**Mean absolute error**

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For a broader coverage related to this topic, see [Mean absolute difference](https://en.wikipedia.org/wiki/Mean_absolute_difference).

In [statistics](https://en.wikipedia.org/wiki/Statistics), the **mean absolute error (MAE)** is a quantity used to measure how close forecasts or predictions are to the eventual outcomes. The mean absolute error is given by

M A E = 1 n ∑ i = 1 n | f i − y i | = 1 n ∑ i = 1 n | e i | . {\displaystyle \mathrm {MAE} ={\frac {1}{n}}\sum \_{i=1}^{n}\left|f\_{i}-y\_{i}\right|={\frac {1}{n}}\sum \_{i=1}^{n}\left|e\_{i}\right|.}

As the name suggests, the mean absolute error is an average of the absolute errors | e i | = | f i − y i | {\displaystyle |e\_{i}|=|f\_{i}-y\_{i}|} , where f i {\displaystyle f\_{i}} is the prediction and y i {\displaystyle y\_{i}} the true value. Note that alternative formulations may include relative frequencies as weight factors.

The mean absolute error is on same scale of data being measured. This is known as a scale-dependent accuracy measure and therefore cannot be used to make comparisons between series on different scales.[[1]](https://en.wikipedia.org/wiki/Mean_absolute_error#cite_note-1)

The mean absolute error is a common measure of [forecast error](https://en.wikipedia.org/wiki/Forecast_error) in [time](https://en.wikipedia.org/wiki/Time_series_analysis) [[2]](https://en.wikipedia.org/wiki/Mean_absolute_error#cite_note-Hyndman2005-2)[series analysis](https://en.wikipedia.org/wiki/Time_series_analysis), where the terms "mean absolute deviation" is sometimes used in confusion with the more standard definition of [mean absolute deviation](https://en.wikipedia.org/wiki/Mean_absolute_deviation). The same confusion exists more generally.

**Related measures**

The mean absolute error is one of a number of ways of comparing forecasts with their eventual outcomes. Well-established alternatives are the [mean absolute scaled error](https://en.wikipedia.org/wiki/Mean_absolute_scaled_error) (MASE) and the [mean squared error](https://en.wikipedia.org/wiki/Mean_squared_error). These all summarize performance in ways that disregard the direction of over- or under- prediction; a measure that does place emphasis on this is the [mean signed difference](https://en.wikipedia.org/wiki/Mean_signed_difference).

Where a prediction model is to be fitted using a selected performance measure, in the sense that the [least squares](https://en.wikipedia.org/wiki/Least_squares) approach is related to the [mean squared error](https://en.wikipedia.org/wiki/Mean_squared_error), the equivalent for mean absolute error is [least absolute deviations](https://en.wikipedia.org/wiki/Least_absolute_deviations).

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**See also**

* [Least absolute deviations](https://en.wikipedia.org/wiki/Least_absolute_deviations)
* [Mean absolute percentage error](https://en.wikipedia.org/wiki/Mean_absolute_percentage_error)
* [Mean percentage error](https://en.wikipedia.org/wiki/Mean_percentage_error)
* [Symmetric mean absolute percentage error](https://en.wikipedia.org/wiki/Symmetric_mean_absolute_percentage_error)

**References**

 *["2.5 Evaluating forecast accuracy | OTexts"](https://www.otexts.org/fpp/2/5). www.otexts.org. Retrieved 2016-05-18.*

* 1.  Hyndman, R. and Koehler A. (2005). "Another look at measures of forecast accuracy" [[1]](http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.154.9771&rep=rep1&type=pdf)

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* Not logged in
* [Talk](https://en.wikipedia.org/wiki/Special:MyTalk)
* [Contributions](https://en.wikipedia.org/wiki/Special:MyContributions)
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* [Log in](https://en.wikipedia.org/w/index.php?title=Special:UserLogin&returnto=Mean+absolute+error)
* [Article](https://en.wikipedia.org/wiki/Mean_absolute_error)
* [Talk](https://en.wikipedia.org/wiki/Talk:Mean_absolute_error)
* [Read](https://en.wikipedia.org/wiki/Mean_absolute_error)
* [Edit](https://en.wikipedia.org/w/index.php?title=Mean_absolute_error&action=edit)
* [View history](https://en.wikipedia.org/w/index.php?title=Mean_absolute_error&action=history)

Top of Form

Bottom of Form

Top of Form

Bottom of Form

* [Main page](https://en.wikipedia.org/wiki/Main_Page)
* [Contents](https://en.wikipedia.org/wiki/Portal:Contents)
* [Featured content](https://en.wikipedia.org/wiki/Portal:Featured_content)
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