

Introduction to Deep Learning Part IV - Hands-On

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Knowledge for Tomorrow



Practical part

Load Tutorials on Binder:

https://mybinder.org/v2/gh/auliyafitri/deep_learning_basics_pytorch/HEAD

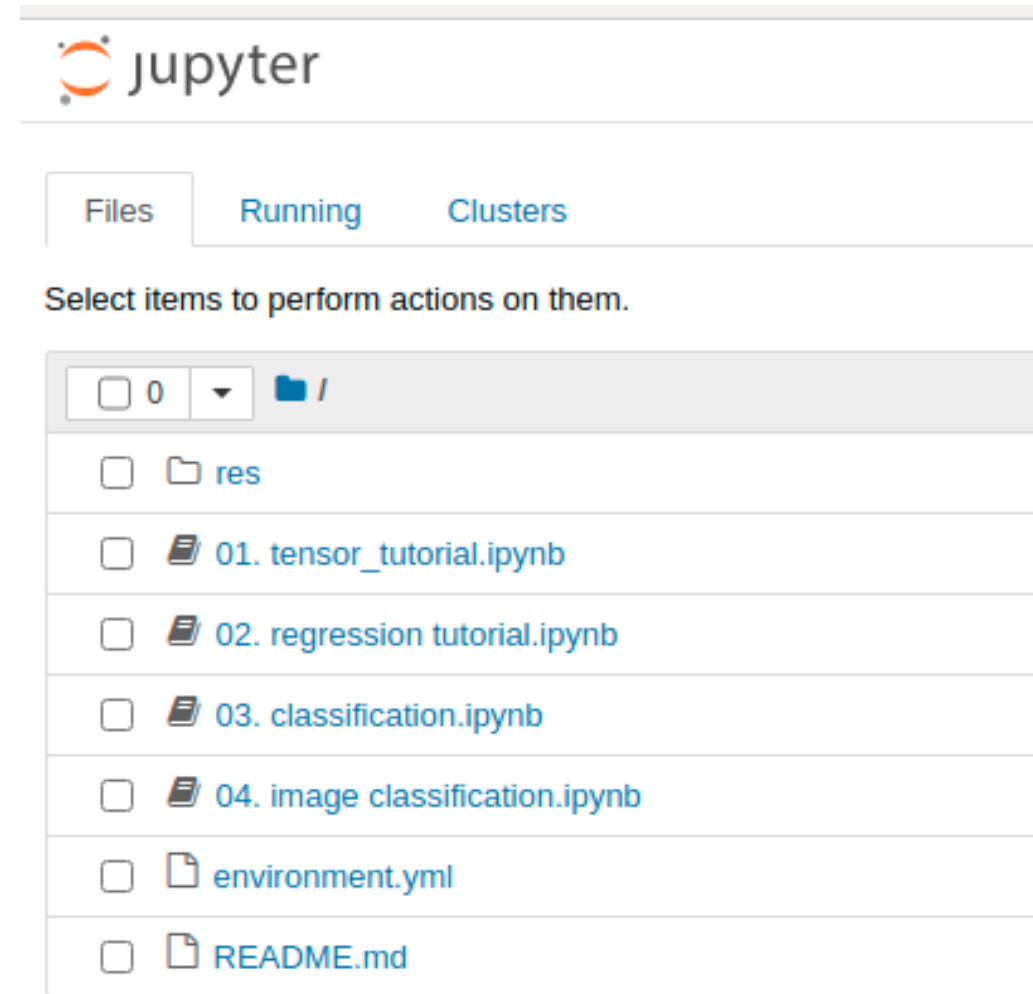
or

<https://tinyurl.com/dlbasics-dlr>



Practical part

Four parts:	Basics	~20 Minutes (now)
(Afternoon)	Regression	~50 Minutes
(Afternoon)	Classification	~50 Minutes
(Afternoon)	Image Classification	~50 Minutes
Structure:	~15 Minutes	Present Jupyter Notebook
	~25 Minutes	Excercises and Self-Study
	~10 Minutes	Wrap-Up and Discussion

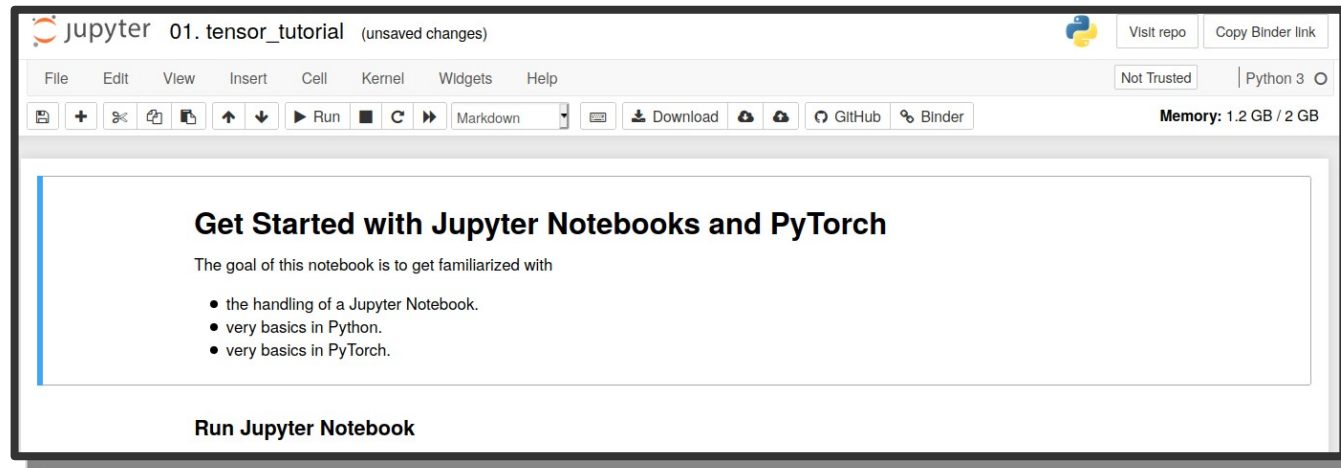


Practical Part: Basics

Time: ~10 Minutes: Presentation
 ~10 Minutes: Self-study

Content: Simple definitions and operations using Python and the PyTorch Package

Goal: Get familiar with the setup
 Learn to run a Jupyter Notebook on Binder
 Learn very first steps with PyTorch

