Welcome

to Advanced Topics in Algorithms

Summary: Advanced Topics in Algorithms
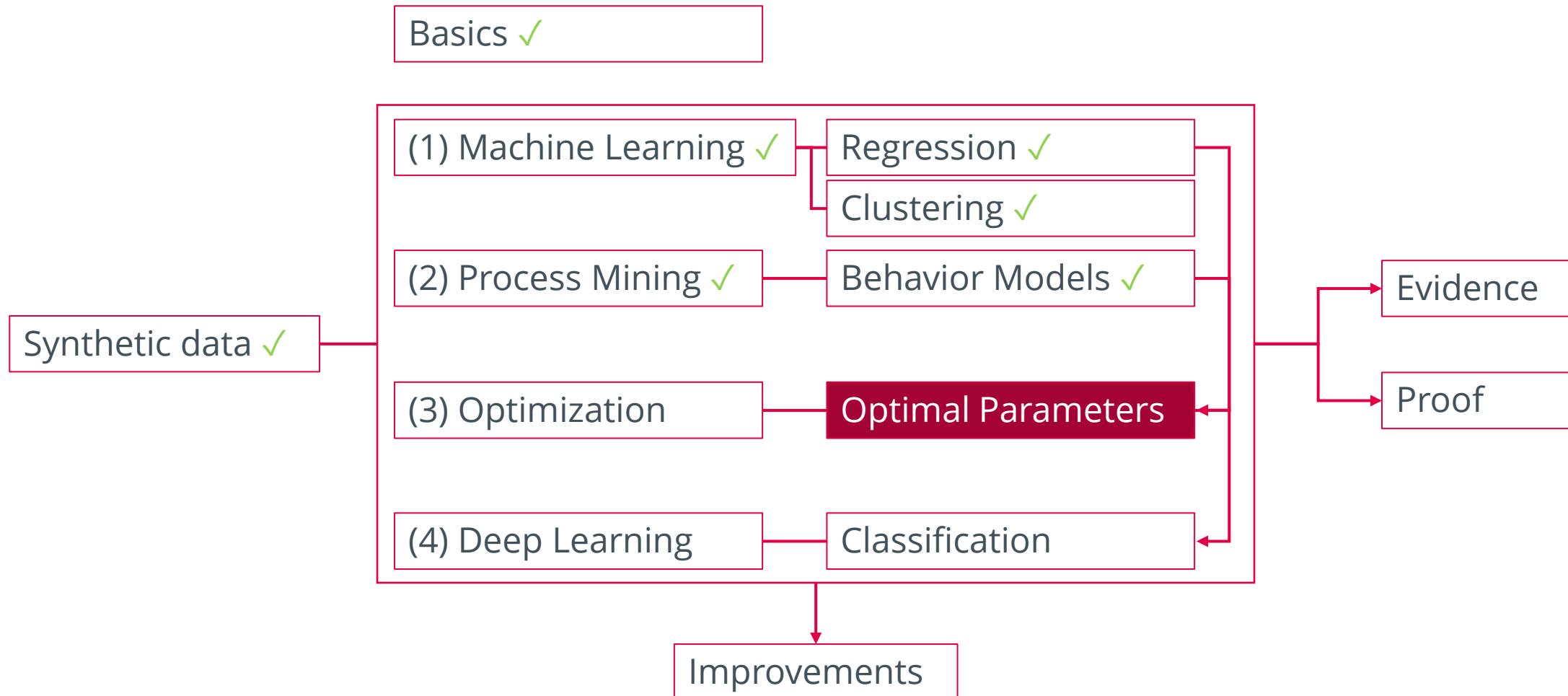
Basics ✓

(1) Machine Learning ✓

Regression ✓

Clustering ✓

(2) Process Mining ✓

Behavior Models ✓

Synthetic data ✓

(3) Optimization

Optimal Parameters

Evidence

Proof

(4) Deep Learning

Classification

Improvements

Find Optimal Parameters of an Algorithm

Data   Parameters   Measurements

Algorithm XY

Find Optimal Parameters of an Algorithm

**100x
sample configuration**

3, 3.105, 3.175, ...
5.065, 5.135, 5.205 ...
8.005, 8.075, 8.145 ...
9.825, 9.895, 10

