MSE | MASTER OF SCIENCE IN ENGINEERING

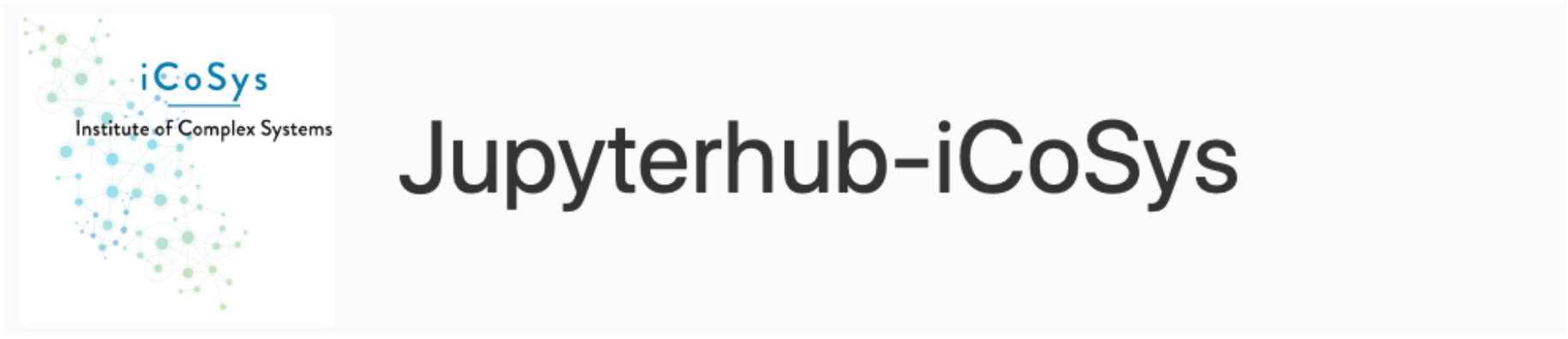
Deep Learning

TSM-DeLearn

Using Jupyterhub and GPUs

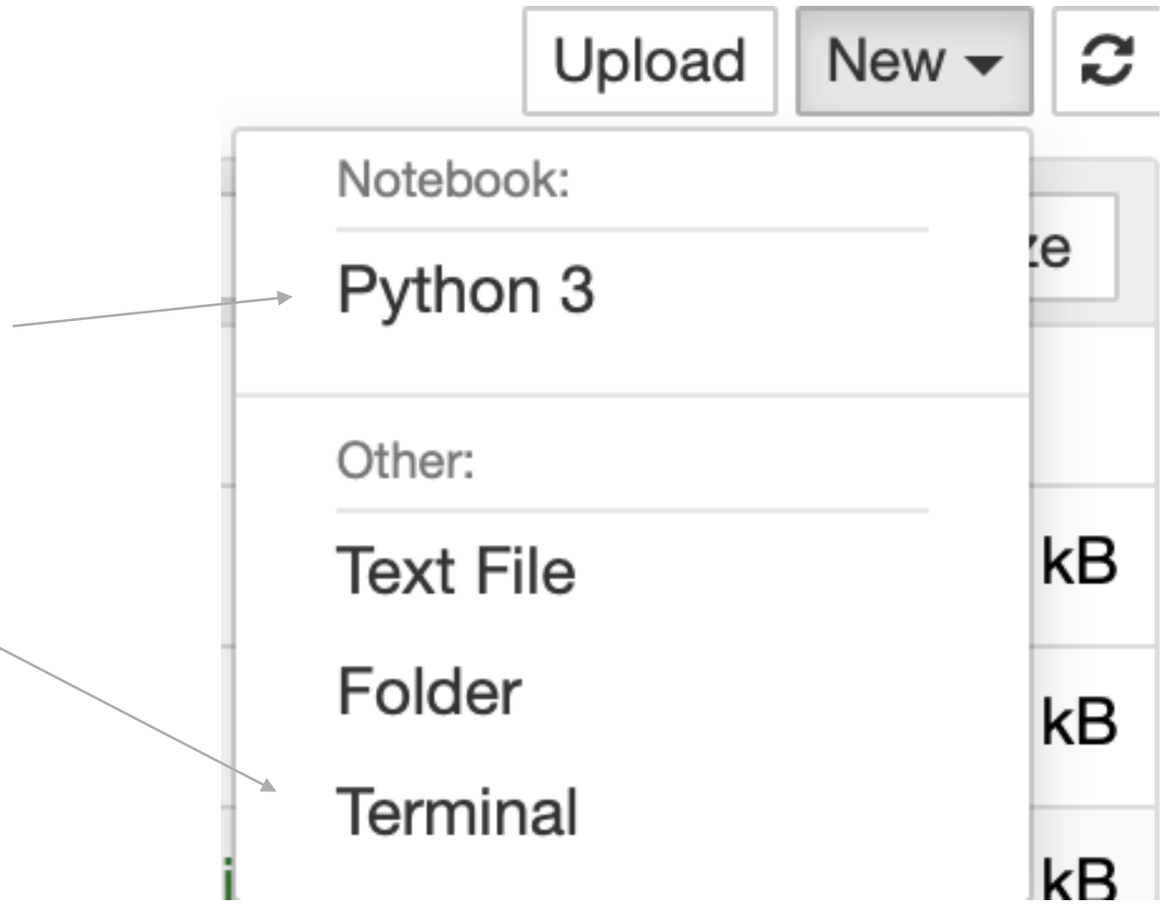
Signing in

- You'll need to use your GitHub account to sign in
  - create one if you don't have one
  - send your GitHub user name to julien.esseiva@hefr.ch and CC jean.hennebert@hefr.ch
- Only members of the Jupyterhub-iCoSys GitHub organisation are authorised
  - You need to wait we add you to the organisation
  - You receive and must accept the invitation
- Then you can access the Jupiter hub at https://icolab-gpu-2.tic.heia-fr.ch



Using the HUB

- You probably already know how to use Jupyter, you can either upload your notebook or create a new one directly on the server
- You can also start a terminal, it'll be useful to check GPU utilisation or manipulating files
- Don't forget to stop your server in the control panel when you're done



Using the HUB - cont'd

- TF (and therefore Keras) is greedy and uses all the memory of each GPUs by default.
- You can expect python kernel dying with multiple users running the default configuration
- You can check the GPU utilisation using the command `nvidia-smi`

```
cuda_user@8cc810abf499:~$ nvidia-smi
Wed Nov  7 17:50:19 2018
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 410.48                 Driver Version: 410.48                    |
|-------------------------------+----------------------+----------------------+
| GPU  Name        Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
|===============================+======================+======================|
|   0  Tesla K80           Off  | 00000000:04:00.0 Off |                    0 |
