23.10.23

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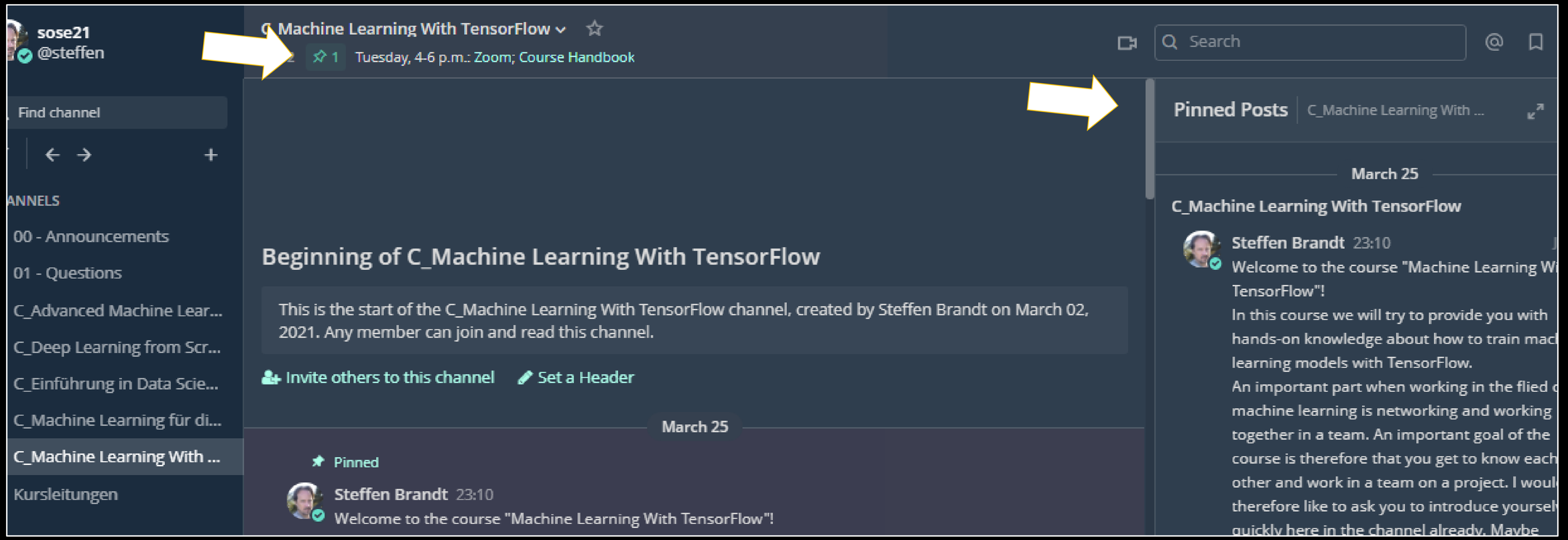
Machine Learning With TensorFlow

GENERAL INTRODUCTION

- Personal Introduction
- Organizational Matters
- Introductory Discussion on AI
- Coursera Registration
- Course Projects
- ML Frameworks

