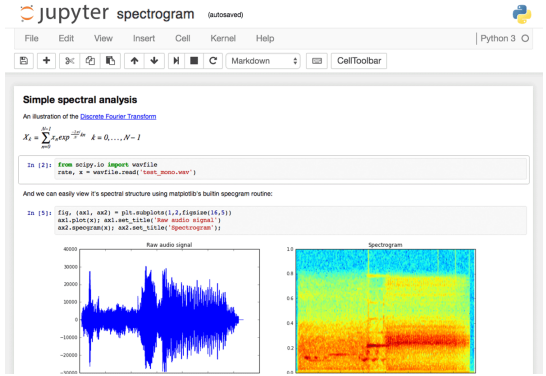
Introduction to Deep Learning (I2DL)

Exercise 3: Python and Data

Today's Outline

- Python Setup
- Jupyter Notebooks
- Contents of the first python exercise
  - Example Datasets in Machine Learning
  - Dataloader
- Submission system



- Number of submissions: 3

Some notes on "effort" and the exam

- Exercise sessions generally will be short (~45min)
- Practical tasks will take time both to
  - implement
  - run and test network configurations

- In the end, you will receive
  - A 0.3 bonus on the final grade, if you pass all but one submission
  - Practical experience for work/internships/thesis

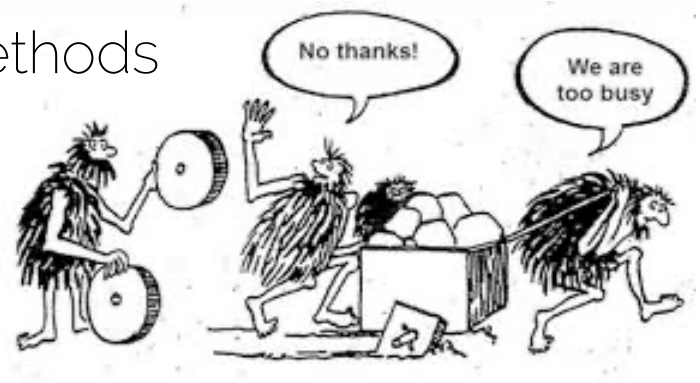
Lecture/Exercise Alignment

- All exercise content is relevant for the exam
- Generally we try to cover the topics of the previous lecture

- However
  - Giving you a second view on the material presented in the lectures
  - We might cover content that will be presented later in the lecture

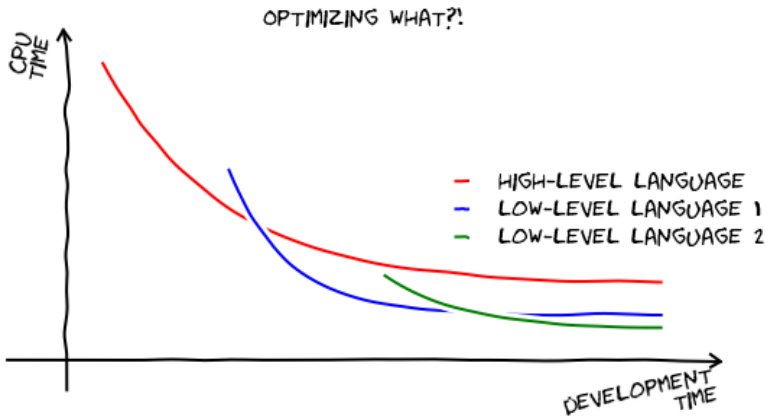
Your task for the next exercises

- Implementation of
  - Classic datasets and data loading
  - Classification pipeline using
    - Traditional machine learning methods
    - Neural Networks
      - Layers
      - Optimizers
      - Etc.
- „Reimplement the wheel“



Python “Introduction”

- Why python:
  - Very easy to write development code thanks to an intuitive syntax
  - A plethora of inbuilt libraries, esp. for deep learning
    - Biggest language used in deep learning research
- Mainly we will use
  - Jupyter notebooks
  - Numpy
  - Pytorch



Live Demo

(Jupyter notebooks)

Python Setup

- New users: install python3.7
  - `README.md`
- "Advanced" users:
  - Virtual environment via anaconda/whatever
  - Regular system python install in this environment
    - `pip install -r requirements.txt`