| N/A   35C    P0    56W / 149W |  10899MiB / 11441MiB |      3%      Default |
+-------------------------------+----------------------+----------------------+
|   1  Tesla K80           Off  | 00000000:05:00.0 Off |                    0 |
| N/A   42C    P0    70W / 149W |  10877MiB / 11441MiB |      0%      Default |
+-------------------------------+----------------------+----------------------+
|   2  Tesla K80           Off  | 00000000:83:00.0 Off |                    0 |
| N/A   42C    P0    54W / 149W |  10877MiB / 11441MiB |      0%      Default |
+-------------------------------+----------------------+----------------------+
|   3  Tesla K80           Off  | 00000000:84:00.0 Off |                    0 |
| N/A   49C    P0    70W / 149W |  10877MiB / 11441MiB |      0%      Default |
+-------------------------------+----------------------+----------------------+
```

Using the HUB - cont'd

- Select which GPU is used by TensorFlow with "CUDA_VISIBLE_DEVICES"
- Additionally, tell TF to only use a fraction of GPU memory when creating a session. During lectures, each of you should use ~8% of a GPU memory.
- Check which GPUs are available with nvidia-smi

```
import os
os.environ['CUDA_VISIBLE_DEVICES'] = '2'
```

```
gpu_options = tf.GPUOptions(per_process_gpu_memory_fraction=0.08)
config = tf.ConfigProto(gpu_options=gpu_options)
sess = tf.Session(config=config)
with sess:
```

```
+-----------------------------+----------------------+----------------------+
|   2  Tesla K80              Off  | 00000000:83:00.0 Off |                    0 |
| N/A   39C    P0    57W / 149W |   1054MiB / 11441MiB |     16%      Default |
+-----------------------------+----------------------+----------------------+
```