High Level Computer Vision

Using the GPU machines
Machines and Allocations

- You have been allocated 2 machines with GPUs
  - ulla.cs.uni-saarland.de and thor.cs.uni-saarland.de
- Each machine has 8 Tesla GPUs (16GB)
- ulla has Tesla P100 GPUs, thor has Tesla V100 GPUs
- 1 GPU per team
- **Very Important to follow usage instructions** (slides 6 and 7)
  - Abuse will lead to termination of accounts immediately
## GPU Allocation

<table>
<thead>
<tr>
<th>GPU</th>
<th>Team</th>
<th>GPU</th>
<th>Team</th>
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<tbody>
<tr>
<td>uller gpu 0</td>
<td>1</td>
<td>thor gpu 0</td>
<td>9</td>
</tr>
<tr>
<td>uller gpu 1</td>
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<td>thor gpu 1</td>
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</tr>
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<td>thor gpu 2</td>
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<td>12</td>
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<td>5</td>
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<td>6</td>
<td>thor gpu 5</td>
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<td>7</td>
<td>thor gpu 6</td>
<td>15</td>
</tr>
<tr>
<td>uller gpu 7</td>
<td>8</td>
<td></td>
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</table>
Connecting to the machines

- Direct ssh access from the university campus or MPI
  - ssh username@thor.cs.uni-saarland.de
  - ssh username@uller.cs.uni-saarland.de

- From outside the campus, you need to connect to the university’s VPN
  - Official instructions (in German): [https://www.hiz-saarland.de/dienste/vpn/anleitungen-uds/anyconnect/](https://www.hiz-saarland.de/dienste/vpn/anleitungen-uds/anyconnect/)
  - Download & Install Cisco from the link above
  - Connect to one of the servers: asa1.uni-saarland.de or asa2.uni-saarland.de with your Saarland University username + password.
  - Connect via ssh as normal
Basics

- **Group directories**
  - Each team has a group directory created locally on their assigned machine
    /raid/hlcv-projects/student_directories/teamxx
  - Please do not write data elsewhere
  - You may use up to 200 GB of storage space per group.

- **Datasets will be available in:**
  - /raid/hlcv-projects/datasets -- *This is read only for you*
  - **Don’t copy!!** Use soft links
    - `ln -s /raid/hlcv-projects/datasets/coco
     /raid/hlcv-projects/student_directories/teamxx`
GPU Usage

- Check gpu usage `nvidia-smi`

- Specifying which gpu
  - CUDA_VISIBLE_DEVICES=1 your-program
  - Number from 0-7. **Use your allocated GPU only!**
  - Test your configuration (after setting paths in slide 10)

```
CUDA_VISIBLE_DEVICES=0 echo 'import torch;x = torch.Tensor(5, 3); print(x.cuda())' | python
```
Disk Usage

- File system is shared among everyone.
- Too many writes too quickly can hang the file-system for everyone.
- Don’t save/write too often to disk
  - Check your loops.
  - Try to limit disk usage and cleanup files you don’t need anymore.

- Directory structure is as follows.

  #Paths for hlcv course
  /raid/
**tmux**

Allows you to run a process on a GPU machine without keeping an open connection

- `tmux list-sessions` - lists all current sessions
- `tmux new -s session_name` - create new session with a specified name
- `ctrl + b` then `d` - detach from a session (Now you can safely close the connection)
- `tmux attach -t session_name` - attach to an already existing session

More commands [here](#).
Software

- Anaconda installation is available at
  - `/raid/hlcv-projects/software/anaconda3`
  - Additional standard libraries can be installed per request (email me)

- Pytorch is also installed, add paths to `~/.profile` as instructed in the next slide

- Tensorflow is installed, but in separate anaconda environment

  `source activate tensorflow`

- Git and gvim are also available.
Paths to setup in ~/.profile

**Paths to add in uller**

#Paths for hlcv course on uller
export PATH="/usr/local/cuda-9.1/bin:/raid/hlcv-projects/software/anaconda3/bin:$PATH"

export LD_LIBRARY_PATH=/raid/hlcv-projects/software/cudnn/lib64:
/usr/local/cuda-9.1/lib64:/raid/hlcv-projects/software/cudnn/lib64:$LD_LIBRARY_PATH

export CUDNN_PATH=/raid/hlcv-projects/software/cudnn/lib64

**Paths to add in thor**

#Paths for hlcv course on thor
export PATH="/usr/local/cuda-9.0/bin:/raid/hlcv-projects/software/anaconda3/bin:$PATH"

export LD_LIBRARY_PATH=/raid/hlcv-projects/software/cudnn/lib64:
/usr/local/cuda-9.0/lib64:/raid/hlcv-projects/software/cudnn/lib64:$LD_LIBRARY_PATH

export CUDNN_PATH=/raid/hlcv-projects/software/cudnn/lib64
Password Change

- We encourage you to change your password.
- Simply run `passwd` from the terminal and follow the prompt instructions.
Mounting a folder on your local machine

- You can mount a folder from the GPU machine to your local machine
- On Linux, you can achieve it using `sshfs`:

  ```
  sshfs username@machine: //[path_to_folder] [local_folder]
  ```

- For example:

  ```
  sshfs username@thor.cs-uni-saarland.de:/raid/hlcv-projects/student_directories/teamxx/code [local_folder]
  ```

- This will allow you to interact with the code as if it were on your local machine. Be careful about what you mount though, large files in the mounted folder might slow everything down.
- This should be fast
- On MacOS, it is possible to install sshfs through FUSE [https://osxfuse.github.io/](https://osxfuse.github.io/)
- There should be equivalent software on Windows as well
- If it doesn’t work, check your local machine’s configuration
Backup

- There is no backup of the project folders as far as we know
- Please use version control for your code