ that represents the "uncertainty" for $\tilde{X} : \Omega \rightarrow \mathbb{R}$

ML Practitioners

Goal: We want $\mathcal{E} : \tilde{X} \rightarrow \mathbb{R}$ that represents the "non-zeroness" for $\tilde{X} : \Omega \rightarrow \mathbb{R}$

Risk Quadrangle

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Goal: We want $\mathcal{E} : \tilde{X} \rightarrow \mathbb{R}$ that represents the "non-zerosness" for $\tilde{X} : \Omega \rightarrow \mathbb{R}$

Observation: The three goals are not independent

Risk Quadrangle

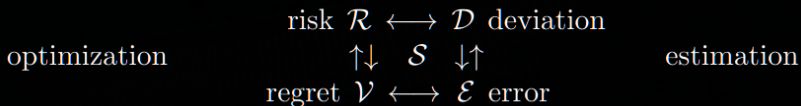


Diagram 1: The Fundamental Risk Quadrangle

Risk Quadrangle

$\mathcal{R}(X)$ provides a numerical surrogate for the overall hazard in X ,
 $\mathcal{D}(X)$ measures the “nonconstancy” in X as its uncertainty,
 $\mathcal{E}(X)$ measures the “nonzeroness” in X ,
 $\mathcal{V}(X)$ measures the “regret” in facing the mix of outcomes of X ,
 $\mathcal{S}(X)$ is the “statistic” associated with X through \mathcal{E} and \mathcal{V} .

Diagram 2: The Quantifications in the Quadrangle.

Risk Quadrangle

Today: we focus on what relates all of these measures

$$\mathcal{R}(\tilde{X})$$

How should we give meaning to the statement

$$\tilde{X} \text{ "adequately"} \leq C$$

$$\mathbb{E}(\tilde{X}) \leq C$$

$$\mathbb{E}(\tilde{X}) + \lambda\sigma(\tilde{X}) \leq C$$

$$q_{\alpha}(\tilde{X}) \leq C$$

$$\sup(\tilde{X}) \leq C$$

$$\mathcal{D}(\tilde{X})$$

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