New python users: http://nbviewer.jupyter.org/github/jrjohansson/scientific-python-lectures/blob/master/Lecture-1-Introduction-to-Python-Programming.ipynb

Submission Start

- We will open the submission system next week
  - So don't worry if you can't submit right away

- External students with TUM/LMU affiliation
  - Use the google form for external TUM/LMU affiliated students to sign up
  - We will send you a matriculation number which you can use to sign up

How to submit exercises

- Register at our submission webpage (https://dvl.in.tum.de/teaching/submission/)
  - Sign up with valid matriculation number
  - Get `id` and `password` via mail from tum-online (it will display the email address)
- Submit models with
  - Upload models for respective exercise by zipping them (no rar, gzip)
  - Note: You will submit your whole code folder as well as your trained models (there are file limits)

How to submit exercises

- On the submission webpage
  - Upload your zipped exercise folder
  - Select the model you want to evaluate

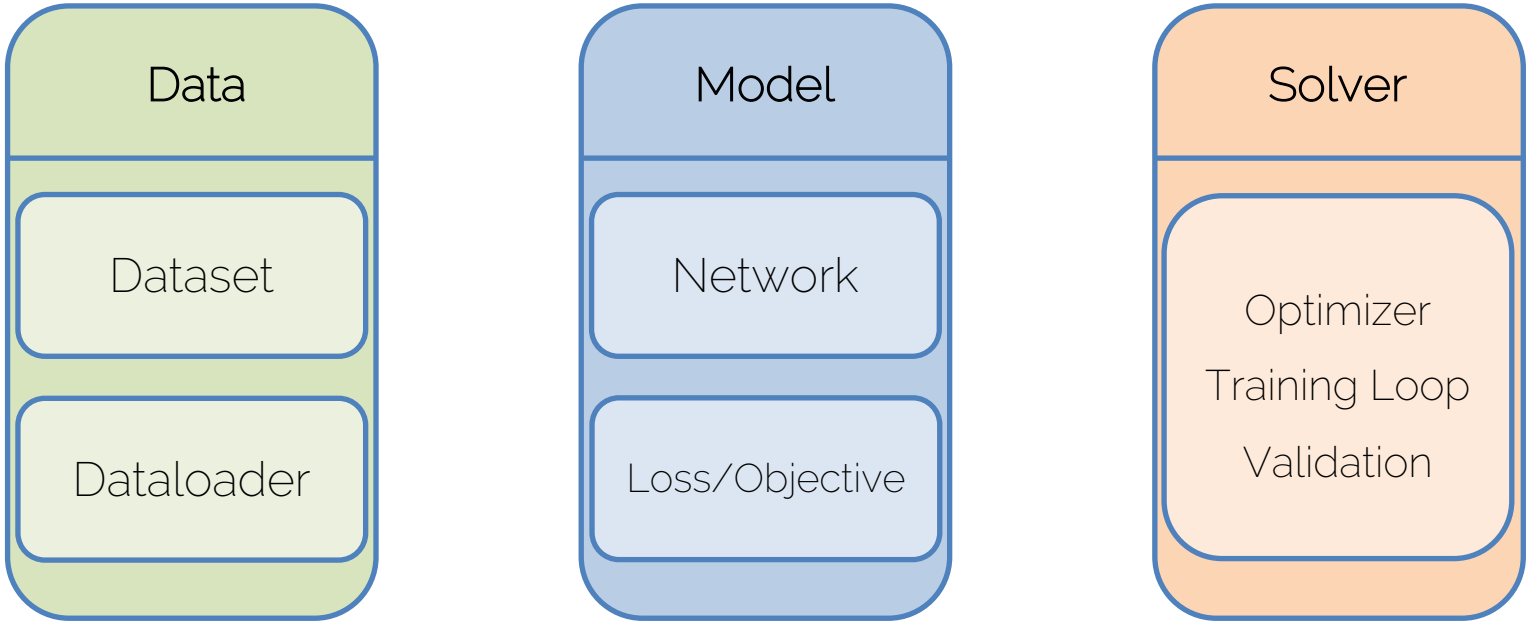
- Wait for the email with your score
  - Uses email that you signed up with
  - Refresh webpage until it no longer says „job currently waiting in queue“ and check out your score on the webpage and via email

