TIES 4911 (2026): Guidelines for the Task 4

Your surname:

Your first name:

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

Task 4-1: Use available Keras Applications models (try at least 3) to compare their performance on image classification task. Be creative and try also some tricky images. Present results in a table in .ppt file.

Task 4-2: Use available Keras Applications models (try at least 3) to apply transfer learning with own chosen training dataset. Fine-tune the models (play with frozen and trainable layers of the base model) to see difference in performance. Present results in a table in .ppt file.

Task 4-3: Create a customized image classification service:
- Choose a domain and prepare a set of images that will represent several classes similarly to the case with flowers (Lecture 4). Take a different dataset (not the one from the lecture).
- Retrain the model based on prepared image set.
- Build a restful service following the given example in the lecture materials.
- Get ready to present the service performance via Postman or implement own simple client with human friendly GUI for the service (will be appreciated ☺)

Extra task for those who are aiming higher (optional). You can choose one of the following tasks:
Task 4-4 extra:
- Modify service to support multi-label image classification. Extend results of sub-task 4-3 and implement multi-label image classification following the tutorials:
  https://towardsdatascience.com/multi-label-image-classification-with-inception-net-cbb2ee538e30
  https://www.analyticsvidhya.com/blog/2019/04/build-first-multi-label-image-classification-model-python/
  https://machinelearningmastery.com/multi-label-classification-with-deep-learning/
  https://machinelearningmastery.com/how-to-develop-a-convolutional-neural-network-to-classify-satellite-photos-of-the-amazon-rainforest/
  or any other source you may find (please include link to the tutorial into the report). Most probably you would also need to modify you dataset to fit the nature of the task.

Task 4-5 extra:
- Study official tutorials for the Video Classification and corresponding Transfer Learning (https://www.tensorflow.org/tutorials/video/video_classification, https://www.tensorflow.org/tutorials/video/transfer_learning_with_movinet, https://keras.io/examples/vision/video_transformers/ or https://keras.io/examples/vision/vivit/).
- Prepare kind of own tutorial (slides presentation) to explain the topic to others. Make a focus on the most significant (maybe the most unclear, in your opinion, parts of the tutorial). Try to adapt the tutorial for use of different dataset you find yourself and present the results.

Use of AI for task implementation:

< in case you have been using some AI tools for task completion, please, describe here what for and to what extent you have been using it >

Files to include in the demo results (archive file ties4911-task04-(*your_surname*).zip):

- o *Task4-instructions.doc (this file)*
- o *PPT presentation with relevant information (data sets, restful service API, service performance screenshots, etc.)*
- o *used datasets*
- o *source codes*

Send the results as an archive to lecturer (oleksiy . khriyenko @ jyu . fi) before the deadline (end of 19.02.2026). It is always preferable to place the file on some online storage (Google Drive, Dropbox, OneDrive, your web drive/space on JYU, etc.) and provide a link for downloading.

Results should be present during the Demo-4 Session. Be sure that you have all the necessary adapters to connect your computer in the classroom (if applicable).