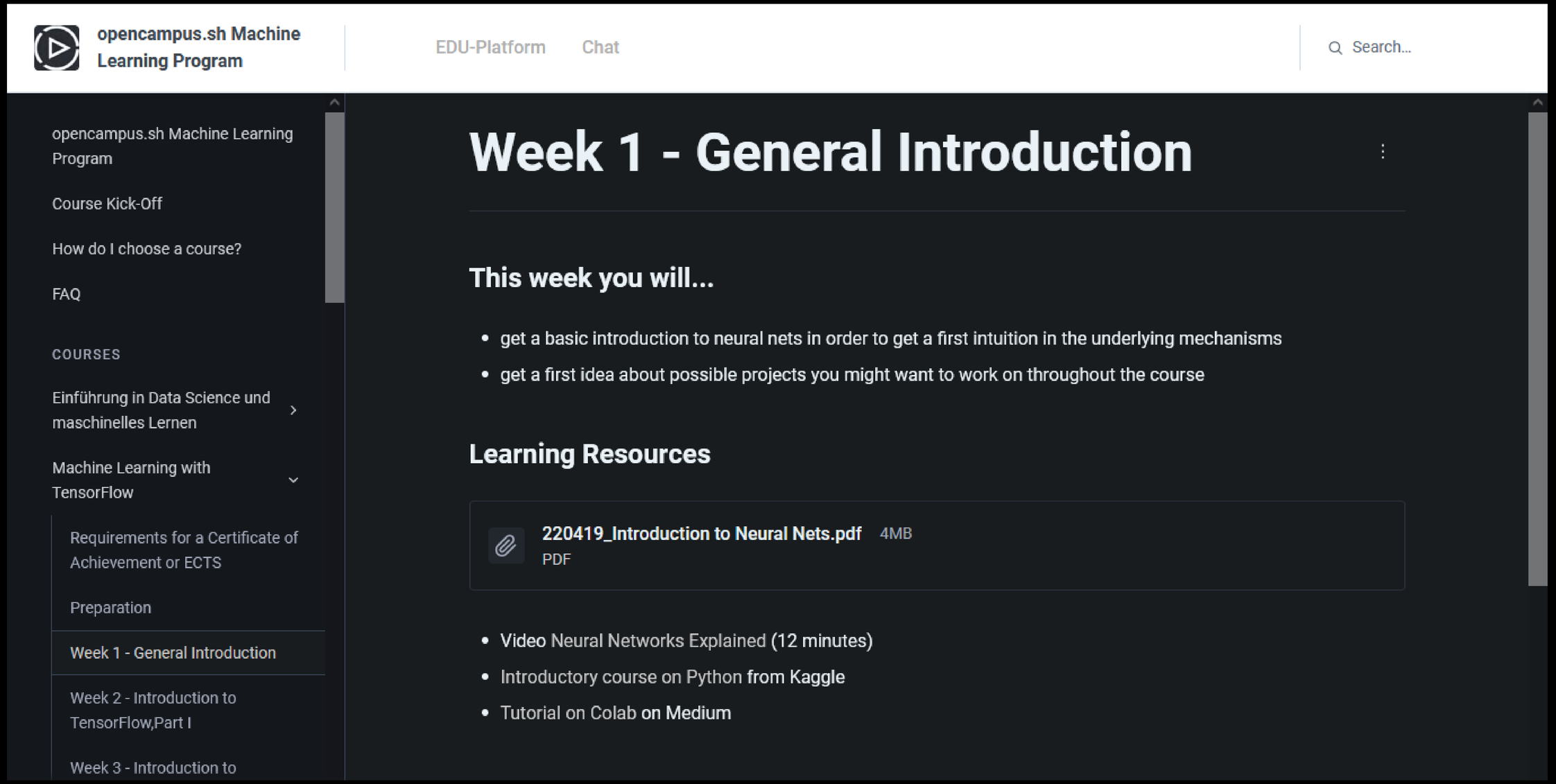
PERSONAL INTRODUCTION

CHAT



- Please, ask questions to us in the chat

COURSE HANDBOOK



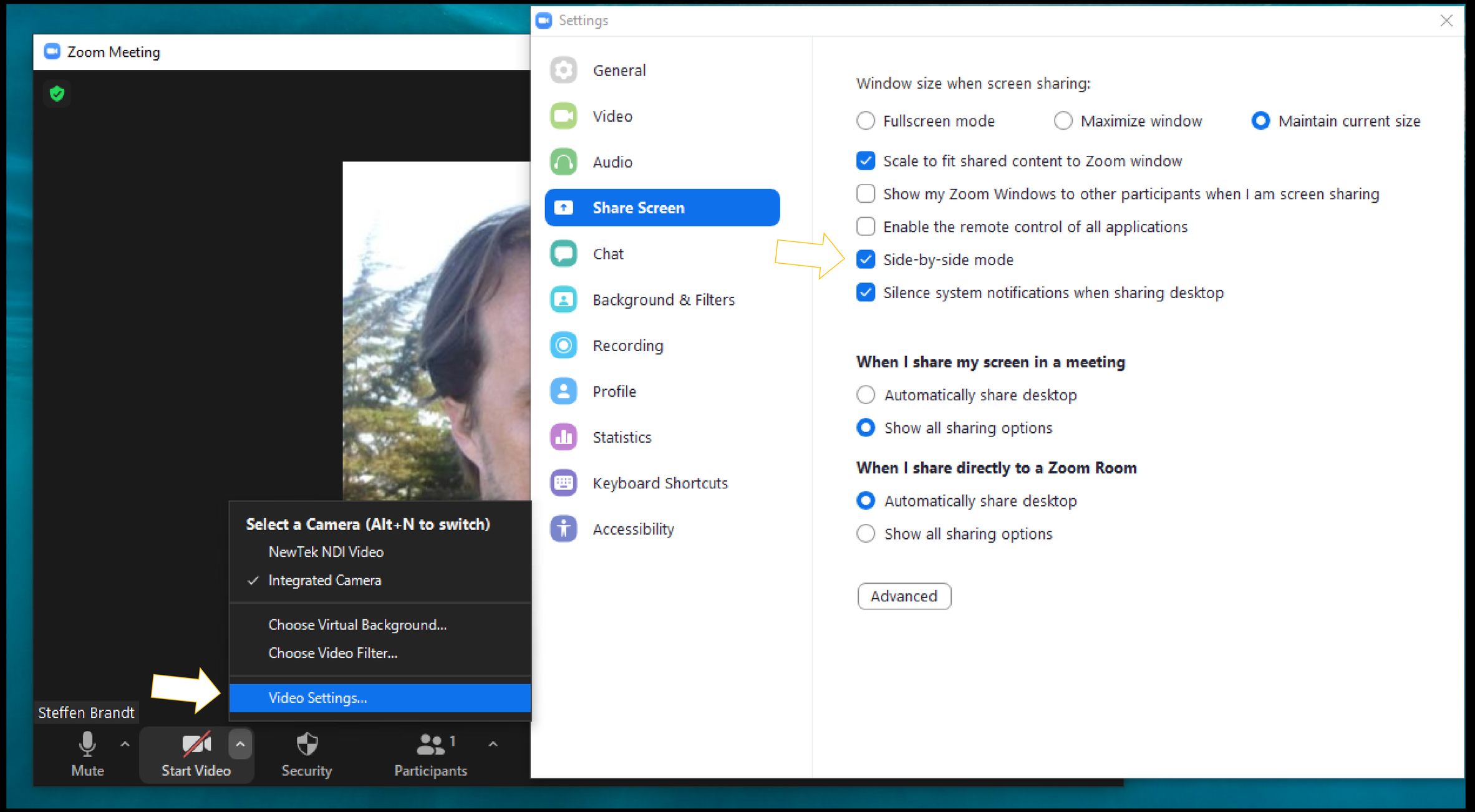
ORGANIZATIONAL MATTERS

- **Use your full names in the zoom meetings!**
- Scan the QR-Code if you participate in presence
- **Complete your profile in the Mattermost chat with your full name and a photo.**
- **Please write us if you will not go on with the course!**

ZOOM

- Try the different viewing modes:
  - Gallery View/ Active Speaker
  - Split Screen/ Full Screen Mode

- Maybe watch this video to get an idea: https://www.youtube.com/watch?v=v3IPAbpVjd4


Zoom Meeting
Select a Camera (Alt+N to switch)
NewTek NDI Video
Integrated Camera
Choose Virtual Background...
Choose Video Filter...
Video Settings...
Steffen Brandt
Mute
Start Video
Security
Participants
1
Settings
General
Video
Audio
Share Screen
Chat
Background & Filters
Recording
Profile
Statistics
Keyboard Shortcuts
Accessibility
Window size when screen sharing:
Fullscreen mode
Maximize window
Maintain current size
Scale to fit shared content to Zoom window
Show my Zoom Windows to other participants when I am screen sharing
Enable the remote control of all applications
Side-by-side mode
Silence system notifications when sharing desktop
When I share my screen in a meeting
Automatically share desktop
Show all sharing options
When I share directly to a Zoom Room
Automatically share desktop
Show all sharing options
Advanced