Submission Overview

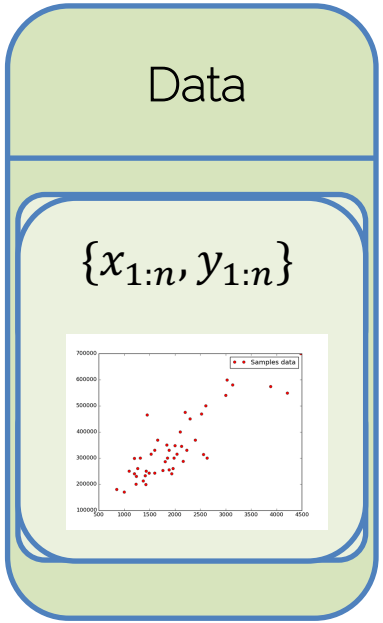
- We will announce the number of submissions for each exercise
- Optional notebooks are not numbered or tagged as optional

- Every submission has a submission goal
  - Goal: Implement a sigmoid function
  - Reachable points [0, 100]
  - Threshold to clear exercise: 100
  - Submission start: May 11, 2020 23:59
  - Submission deadline: May 17, 2020 23:59

The Pillars of Deep Learning

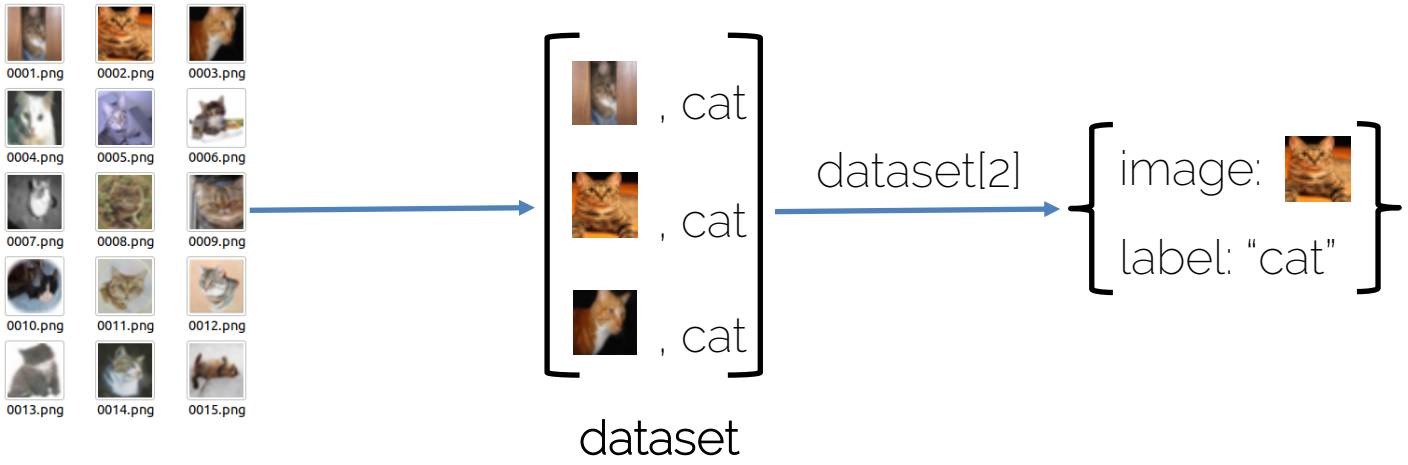


The Pillars of Deep Learning



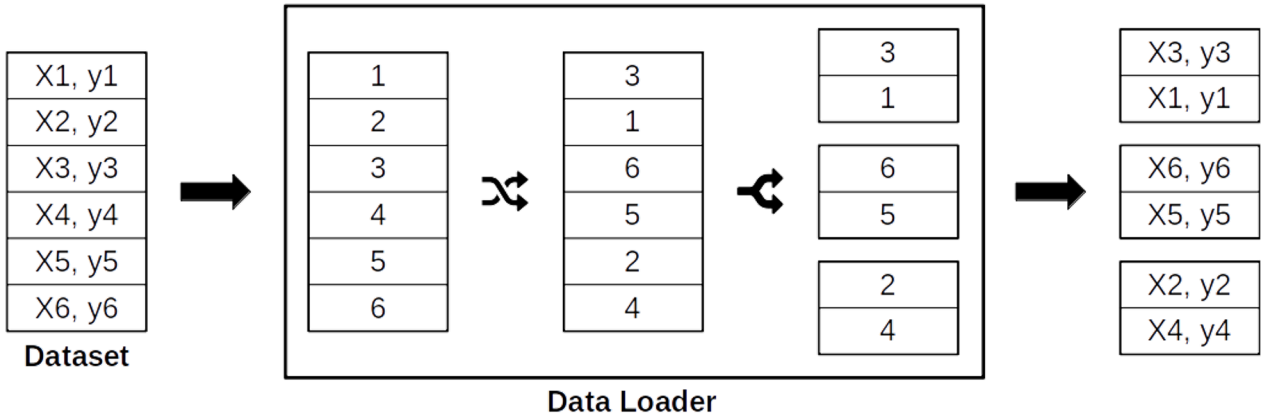
Dataset

- Stores the data in an efficient, accessible form
- Performs data preprocessing steps using Transforms
- Example: Image Folder Dataset



DataLoader

- Defines how to load the dataset for model training
- Shuffles the dataset
- Splits the dataset into small subsets



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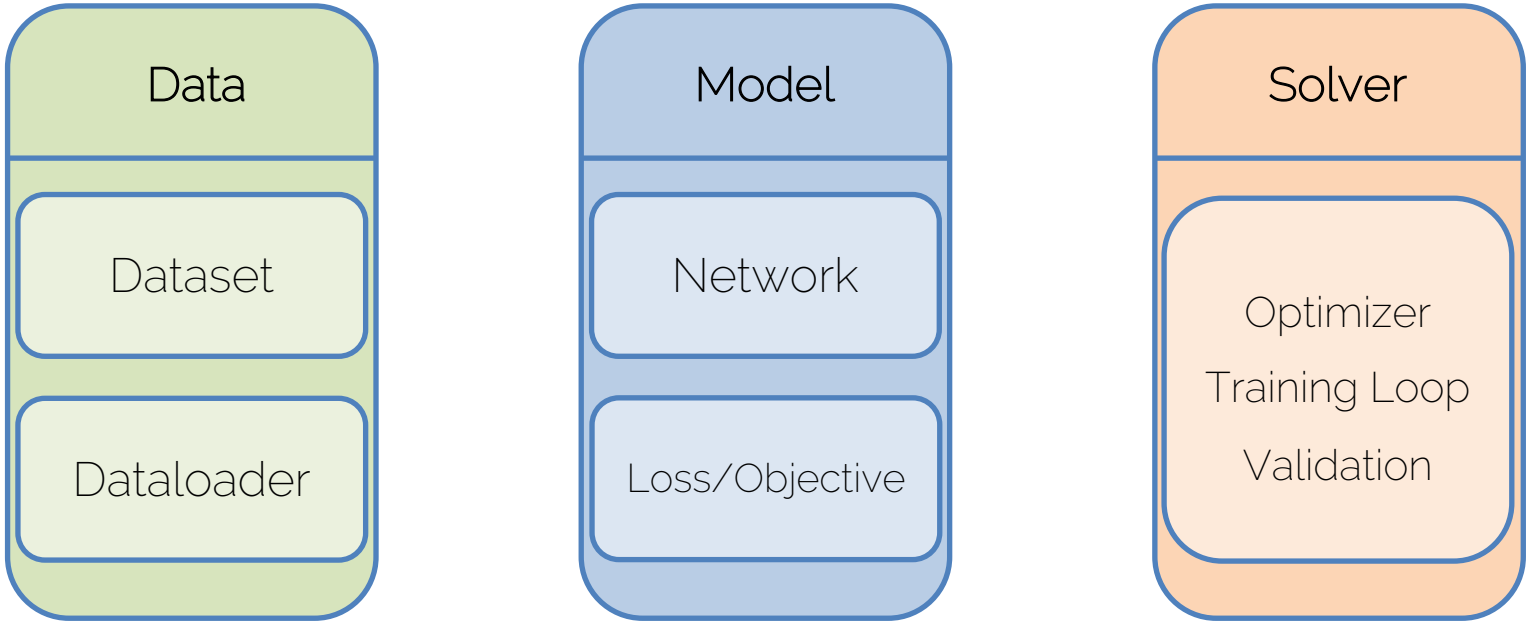

