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# scikit-learn

## Machine Learning in Python

Getting Started    Release Highlights for 1.5

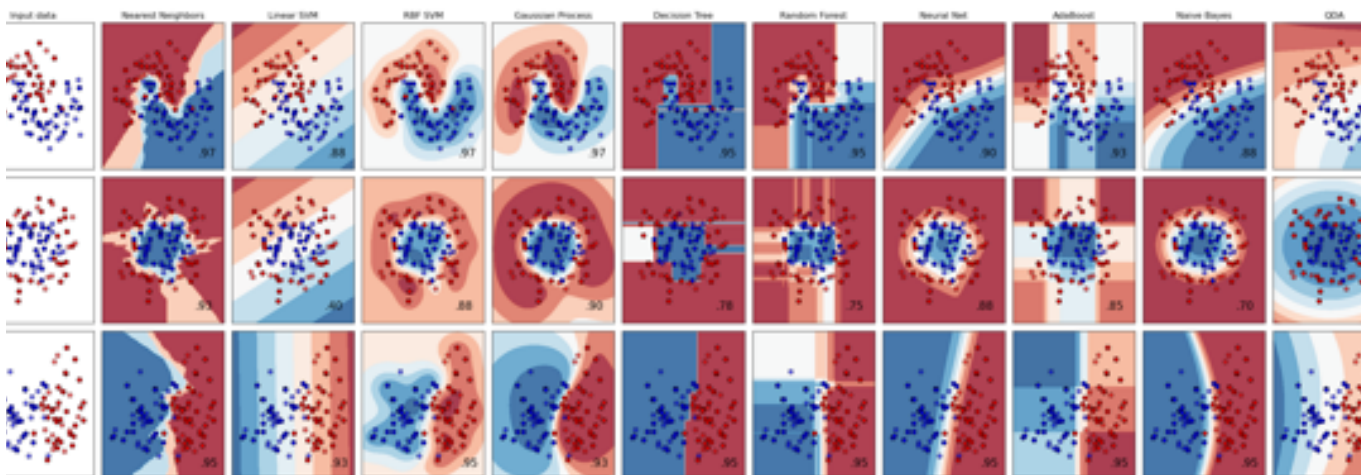
- Simple and efficient tools for predictive data analysis
- Accessible to everybody, and reusable in various contexts
- Built on NumPy, SciPy, and matplotlib
- Open source, commercially usable - BSD license

### Classification

Identifying which category an object belongs to.

**Applications:** Spam detection, image recognition.

**Algorithms:** [Gradient boosting](#), [nearest neighbors](#), [random forest](#), [logistic regression](#), and [more...](#)



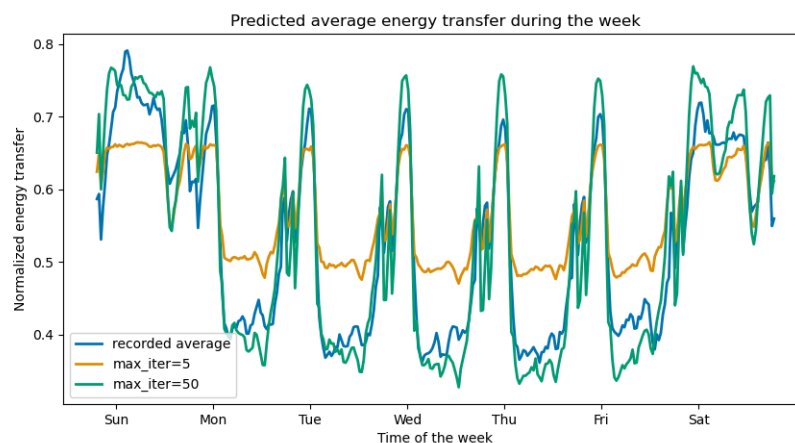
Examples

### Regression

Predicting a continuous-valued attribute associated with an object.

**Applications:** Drug response, stock prices.

**Algorithms:** [Gradient boosting](#), [nearest neighbors](#), [random forest](#), [ridge](#), and [more...](#)



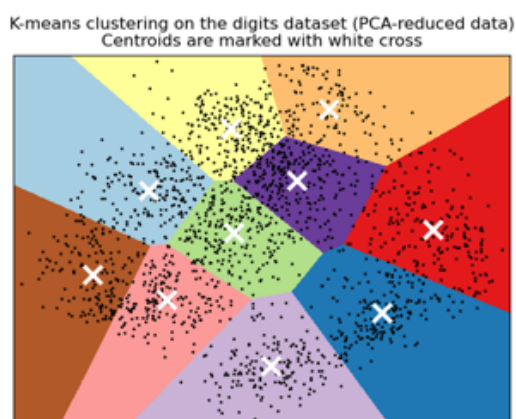
Examples

## Clustering

Automatic grouping of similar objects into sets.

