The Project Plan

Week 1-3

1. Intro to Deep Learning & Neural Networks

1.1. Basics of NN layout/neurons
1.2. Mathematical concepts of NNs
1.3. Types of NNs

2. Intro to DL frameworks (TensorFlow)

2.1. Learn to apply TF & APIs (Keras) to model simple DL models
2.2. Test the models for performance to evaluate our learning and to set further milestones

Week 4-6

3. Introduction to data frames & data loading pipelines

3.1. Learn to pre-process data and prepare it for the model to be applied
3.2. Introduction to pre-defined CAMELS Multifield datasets. Choose between SIMBA and IllustriTNG for future train, test, and validation datasets.

4. Optimization of models.

4.1. Learn to analyse dependencies between data specifications and the model learning outcome (predict overfitting)
4.2. Learn to see patterns of how differently processed datasets affect the loss function growth/decrease rate
4.3. Based on the observations, apply corresponding measures to optimize the model for best performance (change layout of model, layer parameters or loss function type)

Week 6-10

5. Advanced NN types to deal with significant distribution shifts in datasets

5.1. Choose between a convolutional or recurrent NN model for the project
5.2. Compile a test model
5.3. Train and evaluate it using the SIMBA or IllustriTNG dataset
5.4. Evaluate performance, optimize if needed

6. Apply the model to the project dataset (pre-process if needed)

6.1. Evaluate the model's performance
6.2. Make conclusions, note things for improvement

Winter Break

7. Report