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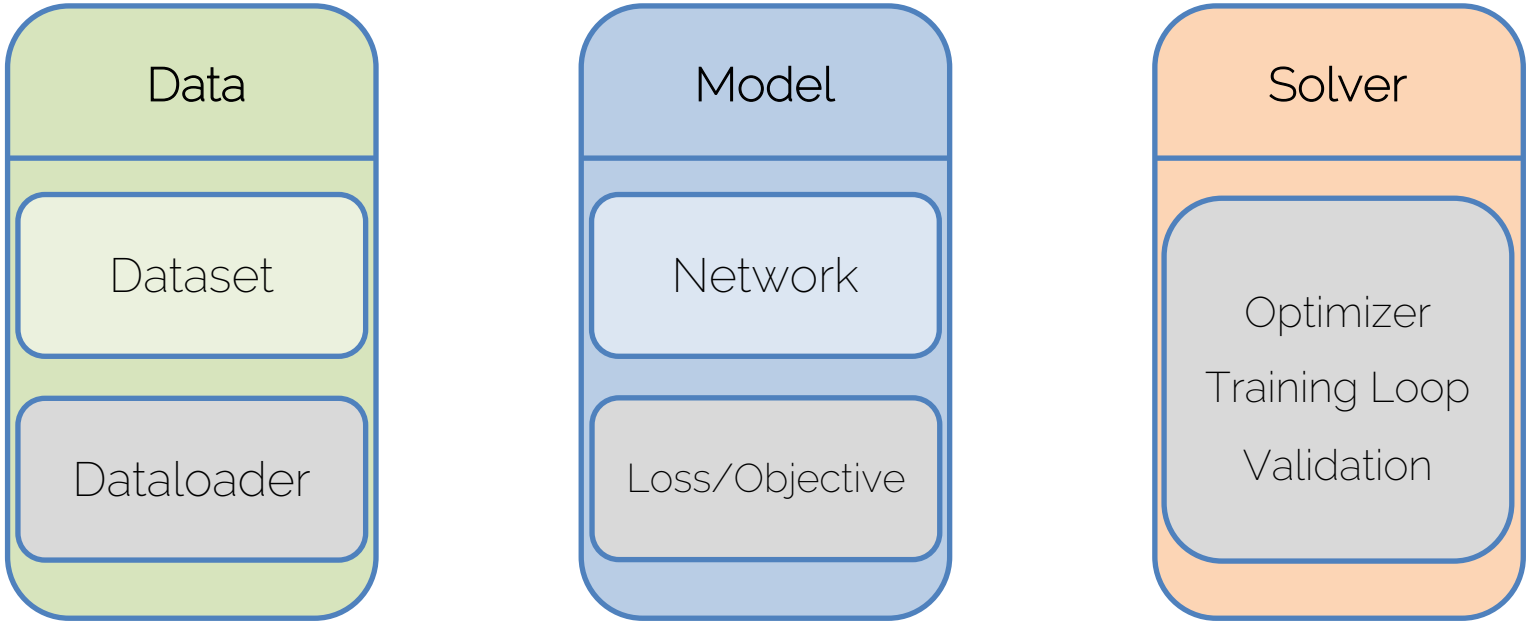


Can be implemented once and used in multiple projects

Exercises FAQ

- I don't want to code in notebooks. Can I use my favourite IDE?
  - Yes
- Cool, so I can just change the whole code structure?
  - No
  - You can write any helper functions, but keep the skeleton classes intact (i.e., don't rename important functions or variables)
  - You will upload all files and those will be archived on our end

Threshold and Submission FAQ

- How do I know that I passed?
  - Once you submit a score that surpasses the threshold, you will receive an email that contains a message which tells you that you passed this submission

