

TIES 4911 (2024): Guidelines for the Task 3

Your surname:
Your first name:



Study lecture materials... Refer to the examples in the materials to complete following sub-tasks:

Task 3-1: Build “vanilla” and “deep” autoencoders on Fashion MNIST dataset. Play with architecture and training hyper-parameters. Compare performance and visualize the results (based on several test samples).

Task 3-2: Try various implementations of CNNs that are present in lecture materials using MNIST or Fashion MNIST (or any other you wish) dataset. You may try other examples you find in the web as well. Play with training hyper-parameters and network architecture, with dropouts, batch normalization and data generation. Build the table where compare performance (loss, accuracy) of the combinations you made.

Task 3-3: Check the CNN tutorials on CIFAR-10 dataset with code from the following link: <https://www.tensorflow.org/tutorials/images/cnn>. Similarly, to the previous sub-task, try to play with hyper-parameters and network architecture, and present performance comparison.

Extra task for those who are aiming higher (optional):

Task 3-4 (extra): Implement “sparse” and “denoising” autoencoders. Play with architecture (try both undercomplete and overcomplete, shallow and deep) and training hyper-parameters. Compare performance and visualize the results (based on several test samples).

Task 3-5 (extra): Implement CNN based autoencoder and compare performance vs Dense Deep version using Fashion MNIST dataset. Compare performance and visualize the results (based on several test samples).

Task 3-6 (extra): Learn more about Capsule Net and study existing samples of corresponding implementations (use references from the lecture materials or any other materials from the web). Implement and compare performance of the initial CNN model and the model enhanced with Capsule Net. Test the models on normal samples and samples modified with the purpose to cheat the CNN. Present the comparison results on the slides.

Files to include in the demo results (archive file [ties4911-task03-\(your_surname\).zip](#)):

- *Task3-instructions.doc (this file)*
- *PPT presentation with relevant information (comparisons, screenshots, etc.)*
- *source codes*

Send the demo results as an archive to lecturer (oleksiy . khriyenko @ jyu . fi) before the deadline (end of 15.02.2024).

Results should be present during the Demo-3 Session. Be sure that you have all the necessary adapters to connect your computer in the classroom.