# Fundamentals of Deep Learning 2025, Apr 05

This is the link shared in discord:  
<https://www.kaggle.com/competitions/fruit-classification/overview>

discord channel:

<https://discord.gg/fiftyone-community>

==discord==

Step 1 - Discord Invite

<https://discord.com/invite/fiftyone-community>

Step 2 - Access Channel

<https://discord.com/channels/1266527359511564372/1345119286041116763>

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notebook

<https://docs.google.com/presentation/d/1OdZUomsz607iXTWrv3NFEFXy9SSSnwRnRpAmCt_D05Q/edit?usp=sharing>

Hi can you share the colab notebook link here?  
<https://colab.research.google.com/drive/1W4vOfqISsqRceORzGaJqmwLXt0GOhNU3?usp=sharing>

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practical computer vision with PyTorch Youtube playlist

<https://youtube.com/playlist?list=PLf-F6yXx9sp9YgRLzuegQWxA71XD13tVH&si=5EzgYwJqbOFrKUkY>

Explanation on Dataset and Dataloader from Antonio

<https://www.youtube.com/watch?v=d2TdTiTLBb0&list=PLf-F6yXx9sp9YgRLzuegQWxA71XD13tVH&index=9>

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<https://discord.com/invite/fiftyone-community>  
<https://colab.research.google.com/drive/1W4vOfqISsqRceORzGaJqmwLXt0GOhNU3?usp=sharing>

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LeNet5 digit recognizer challenge [Kaggle]

exercise

andandandand (Antonio Rueda-Toicen) · GitHub

<https://github.com/andandandand/practical-computer-vision>

Link to the private Kaggle competition:

<https://www.kaggle.com/t/b4dbb9add11c4da0962b837929799d52>

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Link to LeNet5 competition:

<https://www.kaggle.com/code/andandand/lenet5-digit-recognition>

after break at 11:35==

Kaggle competition link (only visible if you are logged into Kaggle)

<https://www.kaggle.com/t/b4dbb9add11c4da0962b837929799d52>

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selecting a gpu

If you wanted to use a specific device

--> torch.device('cuda:0')

<https://pytorch.org/docs/stable/tensor_attributes.html#torch.device>

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1. Download the notebook here <https://github.com/andandandand/practical-computer-vision/blob/main/notebooks/Starter_Create_Dataloaders_Train_Val_Test.ipynb>, upload through File -> Import Notebook via Kaggle
2. @Shrinidhi Rajesh

Hi, in Kaggle, only when we use the registered email ( the one we use for the event), we will be able to access the dataset and the competition?

AntonioRT — 11:48

To access the competition you only need the access link <https://www.kaggle.com/t/b4dbb9add11c4da0962b837929799d52>

[**Kaggle: Your Home for Data Science**](https://www.kaggle.com/t/b4dbb9add11c4da0962b837929799d52)

Kaggle is the world’s largest data science community with powerful tools and resources to help you achieve your data science goals.

1. [11:50]

Explore the MNIST dataset:

1. <https://try.fiftyone.ai/datasets/mnist/samples>

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List of prebuilt torchvision datasets

<https://pytorch.org/vision/main/datasets.html>

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after break at 13:00

Visualizing embedding spaces on FiftyOne (Intro to Dataset Curation)

<https://colab.research.google.com/drive/10pN3wvRm0zzW_LzBzdOp0FwS0rdxK-W0?usp=sharing>

[**Google Colab**](https://colab.research.google.com/drive/10pN3wvRm0zzW_LzBzdOp0FwS0rdxK-W0?usp=sharing)

use it to get a sense of embedding visualization on fiftyone

1. <https://try.fiftyone.ai/datasets/bdd100k/samples> ​

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1. What happens with an unbalanced dataset, especially with the number of data of each class for the validation and test set?

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<https://labelerrors.com/> explore label errors on ImageNet

[**Label Errors in Benchmark ML Datasets**](https://labelerrors.com/)

We identify label errors in 10 benchmark ML test sets and study the potential for these label errors to affect benchmark results.

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<https://youtu.be/e1RrEafgUjQ?si=2fMuuPT6e58RTLcM>

[YouTube](https://www.youtube.com/)

[**Antonio Rueda Toicen**](https://www.youtube.com/channel/UCPAsBsjTk6THyLPFcZZ2i3A)

[**Metrics for Classification and Experiment Tracking**](https://www.youtube.com/watch?v=e1RrEafgUjQ)

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Biased sampling (also called hierarchical sampling) is a possible strategy to deal with unbalanced datasets. A more common, effective, and simple one is calibration of probabilities (explained in the video <https://youtu.be/e1RrEafgUjQ?si=2fMuuPT6e58RTLcM>)

[YouTube](https://www.youtube.com/)

