R^2, Adjusted R^2

R^2

Coefficient of Determination

$$R^2 = 1 - (SS_{res} / SS_{tot})$$

Proportion of variance explained

- Range: -∞ to 1 (typically 0 to 1)
- R^2 = 1: Perfect predictions
- R^2 = 0: No better than mean
- Negative R^2: Worse than baseline

Adjusted R^2

Penalized R^2

$$R^2_{adj} = 1 - [(1-R^2)(n-1)/(n-p-1)]$$

Adjusts for number of predictors

- Penalizes adding features
- Decreases if feature doesn't help
- Use for model comparison
- Better for high-dimensional data

R^2 Interpretation Scale

< 0	0.25	0.50	0.75	1.0
Terrible	Weak	Moderate	Strong	Perfect

⚡ When to Use Which?

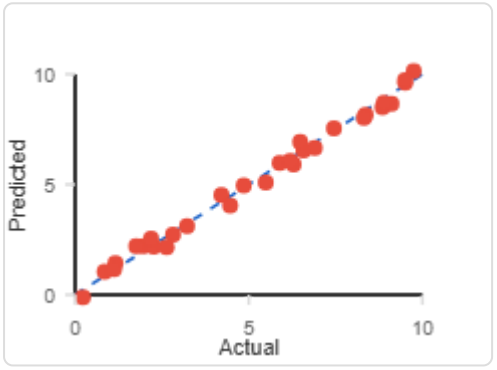
R^2
Single model evaluation

Adjusted R^2
Comparing multiple models

Predicted vs Actual Values

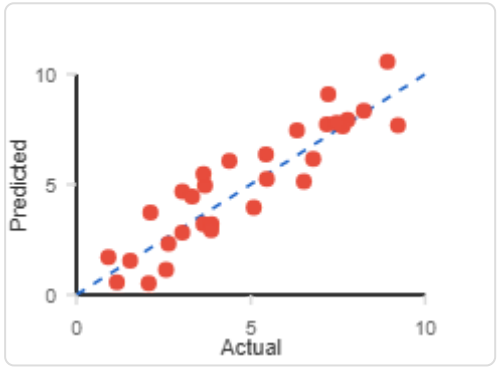
$R^2 \approx 0.95$

Strong Fit



$R^2 \approx 0.50$

Moderate Fit



$R^2 \approx 0.10$

Weak Fit