

Machine Learning



Lab 10: Parameter estimation

Task 1.

In this question you will go back to the bike sharing dataset from the previous lab available at <https://archive.ics.uci.edu/ml/datasets/Bike+Sharing+Dataset>.

The task is to estimate the parameters of a regression function to determine the number of casual renters depending on outdoor temperature and wind speed based on the dataset in the file "day.csv".

- A. Load the dataset and create numpy arrays for the feature vector and the target vector.
- B. Create a function to calculate the value of a bi-variate polynomial of a given degree to be used as model.
- C. Create an initial zero value parameter vector of correct size to pass into the model function as initial linearization point.
- D. Create a function to linearize the model function, calculating the value of the model function and its Jacobian at a given linearization point.
- E. Create a function to calculate the parameter update based on the value of the model function and its Jacobian.
- F. Create an iterative procedure to execute these parameter updates and move the linearization point towards the optimal solution.
- G. Plot the feature vectors against the target values together with the polynomial surface into a 3d graph for increasing degrees of the polynomial.