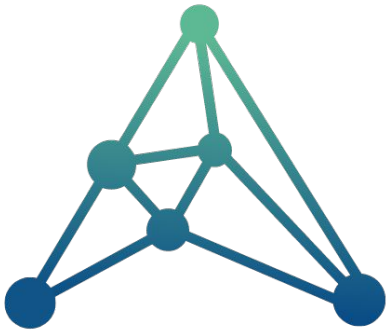


ERUM

DATA HUB

Galaxy Classification Challenge

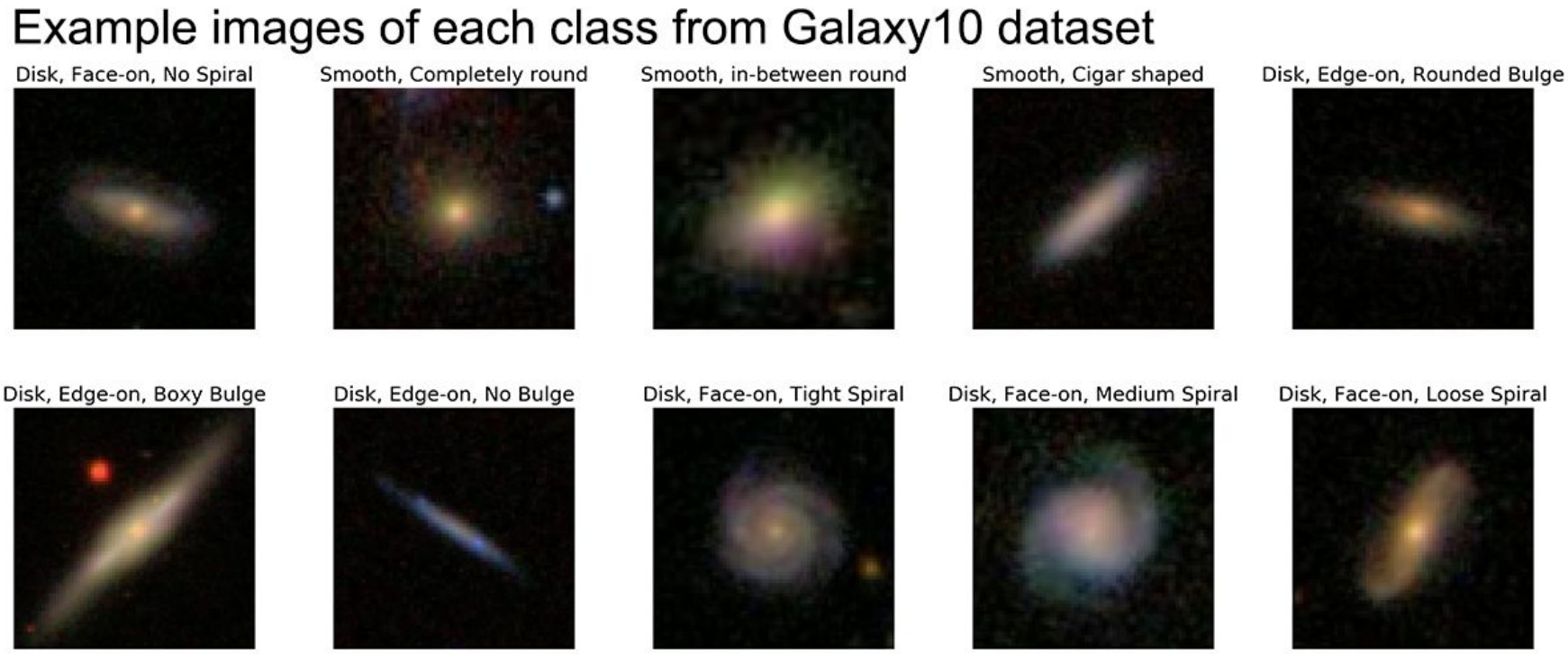
Deep Learning School "Basic Concepts"

ErUM-Data-Hub

01.03.2023

RWTH AACHEN UNIVERSITY

- The Dataset: Galaxy10 (similar to MNIST dataset)
  - 1000s of images of galaxies
  - labels for 10 different shapes
  - Modifications for this challenge:
    - only grayscale
    - cropped to 64x64 pixels



Primary Task:

- Train a neural network to classify the galaxy image's shapes
- Invest some time into optimizing your network's performance

Questions:

1. How do you measure your network's performance?
    - What is your reason for this choice?
    - What other good choices are there?
2. What makes Class 5 (Disk, Edge-on, Boxy Bulge) stand out?
    - How can this be addressed?
3. Find the galaxy images that your network performs best(worst) with. Explain why this is the case.

Keywords that **could** be relevant to answering questions:

Activation	Overtraining		Layers	Splitting
Mirror	Stride	Imbalance	Pooling	Confusion
L2	Ensemble	Gradients	Overall-vs-Specific	

The Rules

- Limitations: **none** - use anything you want/are comfortable with:
  - Software: e.g. TensorFlow, PyTorch, JAX, …
  - Resources: e.g. Google Colab (great for working in teams), Uni-cluster, …
  - Neural Network Techniques: e.g. SeLU, Convolutions, ResNet, …
- Starting point (IPython Notebook): Google Colab, Github, Indico

- Teams
  - 5 people per team
  - teams will be assigned
  - after you have been assigned, please put your name accordingly into this online spreadsheet

Team-Names:

1. Eins
2. Twee
3. Trios
4. Quattro
5. Cinco
6. Six

- Presentations (starting: Thur. 10:45)
  - prepare slides for 7(+3) minutes of presentation
  - introduce your neural network (e.g. architecture & performance)
  - show/explain your answers to the Questions
  - please mail you slides to info@erumdatahub.de by Thur. 10:30