[Homework] Tensorflow

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November 9, 2020

Due: **Before Tuesday November 17, 2020, 08h30** (before the next lab session).
Evaluation: Submit code, explanation about the code, and the answers to the questions
Remark:

- Only groups of two/three people accepted. Forbidden groups of one or larger number of people.
- **No late homework will be accepted**.
- No plagiarism. If plagiarism happens, both the "lender" and "borrower" will have a zero.
- Code using the TensorFlow library.
- Do thoroughly all the demanded tasks.
- Study the theory for the questions.

Notice: This week's homework is similar to what you did in part during the last week with the only change that instead of coding the regressor from scratch you are going to use the TensorFlow library.

1 Tasks

1) Read the dataset given in the provided file `data.csv` and plot the output value as a function of the input data.

2) Suppose that we would like to design a non-regularized regressor for a single-period forecast of the 1D position of a robot as function of time by training the regressor with the provided data. For this, construct first the training input and output matrices ($X_{\text{train}} \in \mathbb{R}^{I\times N}$ and $Y_{\text{train}} \in \mathbb{R}^{I\times J}$) and the test input and output matrices ($X_{\text{test}\in\mathbb{R}^{3\times N}}$ and $Y_{\text{test}} \in \mathbb{R}^{3\times J}$), where I is the number of training examples, N is the number of features (or the input-variable dimension), and J is the output-variable dimension. Let for instance N be 150 and J be 1.

3) Using the TensorFlow library, fit the univariate linear regression parameters to the dataset. What are the optimal values of the parameters?

4) Plot the linear regressor obtained in 3) over the original dataset.

5) Test your model using the test data. Plot also these results.

6) Compare the results that you obtained in this homework to those that you obtained during the last homework, where you coded the regressor from scratch.

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