Classification of tree damages from RGB aerial imagery using deep neural networks

- Hackathon -

Bundesministerium
für Umwelt, Naturschutz
und Reaktorsicherheit

Agenda

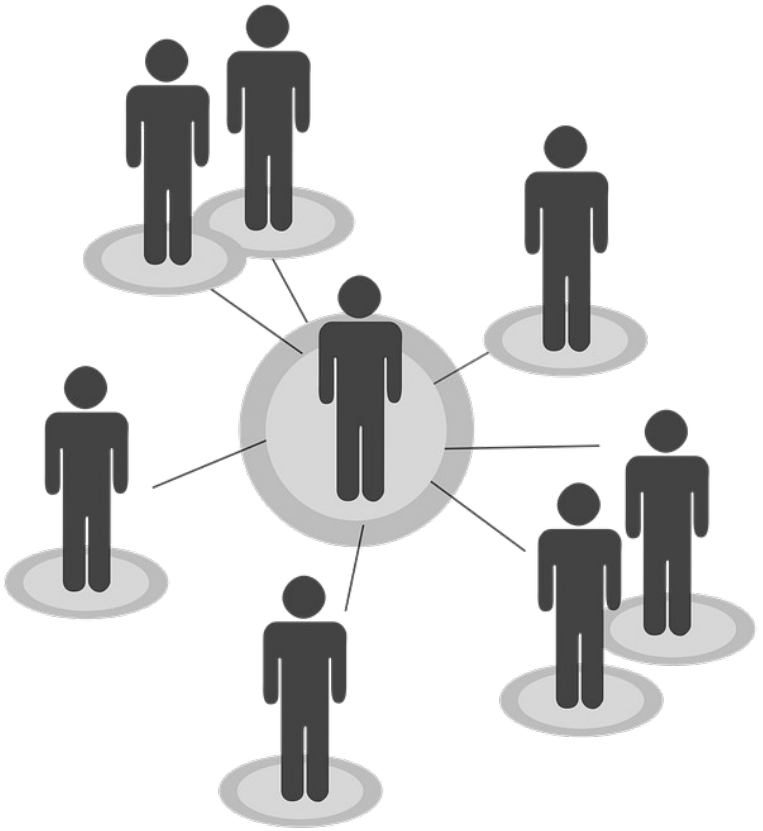
- 10:00 Welcome & short introduction round
- 10:30 Hauke Kirchner: Introduction to the GWDG High Performance Cluster
- 11:00 Selina Schwarz: Mapping dead Trees from orthophotos using Unet in Luxembourg
- 11:30 Outlook, Q&A

Introduction – Jonathan Költzow

- PhD candidate
  - Geographic institute FU Berlin, Future Forest
  - Forest Research Institute Baden-Württemberg
- Focus on tree species classification from Satellite Imagery using Deep Learning
- Research Interest:
  - Deep Learning Techniques
  - Remote Sensing
  - Forest Science

Motivation for the Hackathon

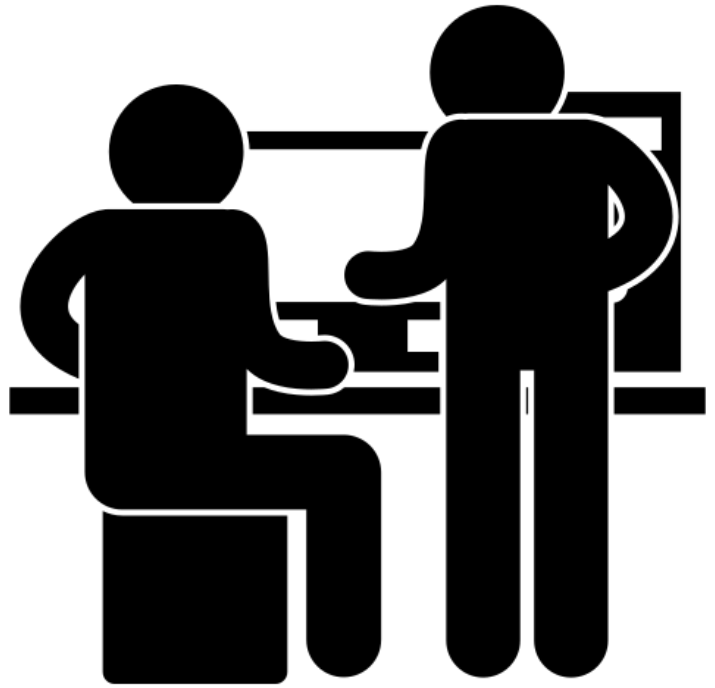
- Remote Sensing phd meetings
- Workshop in Goettingen, Forest SAT
- Self help group for DL practitioners
- Inviting colleagues to give talks and present their research



