# Scikit-optimize

1. Documentation & GitHub
2. Search algorithms

* Bayesian optimization with Gaussian Processes: gp\_minimize
* Bayesian optimization with Random Forests and Extra trees: forest\_minimize
* Bayesian optimization with Gradient Boosting Trees: gbrt\_minimize
* Random Search: dummy\_minimize

1. Objective function

* Created by the user
* Pros:
* Fully customizable
* Works with any algorithm/package
* Cons:
* Needs to be coded
* ML model
* Hyperparam
* Performance metric

1. Wrapper to use with sklearn

* Provides wrapper to streamline the search for scikit-learn models – BayesSearchCV
* No need to write objective function anymore

1. Search space

* Built-in module to create hyperparam space to sample from
* Samples Reals, Integers, Categories
* For Reals and Integers samples with uniform and log-uniform

1. Acquisition function

* Expected Improvement (EI)
* Probability of Improvement (PI)
* Lower Confidence Bound (LCB)
* EI and PI per second, to account for compute time
* Hedge optimization of all acquisition functions

1. Analysis

* Explore results of the search with functions
* plot\_convergence
* plot\_evaluations
* plot\_objective
* Returns the parameters sampled at each iteration and the optimization function value

1. Parallelization

* Allows search in parallel
* More evaluations of f(x) needed >< less wall clock time