

# Isotonic regression

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\scikit-learn-main\doc\modules\[scikit-learn-main] [doc] [modules] isotonic.rst, line 7)

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```
.. currentmodule:: sklearn.isotonic
```

The class `:class:'IsotonicRegression'` fits a non-decreasing real function to 1-dimensional data. It solves the following problem:

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$$\text{minimize } \sum_i w_i (y_i - \hat{y}_i)^2$$

$$\text{subject to } \hat{y}_i \leq \hat{y}_j \text{ whenever } X_i \leq X_j,$$

where the weights  $w_i$  are strictly positive, and both  $X$  and  $y$  are arbitrary real quantities.

The *increasing* parameter changes the constraint to  $\hat{y}_i \geq \hat{y}_j$  whenever  $X_i \leq X_j$ . Setting it to 'auto' will automatically choose the constraint based on [Spearman's rank correlation coefficient](#).

`:class:'IsotonicRegression'` produces a series of predictions  $\hat{y}_i$  for the training data which are the closest to the targets  $y$  in terms of mean squared error. These predictions are interpolated for predicting to unseen data. The predictions of `:class:'IsotonicRegression'` thus form a function that is piecewise linear:

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