Exercise DA3

Multivariate analysis of your own experiment

In this assignment you are going to investigate and analyse your own experiments on a multivariate problem. You will have to choose the variables yourself carry out the experiments, analyse the data and finally write a report.

You can do the experiments at HiT, at work, at home or other places. It must be possible to measure one or several responses quantitatively. It should include both PCA and PLS.

You should first find the importance of each of the variables in your problem, maybe you can delete some of the variables after you see the first results? Maybe you can add new variables? This will of course highly depend on your results.

1. Find out which multivariate problem you want to study.
2. Which X-variables do you think are important? Which Y-variable(s)/response?
3. Carry out the experimental part (take notes, remember you might have to repeat the experiments…). Also remember to take pictures during the experimental part of the project for documentation in the report.
4. Use Unscrambler to analyse/calibrate the data using PCA, PLS
   (clusters?, outliers?, nonlinearities? weighting? etc...)
6. Include only the plots you think is relevant/important in your report.

Hopefully you will end up with a multivariate regression model that can be used for prediction. What can be expected from your model for future prediction tasks? Did you learn anything new about you problem? Or was it exactly as expected? Can you suggest a new experiment that will give you even more information?

Remember to discuss the reason behind every statement and conclusion you write in the report.

Use your creativity/knowledge and what you have learned in this course, good luck!

Take a look at the document called Previous DA3 problems.pdf (in Canvas) and see some DA3 examples from previous years/students. Use it as inspiration to find your own multivariate problem!

→ You should work in groups on DA3 (maximum 2 students)
→ **As soon as possible:** Send an e-mail to me (maths.halstensen@usn.no) with the following information:

1. Group members:
2. A short problem description:
3. Explanation of the variables involved:

NB: Start the work on DA3 already now, because experimental work takes time!