Optimization Techniques (Python)

Review a wide range of optimization techniques with hands-on practice. Learn to identify optimization opportunities and how to choose the right technique for each problem.

Numerical optimization
Techniques that are in the heart of modern machine learning, but can be used to solve many other types of numerical problems.

Discrete optimization
Constraint programming and SAT solvers allow optimization of combinatorial / discrete problems.

Metaheuristic optimization frameworks
Flexible optimization techniques that can be used to optimize any objective function and any solution structure.

	Day 1	Day 2	Day 3	Day 4	Day 5

09:00	**Preliminaries**
	 Intro
	 numpy
	 numba
		Numerical optimization pt. 1
		 Intro
		 Gradient methods
		   Gradient descent
		   Newton's method
		   Quasi-Newton methods
			Practice session #2
			 Shape matching
				Practice session #3
				 Group assignment
					Black box optimization
					
					 Iterative optimization

	Classical opt. algorithms **Practice session #1** Face timelapse from videos in the wild	**Numeric optimization pt. 2** Convex optimization Linear programming Integer programming	**Discrete optimization** Constraint programming SAT solvers	**Metaheuristics** Simulated annealing Genetic algorithms Differential evolution	**Practice session #4** Habit learning / structure optimization / city planning / self-directed **Closing remarks**
17:00					

Prerequisites:
- Python programming
- Comfortable with highschool-level mathematical topics