**100x
record new data**

Algorithm
XY

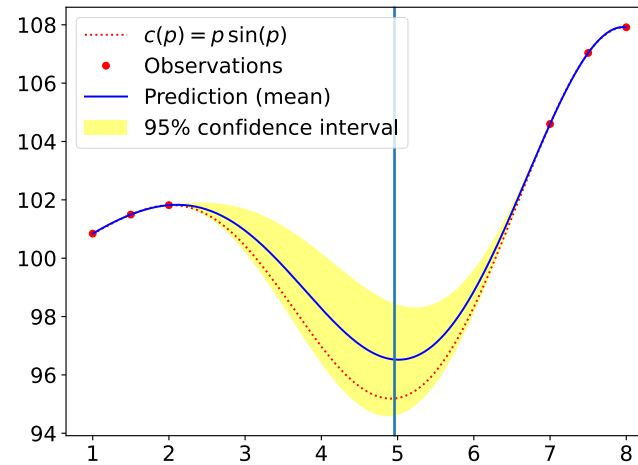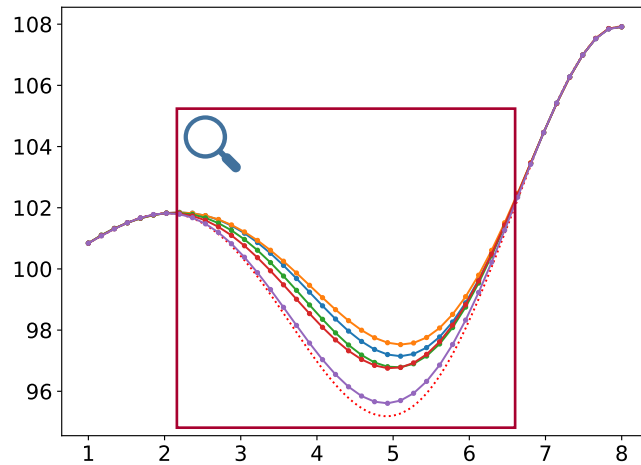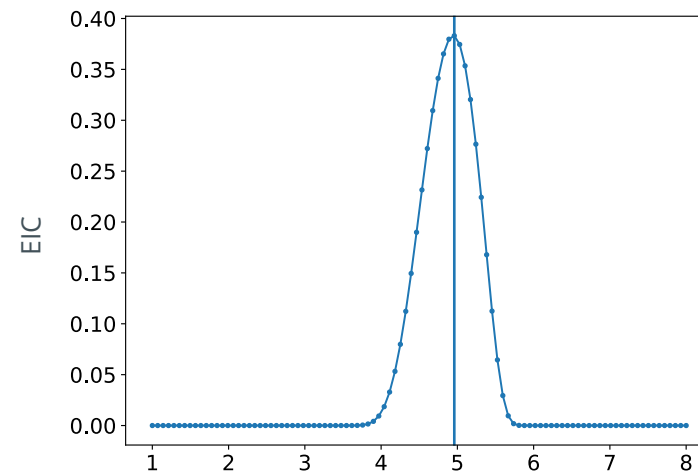**Measurements**
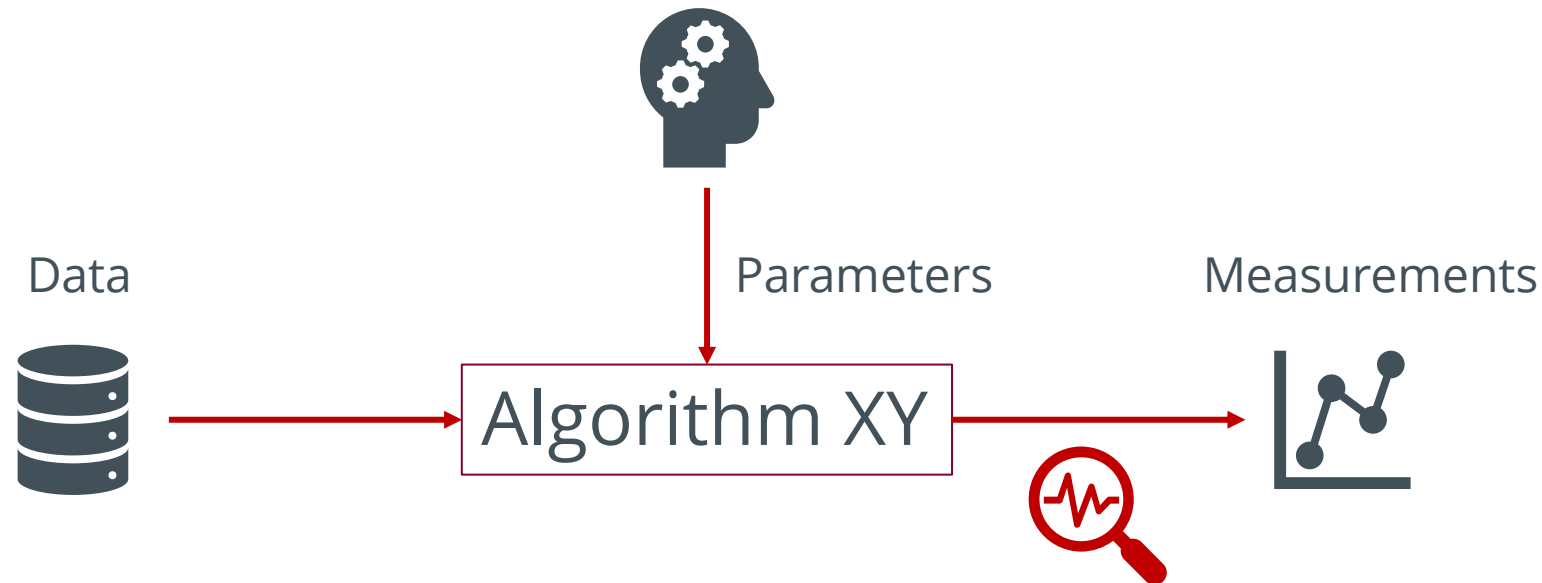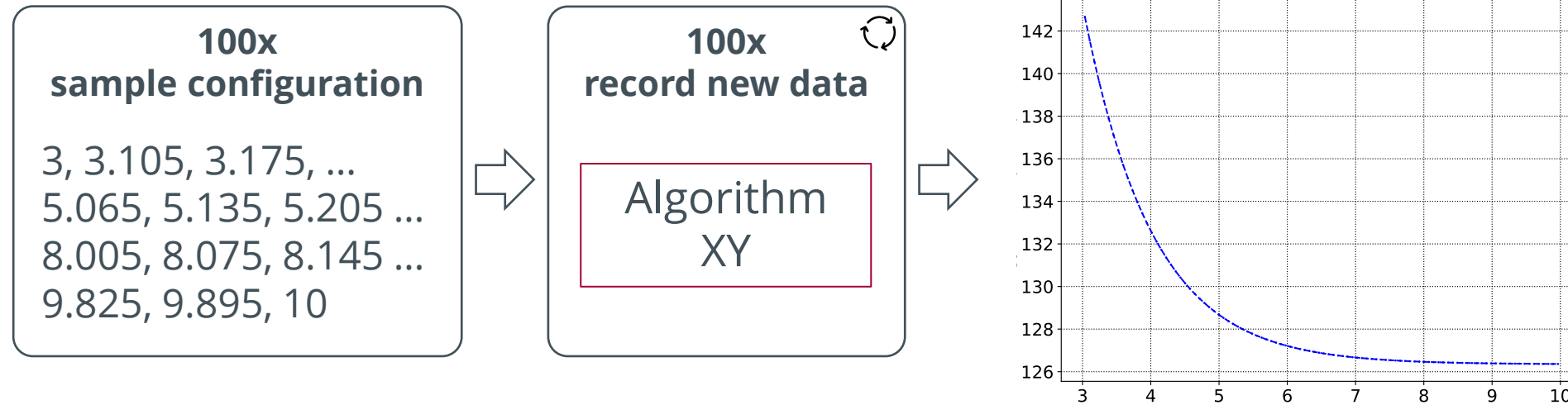
- Exhaustive evaluation of all possible configurations is not possible
- Each evaluation takes time and is therefore expensive