Motivation for the Hackathon

- Another session of frontal talks?
- Initiating a co-working space
- Discussion of actual pieces of code and best practices
- Need for a common denominator

  = > Hackathon



Introduction

- Please introduce yourselves in a few sentences
- tell us about your current work and prior experience with deep learning

FUTURE FOREST

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What is the hackathon about?

- Which model can classify dead trees with the highest accuracy?

- What innovative approaches can you come up with?

Competition…?

- Two categories: Overall accuracy & innovation
- 100€ worth of amazon gift cards per category

- Strict deadline: July 16th – share your final model and code via github.
  Mail to jonathan.koeltzow@fu-berlin.de

...Collaboration!

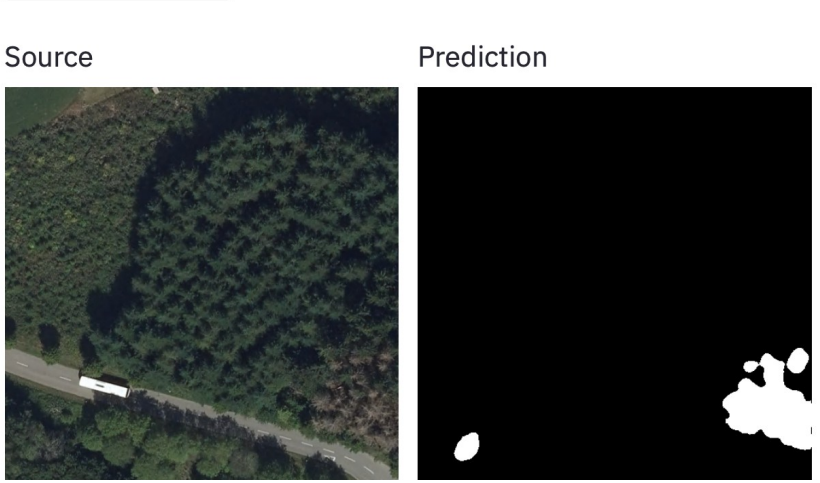
- Team up!
- Please join and use the chat: https://chat.gwdg.de/channel/Forests-in-HPC
- Regular Q&A in the chat Fridays 14:00 – 15:00

Next steps

- Test your access to the cluster
- Familiarize yourselves with the deadtrees package and the data set
- Try out new ideas and prepare for the workshop!

data set

- Ortho Photo shards
- Geopackages
- FORCE datacube (Sentinel 2)
- Conda setup




```
glogin9:~ $ cd /scratch/share/deadtrees/
glogin9:/scratch/share/deadtrees $ ls -l
total 30480020
-rw-r----- 1 bzkurs71 futureforest   304650049 May  4 19:35 FORCE_datacube.tif
-rw-r--r-- 1 bzkurs71 bzkurs71     23517687471 May  2 13:03 ortho_2019_EPSG3044.tif
-rw-r----- 1 bzkurs71 bzkurs71      7387743061 May  4 19:35 processed.images.2017.zip
-rw-r----- 1 bzkurs71 bzkurs71         1431133 May  4 19:36 processed.masks.2017.zip
-rw-r----- 1 bzkurs71 futureforest        2824 May  4 15:00 requirements.txt
-rwxr----- 1 bzkurs71 futureforest        1154 May  4 22:46 setup_conda.sh
glogin9:/scratch/share/deadtrees $
```

Questions?

https://chat.gwdg.de/channel/Forests-in-HPC

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deadtrees package

- Uses yaml configuration files
- Uses dvc versioning of data

- Core utility in deadtrees/:
  train.py
  /utils/

deadtrees package

- Uses Hydra:

  Most Hyperparameters are tuned in a separate file: /deadtrees/default.yaml

- Model architectures are definded in /network/

Further ideas

- Hyperparameter Tuning
- Data Preprocessing
- Resnet vs Unet
- Data Fusion
- Transfer Learning