# Hyperparameter optimization

## 1 Grid Search

Grid Search performs an exhaustive searching through a manually specified subset of the hyperparameter space defined in the searchspace file.

### 1.1 advantage

it will find the best

### 1.2 Disadvantage

Slow, High cost. Local optimization is not necessarily globally optimal.
bad on high spaces

### 1.3 used for

low spaces, small data sets

### 1.4 framework

sklearn.model_selection.GridSearchCV

## 2 Random Search

In Random Search for Hyper-Parameter Optimization show that Random Search might be surprisingly simple and effective. We suggest that we could use Random Search as the baseline when we have no knowledge about the prior distribution of hyper-parameters.

### 2.1 advantage

good on high spaces
Give better results in less iterations

### 2.2 Disadvantage

it doesn't guarantee to find the best hyperparameters.

### 2.3 used for

There may be surprises on big data sets.
Results can be used as a benchmark.

### 2.4 framework

hyperopt:`https://github.com/hyperopt/hyperopt`

Reference Paper:`http://www.jmlr.org/papers/volume13/bergstra12a/bergstra12a.pdf`

## 3 TPE

### 3.1 advantage

### 3.2 Disadvantage

### 3.3 used for

### 3.4 framework

hyperopt:`https://github.com/hyperopt/hyperopt`

# 4 SMAC

## 4.1 advantage

## 4.2 Disadvantage

## 4.3 used for

## 4.4 framework