- Help, I got this message a second time!?
  - You will receive this message every time you submit an exercise that exceeds the score

Threshold and Submission FAQ

- I submitted another model which was below the threshold. Do I have to resubmit the old model?
  - No, once one models surpasses the threshold, you are done with this submission (for the bonus)

- How much time do we have for each set of submissions?
  - See submission goals in the corresponding notebook

Threshold and Submission FAQ

- Is there a limit on how often I can submit?
  - We will publish a detailed submission limit at the beginning of the next week

- Will there always be three submissions?!
  - Nope ;). Most exercises will have a single submission

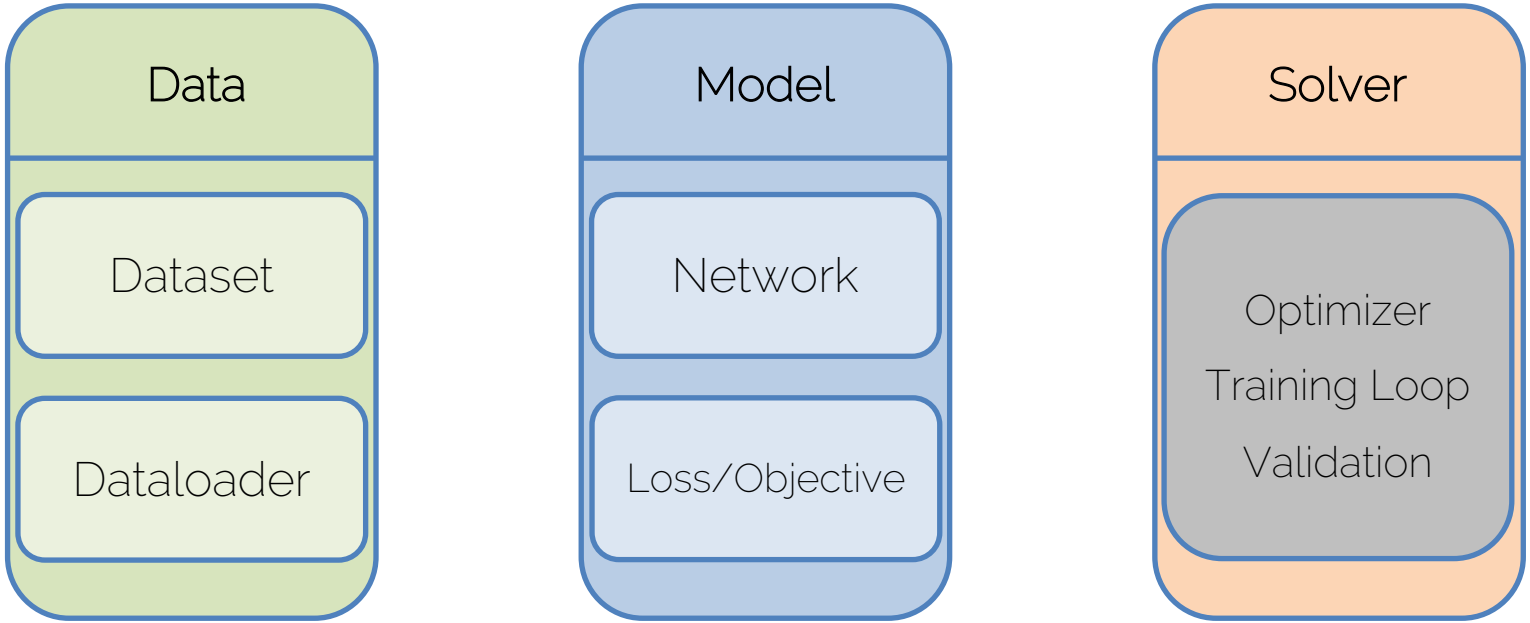
Threshold and Submission FAQ

- How long does it take to do a submission?!
  - Depends on the submission, however you will have to train models for later submissions which can take “hours” to run on your machine, regardless how much coding you have to do

Upcoming Lectures

- Next lecture: Lecture 4: Backpropagation
- Next Thursday: Solver and first Network with Patrick

The Pillars of Deep Learning



See you next week ☺