CS-C1000 – Introduction to Artificial Intelligence

Computer Assignment A

William J. Wilkinson

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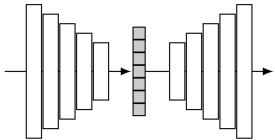
Computer Exercise A:
Deep Generative Autoencoder Model

Input



512-dimensional
encoding

Output

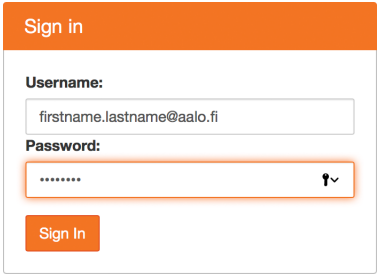
Getting started

- The exercise does not require programming skills, just an open attitude and curiosity.
- The computer exercises are implemented in Python.
- The code can be run by logging into JupyterHub and fetching the course exercise.
- The student is given compute time on a server and depending on the load things can be faster/slower. If no resources are available (there should be plenty!), try again later.

Log into JupyterHub

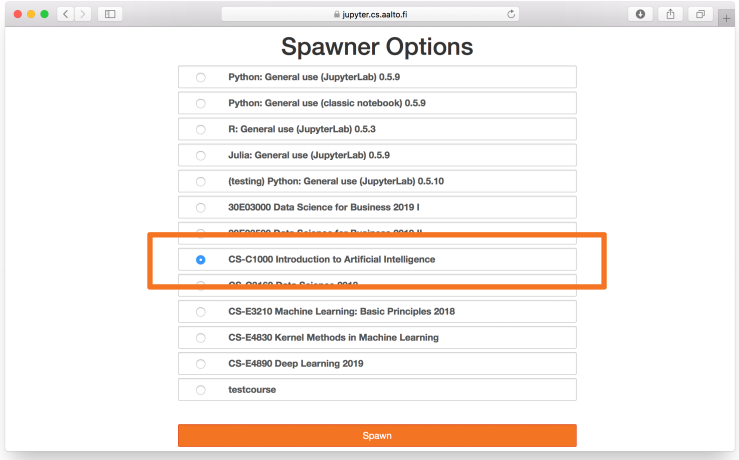
Login to:

`https://jupyter.cs.aalto.fi`

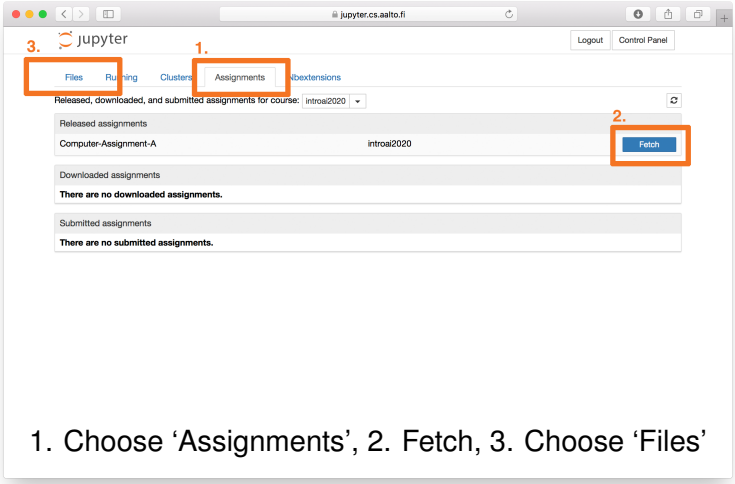


Using your Aalto account.

