

In this exercise we consider **Chapter 10** of the book ‘Deep Learning’ (Recurrent Neural Networks).

1. Preliminary Questions

- (a) CNN vs RNN. (1)
- (b) RNN gradients. (1)
- (c) For course improvements, we would like your **feedback about *this* question**. At least tell us how much time (**hours**) you did invest, if you had major problems and if you think it’s useful.

Points for Question 1: 2

2. LSTM Implementation

- (a) Implement the LSTM cell using pytorch (without using nn.LSTM/nn.LSTMCell of course). (6)
- (b) Implement the LSTM convenience class. (2)
- (c) For course improvements, we would like your **feedback about *this* question**. At least tell us how much time (**hours**) you did invest, if you had major problems and if you think it’s useful.

Points for Question 2: 8

3. LSTM Use Case - Noise Removal

- (a) Plot six instances of the the ground truth data and the noisy data. (1)
- (b) Create a many-to-many NoiseRemovalModel that reduces noise in sine functions. (If you had trouble with part 2, you can use nn.LSTM here). Also fill the gaps in the training loop. (3)
- (c) Hyperparameter tuning: Try at least 3 different hyperparameter configurations and see if the model improves. (2)
- (d) For course improvements, we would like your **feedback about *this* question**. At least tell us how much time (**hours**) you did invest, if you had major problems and if you think it’s useful.

Points for Question 3: 6

You can achieve a total of **16 points** for this exercise. Additionally you can achieve **1 bonus point** for answering the feedback questions.

Please send the **solution notebooks of your group of three** via ILIAS until **19.11.2018 18 pm**.

Note: Jupyter notebooks will be executed **from top to bottom**. To avoid point deduction check your notebook by the following steps: 1. Use the python 3 kernel (Kernel > Change kernel > Python 3), 2. Run the full notebook (Kernel > Restart & Run All), 3. Save (File > Save and Checkpoint).