MAPE, SMAPE

MAPE

Mean Absolute Percentage Error

$$(100/n) \times \Sigma|y_i - \hat{y}_i| / |y_i|$$

Expressed as percentage (%)

- Scale-independent metric
- Easy to interpret & communicate
- Undefined when actual = 0
- Asymmetric (penalizes over-prediction more)

SMAPE

Symmetric Mean Absolute Percentage Error

$$(100/n) \times \Sigma|y_i - \hat{y}_i| / [(|y_i| + |\hat{y}_i|)/2]$$

Bounded: 0% to 200%

- Scale-independent metric
- Easy to interpret & communicate
- ✓ More stable than MAPE
- Symmetric (treats over/under equally)

Key Differences

Feature	MAPE	SMAPE
Handles Zero Values	✗	✓

Symmetric Treatment	✗	✓
Bounded Range	0% - ∞	0% - 200%
Stability	Lower	Higher

💼 Why Use Percentage Metrics?

Compare across different scales

Easy business communication

Intuitive interpretation