

PyTorch Basics & Simple Image Classification

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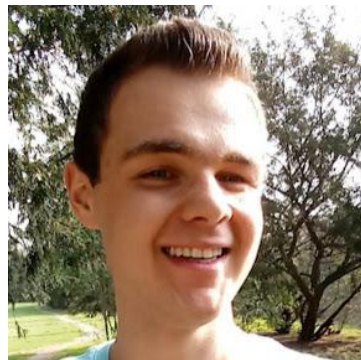
About me

Tomasz Stańczyk   

I'm a PhD student at Inria Stars Team.

My research topic is “Deep Learning methods for human behavior monitoring”, which can be used in healthcare applications and video surveillance.

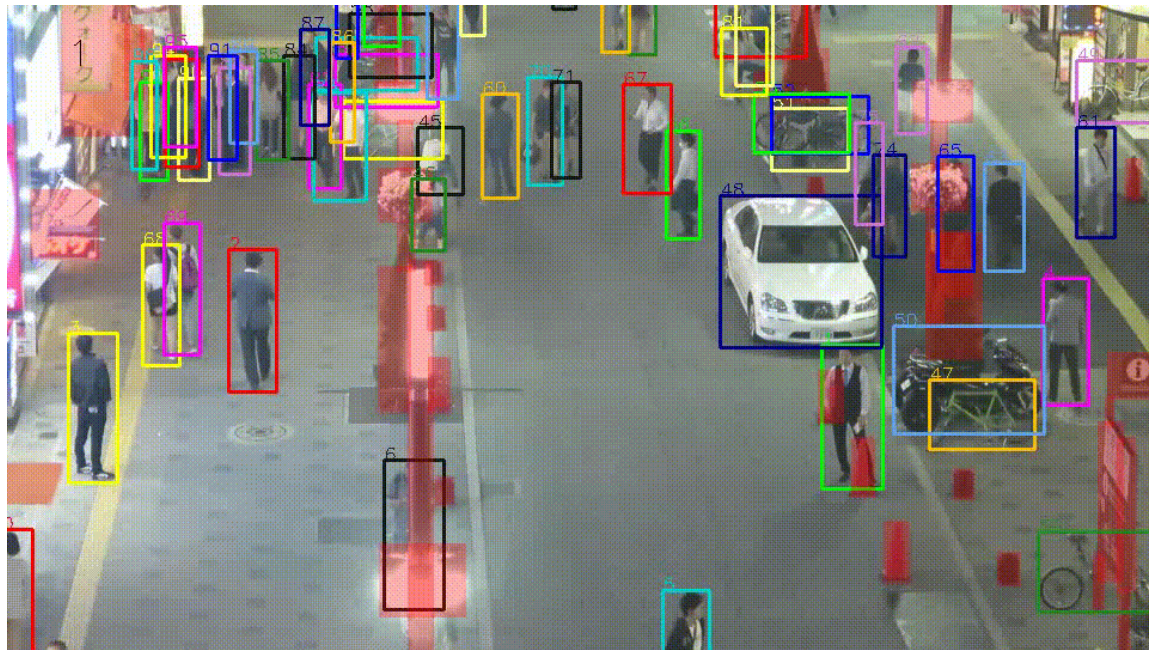
Week 2 and 3: Object Detection and Tracking!
(slides still to be uploaded)



Long-term multi-object tracking

MOT17 dataset (MOT17-04-SDP)

<https://motchallenge.net/vis/MOT17-04-SDP/gt/>



PyTorch

A deep learning framework

Makes the neural network prototyping and training easy

Widely used in the academia, but also more and more popular in the industry

And most importantly, used during our practicals!



Deep Learning with PyTorch Tutorial

Official tutorial provided by the PyTorch authors (Meta AI)





https://pytorch.org/tutorials/beginner/deep_learning_60min_blitz.html

You do **not** need to install any packages for now

Goal of this tutorial:

- Understand PyTorch's Tensor library and neural networks at a high level.
- Train a small neural network to classify images

To run the tutorials below, make sure you have the `torch`, `torchvision`, and `matplotlib` packages installed.

 Tensors In this tutorial, you will learn the basics of PyTorch tensors.	 A Gentle Introduction to torch.autograd Learn about autograd.	 Neural Networks This tutorial demonstrates how you can train neural networks in PyTorch.	 Training a Classifier Learn how to train an image classifier in PyTorch by using the CIFAR10 dataset.
<> Code	<> Code	<> Code	<> Code

How to approach it

For each part of the tutorial: read/skim the website content at first

Having done so, open the related Google Colab notebook
(link at the top of each site)

 Run in Google Colab

All the libraries are already there
(Unless it is specified how to install them)

Follow the instructions in the colab notebook.

Get your hands dirty and play with selected elements, changing parameters, details, etc.

Improving your skills

After finishing the main tutorial, you can proceed to the additional parts from “Introduction to PyTorch” (menu on the left side on the website)

Ensure that you feel at ease with using PyTorch as you will need it during the assignment (And most likely later in your career)

You are encouraged to try and figure things out on your own at first, but of course, we are here to help you if you are stuck at some point

Besides, feel free to ask us any questions you have!

Introduction to PyTorch [-]

Learn the Basics

Quickstart

Tensors

Datasets & DataLoaders

Transforms

Build the Neural Network

Automatic Differentiation with `torch.autograd`

Optimizing Model Parameters

Save and Load the Model

Google Colab tips



Consider creating a copy of the notebook to your Google account, so that you can edit cells and save your modifications

Change the runtime: Runtime -> Change runtime type -> Hardware accelerator -> GPU

For later (yet as important):

Everytime you want to run a terminal-like instruction in a code shell, you need to precede the whole instruction with an exclamation mark, e.g.

!git clone... or *!python file.py...*

If you are changing directory with *cd*, you need to do it as a one instruction with the proceeding command:

!cd && python file.py...

You can save your output (ctrl+S), edit files (double click) in and upload them (e.g. drag and drop) into your Google Colab space, but mind that they might be automatically erased after some time. Thus do make copies (download them into your PC, right click -> download)

Running codebases outside Google Colab

If you have a computer with a GPU or an access to the cluster with GPUs, you can (and should) actually install PyTorch so that you execute your code there.

Recommended approach:

Install Anaconda (or Miniconda if on a server/cluster)



<https://pytorch.org/> -> scroll down -> Install PyTorch -> select "Conda" as the package. Follow the instructions

If you are stuck, we can help you here as well. Also at the beginning of the next practical session (week 2).



Final tips for the practicals (in general)

Do it earnestly, **you will learn a lot and it will become useful to you on the later stages of your studies and afterwards.**

When facing issues and errors, google it at first and see if someone has had such an issue before. That's how you learn in practice.

Feel free to discuss the stuff with your classmates, but ensure it is you who does and understands the assignment.

If you are seriously stuck and cannot proceed, you can contact me via e-mail.

Happy learning!

Extra homework

How to read a (machine learning) scientific paper by Andrew Ng.

<https://www.youtube.com/watch?v=733m6qBH-jl>

(<https://tinyurl.com/2p84mj48>)

From 0:59 to 28:51, yet in fact, the whole video might be of interest to you.

Handy summary after watching: <https://forums.fast.ai/t/how-to-read-research-papers-andrew-ng/66892>

(<https://tinyurl.com/2s4mc3eu>)

Remember that your final examination will be based on the reading, understanding and presenting a scientific paper of your choice relevant to our class.