1.15. Isotonic regression

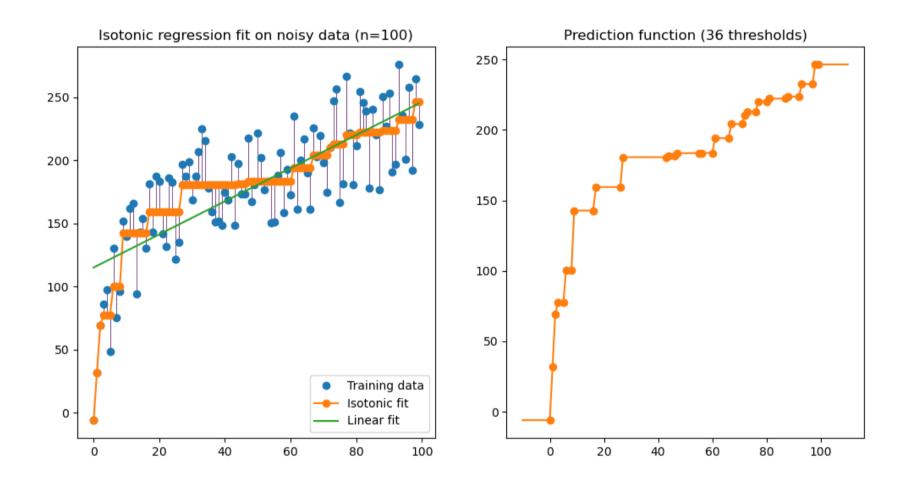
The class <u>IsotonicRegression</u> fits a non-decreasing real function to 1-dimensional data. It solves the following problem:

minimize $\sum_i w_i (y_i - \hat{y}_i)^2$ subject to $\hat{y}_i \leq \hat{y}_j$ 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 <u>Spearman's rank correlation coefficient</u>.

<u>IsotonicRegression</u> 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 <u>IsotonicRegression</u> thus form a function that is piecewise linear:



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https://scikit-learn.org/stable/modules/isotonic.html