

Deep Learning Questions - Y-Data DL Course Homework Assignment

1. Explain each of these terms in a sentence or two:

1. Cross entropy
2. Gradient clipping
3. Residual connections
4. Momentum
5. Cyclic learning rate
6. Dropout
7. The Inception module
8. Stride
9. Bottleneck layer
10. 1x1 convolution
11. DenseNet

2. Explain the pros and cons of using small and large batch sizes.

3. How many 3x3 filters are needed to replace a 7x7 kernel? Compare the number of parameters in each option.

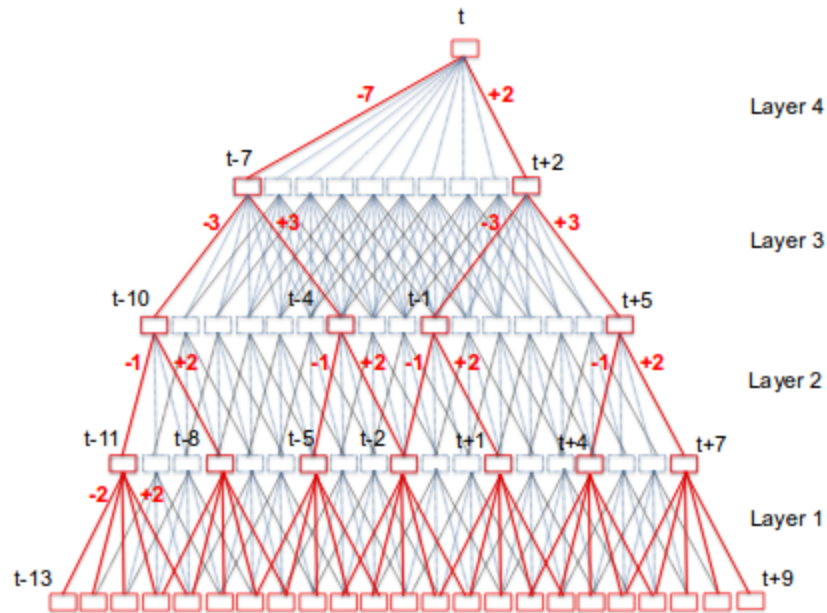
4. Why are RNNs more prone to diminishing gradients?

5. Suggest a few methods for augmenting textual data.

6. Describe a few methods to explain what CNNs learn.

7. Explain how, if at all, the curse of dimensionality lives in harmony with the desire for more expressive power to NN and larger hidden representations.

8. Look at the figure below for a suggestion on a NN architecture for processing sequences. The network provides a prediction for each time unit (e.g, predicts the sentiment of each word in the sequence). Explain the pros and cons of this architecture.



9. You are training a neural network for classifying images on a custom dataset and it doesn't seem to learn anything. Describe your approach to solving the issue.

10. Mention the problems imbalanced datasets can cause to Deep Learning problems, and suggest a few ways to avoid them.

11. You are asked to classify images. Mention a few scenarios in which you'll probably prefer NOT to fine-tune a network pretrained on ImageNet.

12. You have a model that detects spam in English emails with good precision and recall. You are asked to build a similar spam detector for emails written in German, but you don't have any labels for emails in German. You do have access to a large corpus of emails in German and English (no translation - different emails).

13. You are asked to build a model that sets diacritization symbols (סימני ניקוד) in Hebrew texts. Explain your approach - the data you will try to get, the network architecture, how you would evaluate the model, pitfalls you expect along the way, and any important note you'd like to add.