Choose the course

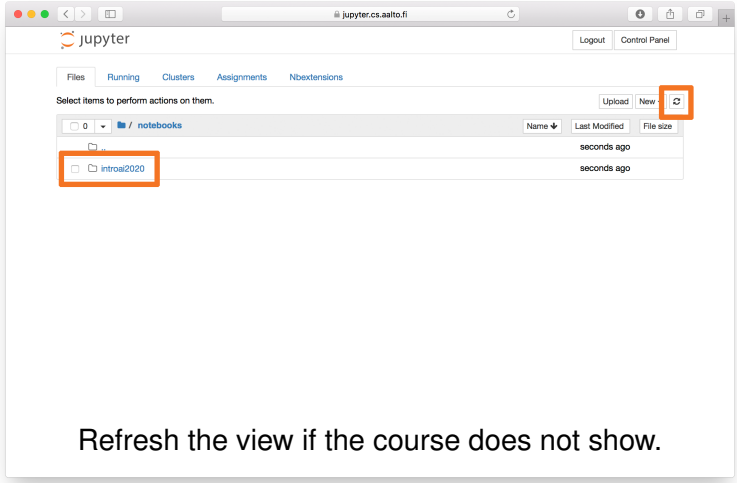


Fetch the exercise



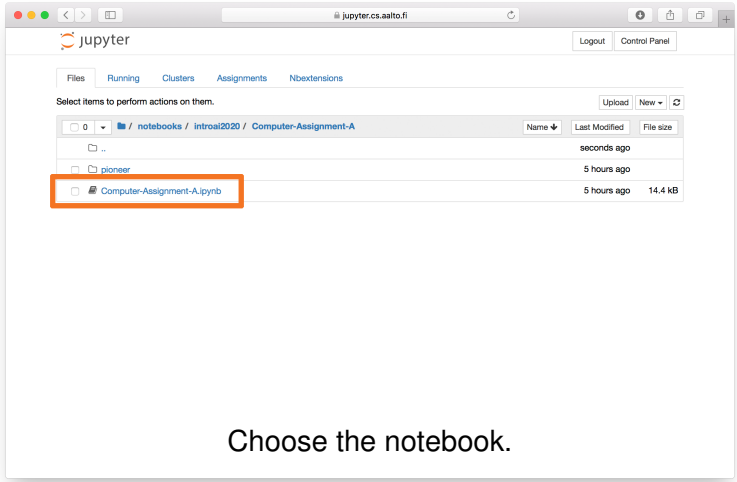
1. Choose ‘Assignments’, 2. Fetch, 3. Choose ‘Files’

Find the notebook



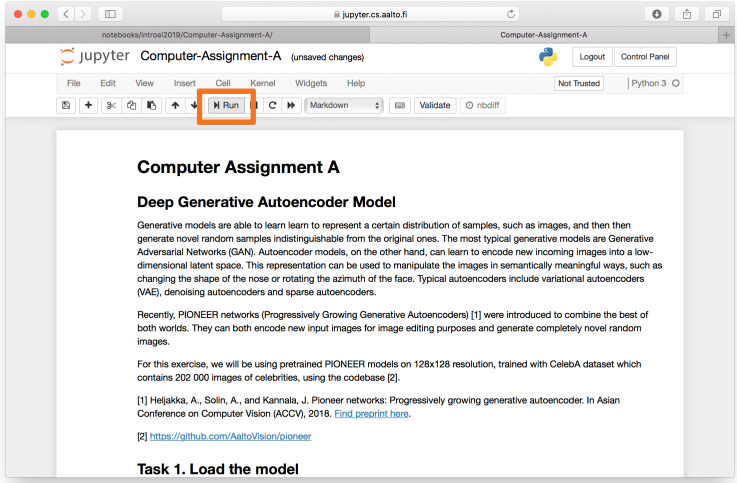
Refresh the view if the course does not show.

Fire it up



Choose the notebook.

Ready to run (a cell at a time)



Task 1: Load the model

- Read the cells and run them one after another by pressing ‘Run’.
- A small asterisk (*) will indicate that the cell is still running.
- You are not going to train the model (the learning already happened), but rather load an already trained model.

Task 2: Fake people

- The autoencoder model is quite handy for many things, you can for example directly create a random vector with 512 numbers and convert that into a face.
- Put in your student number as the random seed in order to have a unique set of faces (you can experiment with other seeds as well).
- Run the cell to get your set of fake people.

Task 3: Reconstruct

- Here you first enocde an image to the 512-dimensional representation, and then you reconstruct it.
- You should notice that the original and reconstruction do not completely match, but they should have the same kind of attributes (hair color, etc.)
- Note the potential bias in the training data: the model is trained on a dataset of Hollywood actors, in which female white actors are over-represented. The ethical implications of this is a current topic of discussion in the AI community. We will have more discussion on these issues in Lecture 6.

Task 4: Interpolation

- Given two encoded images, it is easy to calculate intermediate in-between variations of two faces.

Task 5: Manipulation

- If you know which attributes in the latent representation correspond to specific features, you can manipulate existing images.

Task 6 & 7: Optional

- For those who are familiar with Python and coding, there are two additional tasks.

How to get points?

- To get the points for this week's exercise, answer the questions in MyCourses related to this Computer Exercise A.