[**Antonio Rueda Toicen**](https://www.youtube.com/channel/UCPAsBsjTk6THyLPFcZZ2i3A)

[**Metrics for Classification and Experiment Tracking**](https://www.youtube.com/watch?v=e1RrEafgUjQ)

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Hints for solving the challenge: <https://docs.google.com/presentation/d/16wg1T51oKNLW5uvyKy6agHRTa67clX2M4TqRfzbqh0A/edit?usp=sharing>

Google Docs

[**Workshop 5 - Training Techniques for Convolutional Networks**](https://docs.google.com/presentation/d/16wg1T51oKNLW5uvyKy6agHRTa67clX2M4TqRfzbqh0A/edit?usp=sharing)

1 Workshop 5 - Training Techniques for Convolutional Networks Antonio Rueda-Toicen

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<https://www.kaggle.com/code/andandand/fruit-classifier-resnet18-vs-vgg19-6-labels>

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1. History of neural networks <https://people.idsia.ch/~juergen/deep-learning-history.html>

AntonioRT — 13:31

Demo of network with hidden layer <https://githubtocolab.com/andandandand/intro-to-pytorch/blob/main/Learning_non_linearities.ipynb>

[**Google Colab**](https://githubtocolab.com/andandandand/intro-to-pytorch/blob/main/Learning_non_linearities.ipynb)

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Bias vs no bias unit explanation:

<https://youtu.be/cr4NMVKJzaw?si=mA_UMvncA4IlQYV3>​YouTube  
Antonio Rueda Toicen

Building an MLP for Image-based Regression in PyTorch  
Image  
AntonioRT — 13:51  
Slides about image classification and cross entropy loss:

<https://docs.google.com/presentation/d/1kn9zUhCgPFNjMKHmkYdIc20gmLvPR1LP63H4TM_98Qs/edit?usp=sharing>​Google Docs  
Workshop 3 - Introduction to Image Classification  
1 Workshop 3 - Introduction to Image Classification Antonio Rueda-Toicen

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​Tuesday meetup: Workshop on the use of binary cross entropy for multilabel and binary classification

<https://voxel51.com/computer-vision-events/multi-label-classification-with-binary-cross-entropy-amazon-satellite-images-workshop-april-8-2025/>​Voxel51  
Multi-label Classification with Binary Cross Entropy: Amazon Satell...  
Join us for a 12-part, hands-on series that teaches you how to work with images, build and train models, and explore tasks like image classification, segmentation, object detection, and image generation.  
Multi-label Classification with Binary Cross Entropy: Amazon Satell...

AntonioRT — 14:00

Important to consider: multilabel is not the same as multiclass, for example: I can have 3 labels being positive on the same image, in this case the network should have Sigmoid activations to produce three different labels as positive  
AntonioRT — 14:01  
<https://docs.google.com/presentation/d/1-ZIa5G2kyx6s-_jmlWf5CA8hc23ayN6ZvTJrOYn6Dyo/edit?usp=sharing>​Google Docs  
Video 14 - Binary Cross Entropy Loss  
Hi! In this video we will discuss binary cross entropy loss and its applications in neural networks. You will learn how to match this loss function with neural network architectures for binary and multilabel classification. Usage of Binary Cross Entropy Loss Antonio Rueda-Toicen  
Image  
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1. How do we extract feature? Do we require data preprocessing like uncorrelation, PCA etc?

​ MNIST projection visualization

<https://projector.tensorflow.org/>

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here is how, check the PyTorch code slides:

[https://docs.google.com/presentation/d/1oapQrZwW2RLLrmP-](https://docs.google.com/presentation/d/1oapQrZwW2RLLrmP-vpoWO2W0S87oNQg5VEH9EEGtEBA/edit?usp=sharing)

[vpoWO2W0S87oNQg5VEH9EEGtEBA/edit?usp=sharing](https://docs.google.com/presentation/d/1oapQrZwW2RLLrmP-vpoWO2W0S87oNQg5VEH9EEGtEBA/edit?usp=sharing)

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Intro to convolutions:

<https://youtu.be/M-YWxCUvmnI>

​ Use the train.csv file inside the Kaggle environment, this is demonstrated on the starter notebook

<https://github.com/andandandand/practical-computer-vision/blob/main/notebooks/Starter_Create_Dataloaders_Train_Val_Test.ipynb>

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​after break at 15:40

<https://www.kaggle.com/code/andandand/lenet5-digit-recognition>​

<https://github.com/andandandand/practical-computer-vision>​

​ Illustration of transforms

[https://pytorch.org/vision/main/auto\_examples/transforms/plot\_transforms\_illustrations.html#sphx-glr-auto-examples-transforms-plot-](https://pytorch.org/vision/main/auto_examples/transforms/plot_transforms_illustrations.html#sphx-glr-auto-examples-transforms-plot-transforms-illustrations-py)