Optimization labs

Lluís Garrido – lluis.garrido@ub.edu

Master in Data Science – UB

Optimization labs

Objective

- Set of labs to understand numerical optimization.
- They are self-contained.
- Oriented towards to machine learning.

Labs

1. Gradient descent and Newton method.
2. Robust linear regression.
3. Optimization with equality constraints.
4. Optimization with equality and inequality constraints: Support Vector Machines in the dual space.
5. Stochastic gradient descent: Support Vector Machines in the primal space.

Optimization labs

Objective

- Set of labs to understand numerical optimization.
- They are self-contained.
- Oriented towards to machine learning.

Labs

1. Gradient descent and Newton method.
2. Robust linear regression.
3. Optimization with equality constraints.
4. Optimization with equality and inequality constraints: Support Vector Machines in the dual space.
5. Stochastic gradient descent: Support Vector Machines in the primal space.

Optimization labs

How are the labs performed?

- The labs can be done in pairs of two persons (or individually, if you prefer).
- Python notebook is usually used to perform the experiments.

Follow-up of the labs

- You'll have an online session each Monday from 17h to 18h. See planning in the campus.
- The online session will use Telegram to answer your questions. The invitation link is in the campus. Take profit of it and help each other.
- If needed a videoconference will be done.

Optimization labs

How are the labs performed?

- The labs can be done in pairs of two persons (or individually, if you prefer).
- Python notebook is usually used to perform the experiments.

Follow-up of the labs

- You'll have an online session each Monday from 17h to 18h. See planning in the campus.
- The online session will use Telegram to answer your questions. The invitation link is in the campus. Take profit of it and help each other.
- If needed a videoconference will be done.

Optimization labs

What is expected from you?

- A report of the experiments that are proposed in the labs. It is important to interpret the results that are obtained.
- You may include the code that has been used to make the experiments. The code is not evaluated!
- See planning for the deadlines.

Grading

- Each lab will be graded from 0 (nothing done) and 10 (great!).
- You'll receive feedback through the campus (maximum two weeks after deadline).
- Weights of labs: P1 (30%), P2 (20%), P3 (20%), P4 & 5 (30%)

Optimization labs

What is expected from you?

- A report of the experiments that are proposed in the labs. It is important to interpret the results that are obtained.
- You may include the code that has been used to make the experiments. The code is not evaluated!
- See planning for the deadlines.

Grading

- Each lab will be graded from 0 (nothing done) and 10 (great!).
- You'll receive feedback through the campus (maximum two weeks after deadline).
- Weights of labs: P1 (30%), P2 (20%), P3 (20%), P4 & 5 (30%)

Lab 1: Gradient descent and Newton method

Objective

- The lab has two parts: gradient descent and Newton method.
- In each part the same functions are minimized. You are expected to see the advantages and disadvantages of each method.

Tips

- Please keep the parameters (i.e. in particular the initial points) used in the first part and use them in the second part.
- When the algorithm stops (i.e. it converges), check that you have arrived to the minimum.

Lab 1: Gradient descent and Newton method

Objective

- The lab has two parts: gradient descent and Newton method.
- In each part the same functions are minimized. You are expected to see the advantages and disadvantages of each method.

Tips

- Please keep the parameters (i.e. in particular the initial points) used in the first part and use them in the second part.
- When the algorithm stops (i.e. it converges), check that you have arrived to the minimum.

Lab 1: Gradient descent and Newton method

See you next Monday with Telegram!