

Robust Estimation of Mean and StdDev

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Robustly estimating mean μ

Problem: estimating mean μ from a set of values $\{x_t\}$ when there are outliers (abnormally large or small values) in the set.

Assumption: most values come from the same normal distribution

Use robust estimator for $\mu = \text{median}(\{x_t\})$

Median gets typical value without including outliers, unlike averaging

Robustly estimating standard deviation σ

Problem: estimating standard deviation σ from a set of values $\{x_t\}$ when there are outliers (abnormally large or small values) in the set.

Assumption: most values come from the same normal distribution

Use robust estimator for σ , based on $m = \text{median}(\{|x_t - x_{t+1}|\})$

Median gets typical difference due to noise, rather than abrupt changes

$$\sigma = \frac{m}{0.68\sqrt{2}}$$

What We Have Learned

1. Method to avoid having estimated μ and σ being corrupted by outliers