Quantile Transformer Scaler

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6. Quantile Transformer Scaler

How it works:

Transforms data to follow a uniform or normal distribution using quantiles.

Steps:

1. **Compute the quantile for each data point x_i:**
   The rank of x_i is divided by the total number of data points N:

$$F(x_i) = \frac{\text{rank of } x_i}{N}$$

2. **Map the cumulative probability to the desired distribution:**
   - For a **uniform distribution**:

$$x_i' = F(x_i)$$

   - For a **normal distribution**:

$$x_i' = \Phi^{-1}(F(x_i))$$

     Where Φ^{-1} is the inverse of the Gaussian CDF (probit function).

Use Case: When your data is skewed or non-linear transformations are required.