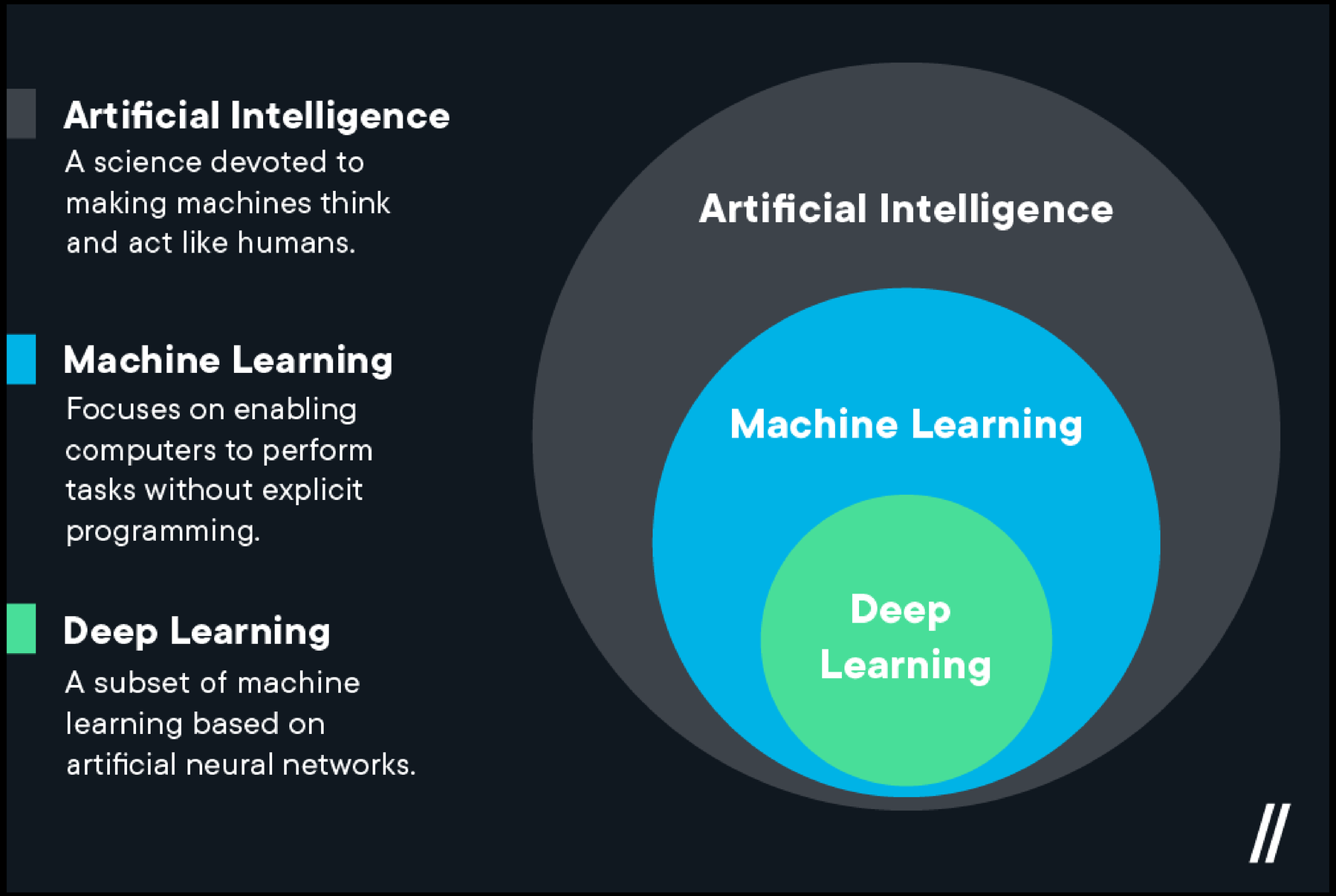
23.10.2023	16:00	17:45	Introduction to Neural Nets and Tools Used Durin
30.10.2023	16:00	17:45	Introduction to TensorFlow for AI, Machine Learni
06.11.2023	16:00	17:45	Introduction to TensorFlow for AI, Machine Learni
13.11.2023	16:00	17:45	Convolutional Neural Networks, Part I
20.11.2023	16:00	17:45	Convolutional Neural Networks, Part II
27.11.2023	16:00	17:45	Natural Language Processing,