Bayesian Optimization

Sample possible values
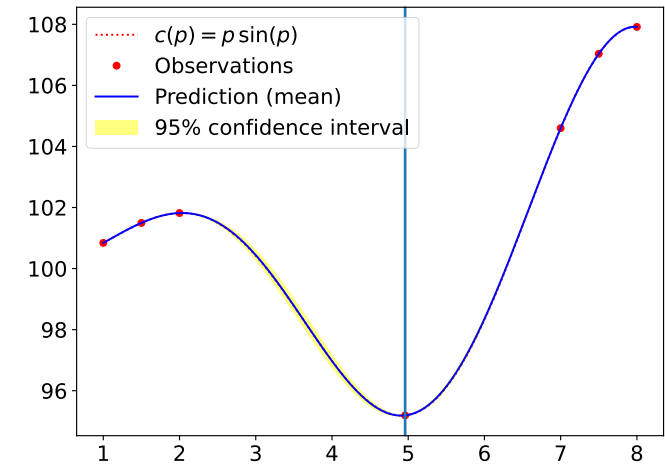
- Use Gaussian Process Regression
- Calculate values using the Expected Improvement Criterion (EIC)
- Choose parameter configuration with the highest EIC

Add observation:
p = 4.9595
c(p) = 95.1911

Thank you!