WKS5 – Error-based Learning

Theory

Review the videos from week 5. Answer the following questions based on those lectures

1. Explain the difference between classification and regression
2. Describe the basic idea behind error-based learning
3. What is the predictor function in linear regression
4. What is the role of the error function in determining the optimal predictor function?
5. What is gradient decent and, briefly, how does it work?
6. How should be treat categorical descriptive features in linear regression?

Practice

Follow the tutorial videos from week 5 and carry out the following steps

1. Download the code archive and extract the file from the week 4 learning materials. Make sure that you can run the examples code as provided.
2. Expand the **sse.ipynb** notebook provided to plot the error function for the w[0] weight. Verify that the local minimum, the derivate of this cost function, is zero as expected
3. Add a 3D error surface of the w[0] and w[1] parameters from this notebook.
4. In the **linear.ipynb** notebook, add error function plots for the “bmi” feature of the dataset with respect to w[0] and w[1]. Find estimates for parameters from the plots and draw the best fit line on the scatter graph
5. Write a function with implements one-hot encoding for a categorical feature of an arbitrary size
6. Implement a basic version of the gradient descent algorithm in Python using the **loss()** function presented in **sse.py** as a starting point. Test your solution on a randomly generated regression dataset and verify your results match those of the corresponding error function minimums (from the plots)