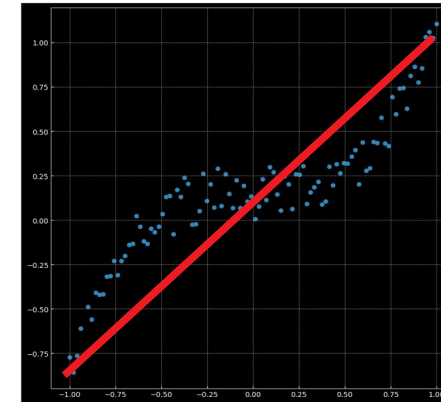


Practical Part: Regression

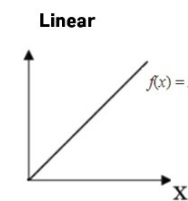
Time: ~15 Minutes: Presentation
 ~25 Minutes: Self-study
 ~10 Minutes: Wrap-Up

Content: Solve a regression task with
 linear and non-linear mode

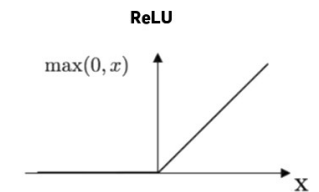
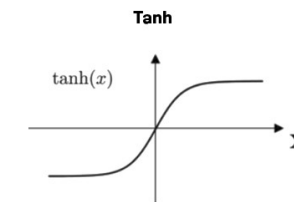
Goal: Learn regression analysis
 Figure out the differences
 between nonlinearities



100 data points around the line $y = x^3 + 0.3$



linear

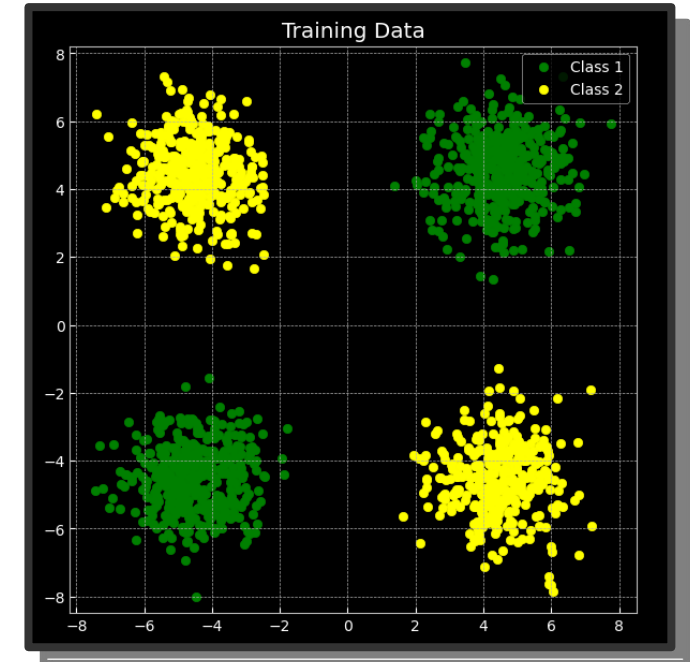


non-linear



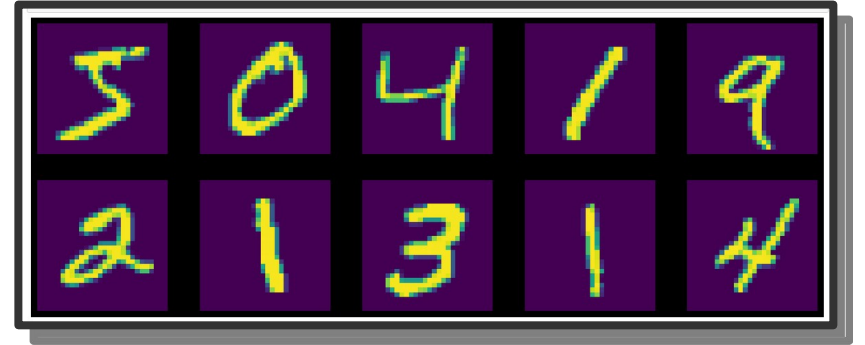
Practical Part: Classification

Time:	~15 Minutes:	Presentation
	~25 Minutes:	Self-study
	~10 Minutes:	Wrap-Up
Content:	Train a classifier for a binary classification task	
	Data based on XOR function	
	Train with „overlapping classes “	
Goal:	Learn how classification tasks are defined	
	Figure out necessity of non-linearities	
	Get an idea of certain and uncertain predictions	



Practical Part: Image Classification

Time: ~15 Minutes: Presentation
 ~25 Minutes: Self-study
 ~10 Minutes: Wrap-Up



Content: Train a classifier for a image classification task based on the MNIST dataset
 Compare a fully connected and a convolutional neural network
 Bonus: evaluate the performance on rotated images (=> Out-of-distribution)

Goal: Learn classification of image data
 Figure out the efficiency of Concolutional Neural Networks
 Bonus: Learn the limitations of neural networks regarding out-of-distribution samples



Feedback Session and Goodbye

Special Thanks to **Simon Meininger!**

