What is the meaning of MAPE values?

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MAPE (Mean Absolute Percentage Error) values are a measurement used to evaluate the accuracy of a forecast or prediction. It is expressed as a percentage and represents the average difference between the actual and predicted values. A lower MAPE value indicates a more accurate prediction, while a higher value suggests a greater degree of error. This metric is commonly used in various industries, such as finance, supply chain management, and sales forecasting, to assess the performance of forecasting models and make informed decisions based on the level of accuracy achieved.

Interpret MAPE Values

One of the most common metrics used to measure the forecasting accuracy of a model is the mean absolute percentage error, often abbreviated as MAPE.

It is calculated as:

MAPE = (1/n) * Σ(|actual - forecast| / |actual|) * 100

where:

Σ - A symbol that means "sum"n - Sample sizeactual - The actual data valueforecast - The forecasted data value

MAPE is commonly used because it's easy to interpret. For example, a MAPE value of 14% means that the average difference between the forecasted value and the actual value is 14%.

The following example shows how to calculate and interpret a MAPE value for a given model.

Example: Interpret the MAPE Value for a Given Model

Suppose a grocery chain builds a model to forecast future sales. The following chart shows the actual sales and the forecasted sales from the model for 12 consecutive sales periods:

Actual Sales	Forecasted Sales
88	90
90	94
96	95
104	109
103	94
109	96
116	110
138	150
145	157
140	134
167	165
170	171

We can use the following formula to calculate the absolute percent error of each forecast:

Absolute percent error = |actual-forecast| / |actual| * 100

Actual Sales	Forecasted Sales	Absolute Percent Error
88	90	2.27%
90	94	4.44%
96	95	1.04%
104	109	4.81%
103	94	8.74%
109	96	11.93%
116	110	5.17%
138	150	8.70%
145	157	8.28%
140	134	4.29%
167	165	1.20%
170	171	0.59%

We can then calculate the mean of the absolute percent errors:

Actual Sales	Forecasted Sales	Absolute Percent Error
88	90	2.27%
90	94	4.44%
96	95	1.04%
104	109	4.81%
103	94	8.74%
109	96	11.93%
116	110	5.17%
138	150	8.70%
145	157	8.28%
140	134	4.29%
167	165	1.20%
170	171	0.59%
	MAPE	**5.12%**

The MAPE for this model turns out to be 5.12%.

This tells us that the mean absolute percent error between the sales predicted by the model and the actual sales is 5.12%.

If the standard model in the grocery industry produces a MAPE value of 2%, then this value of 5.12% might be considered high.

Conversely, if most forecasting models in the grocery industry produce MAPE values between 10% and 15%, then a MAPE value of 5.12% may be considered low and this model may be considered excellent at forecasting future sales.

Comparing MAPE Values from Different Models

The MAPE is particularly useful for comparing the fit of different models.

For example, suppose a grocery chain want to build a model to forecast future sales and they want to find the best possible model among several potential models.

Suppose they fit three different models and find their

corresponding MAPE values:

MAPE of Model 1: 14.5%MAPE of Model 2: 16.7%MAPE of Model 3: 9.8%

Model 3 has the lowest MAPE value, which tells us that it's able to forecast future sales most accurately among the three potential models.