**Applications:** Customer segmentation, grouping experiment outcomes.

**Algorithms:** [k-Means](#), [HDBSCAN](#), [hierarchical clustering](#), and [more...](#)



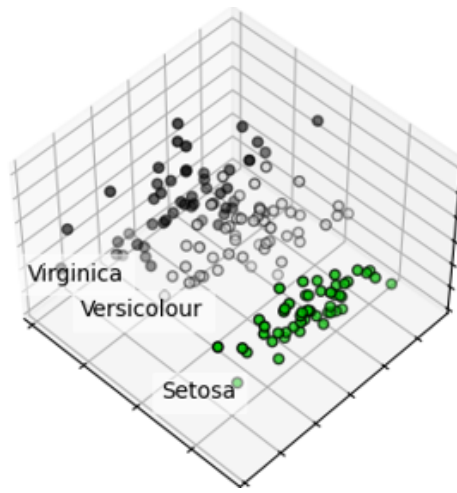
Examples

## Dimensionality reduction

Reducing the number of random variables to consider.

**Applications:** Visualization, increased efficiency.

**Algorithms:** [PCA](#), [feature selection](#), [non-negative matrix factorization](#), and [more...](#)



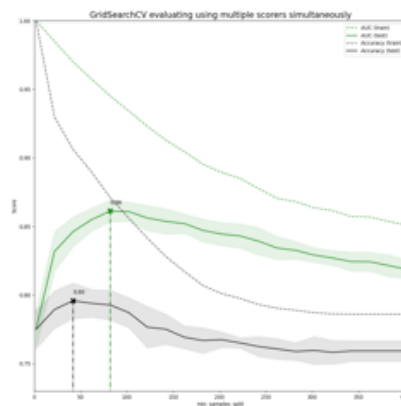
Examples

## Model selection

Comparing, validating and choosing parameters and models.

**Applications:** Improved accuracy via parameter tuning.

**Algorithms:** [Grid search](#), [cross validation](#), [metrics](#), and [more...](#)



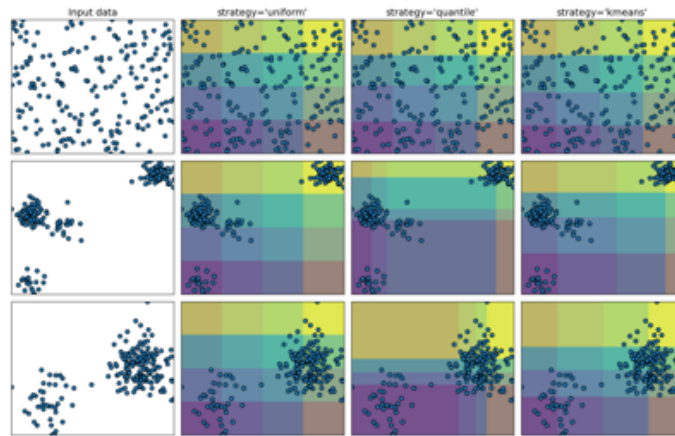
Examples

## Preprocessing

Feature extraction and normalization.

**Applications:** Transforming input data such as text for use with machine learning algorithms.

**Algorithms:** [Preprocessing](#), [feature extraction](#), and [more...](#)



Examples

**On-going development:** [scikit-learn 1.6 \(Changelog\)](#).

**September 2024.** scikit-learn 1.5.2 is available for download ([Changelog](#)).

**July 2024.** scikit-learn 1.5.1 is available for download ([Changelog](#)).

**May 2024.** scikit-learn 1.5.0 is available for download ([Changelog](#)).

**April 2024.** scikit-learn 1.4.2 is available for download ([Changelog](#)).

**February 2024.** scikit-learn 1.4.1.post1 is available for download ([Changelog](#)).

**January 2024.** scikit-learn 1.4.0 is available for download ([Changelog](#)).

**October 2023.** scikit-learn 1.3.2 is available for download ([Changelog](#)).

**September 2023.** scikit-learn 1.3.1 is available for download ([Changelog](#)).

**June 2023.** scikit-learn 1.3.0 is available for download ([Changelog](#)).

**All releases:** [What's new \(Changelog\)](#).

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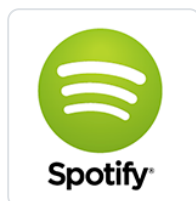
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Communication on all channels should respect [PSF's code of conduct](#).

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## Who uses scikit-learn?



*"I think it's the most well-designed ML package I've seen so far."*

[More testimonials...](#)

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