Present your project idea

04.12.2023	16:00	17:45	Natural Language Processing, Part II
11.12.2023	16:00	17:45	Sequences, Time Series and Prediction, Part I
18.12.2023	16:00	17:45	Sequences, Time Series and Prediction, Part II
08.01.2024	16:00	17:45	Presentation of the Final Projects, Part I
15.01.2024	16:00	17:45	Presentation of the Final Projects, Part II

FIRST BREAKOUT

- 15-20 Minutes
- Present yourself
- Discussion Questions:
  - Do you know examples for Machine Learning?
  - Do you know examples for Deep Learning?
  - Are there AI tools that you use?(Chat GPT etc.)



Deep Learning vs. Machine Learning—What's the Difference? (2021, February 8). Flatiron School. https://flatironschool.com/blog/deep-learning-vs-machine-learning/

INTRO TO NEURAL NETS

- The linked videos are good to get an overview
- Don´t be intimidated if you didn´t understand everything
- Watch the videos again at a later stage and see if you understand more

coursera | What do you want to learn? Steffen Brandt

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About this Professional Certificate

TensorFlow is one of the most in-demand and popular open-source deep learning frameworks available today. The DeepLearning.AI TensorFlow Developer Professional Certificate program teaches you applied machine learning skills with TensorFlow so you can build and train powerful models.

In this hands-on, four-course Professional Certificate program, you'll learn the necessary tools to build scalable AI-powered applications with TensorFlow. After finishing this program, you'll be able to apply your new TensorFlow skills to a wide range of problems and projects. This program can help you prepare for the Google TensorFlow Certificate exam and bring you one step closer to achieving the Google TensorFlow Certificate.

Shareable Certificate
Earn a Certificate upon completion

100% online courses
Start instantly and learn at your own schedule.

Flexible Schedule
Set and maintain flexible deadlines.

deeplearning.ai **DeepLearning.AI TensorFlow Developer Professional Certificate** Enrolled

About How It Works **Courses** Instructors Enrollment Options FAQ

COURSE 1

Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning

★★★★½ **4.7** 12.904 ratings • 2.739 reviews

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This course is part of the upcoming Machine Learning in Tensorflow Specialization and will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

SHOW ALL

COURSE 2

Convolutional Neural Networks in TensorFlow

★★★★½ **4.7** 5.658 ratings • 858 reviews

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This course is part of the upcoming Machine Learning in Tensorflow Specialization and will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

SHOW ALL

COURSE 3

Natural Language Processing in TensorFlow

★★★★½ **4.6** 4.631 ratings • 711 reviews

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This Specialization will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

SHOW ALL

COURSE 4

Sequences, Time Series and Prediction

★★★★½ **4.6** 3.279 ratings • 526 reviews

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This Specialization will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning

4.7 14,803 ratings • 3,104 reviews

Enrolled | Go to Course

Sponsored by OPENCAMPUS

Offered by DeepLearning.AI

About this Course

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This course is part of the upcoming Machine Learning in Tensorflow Specialization and will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

SHOW ALL

Shareable Certificate
Earn a Certificate upon completion

100% online
Start instantly and learn at your own schedule.

Flexible deadlines
Reset deadlines in accordance to your schedule.

Intermediate Level

coursera

For Enterprise

Steffen Brandt

Browse > Data Science > Machine Learning

DeepLearning.AI TensorFlow Developer Professional Certificate

4.7 15.626 ratings

Laurence Moroney

Offered By

DeepLearning.AI

Enrolled

Already enrolled

115,497 already enrolled

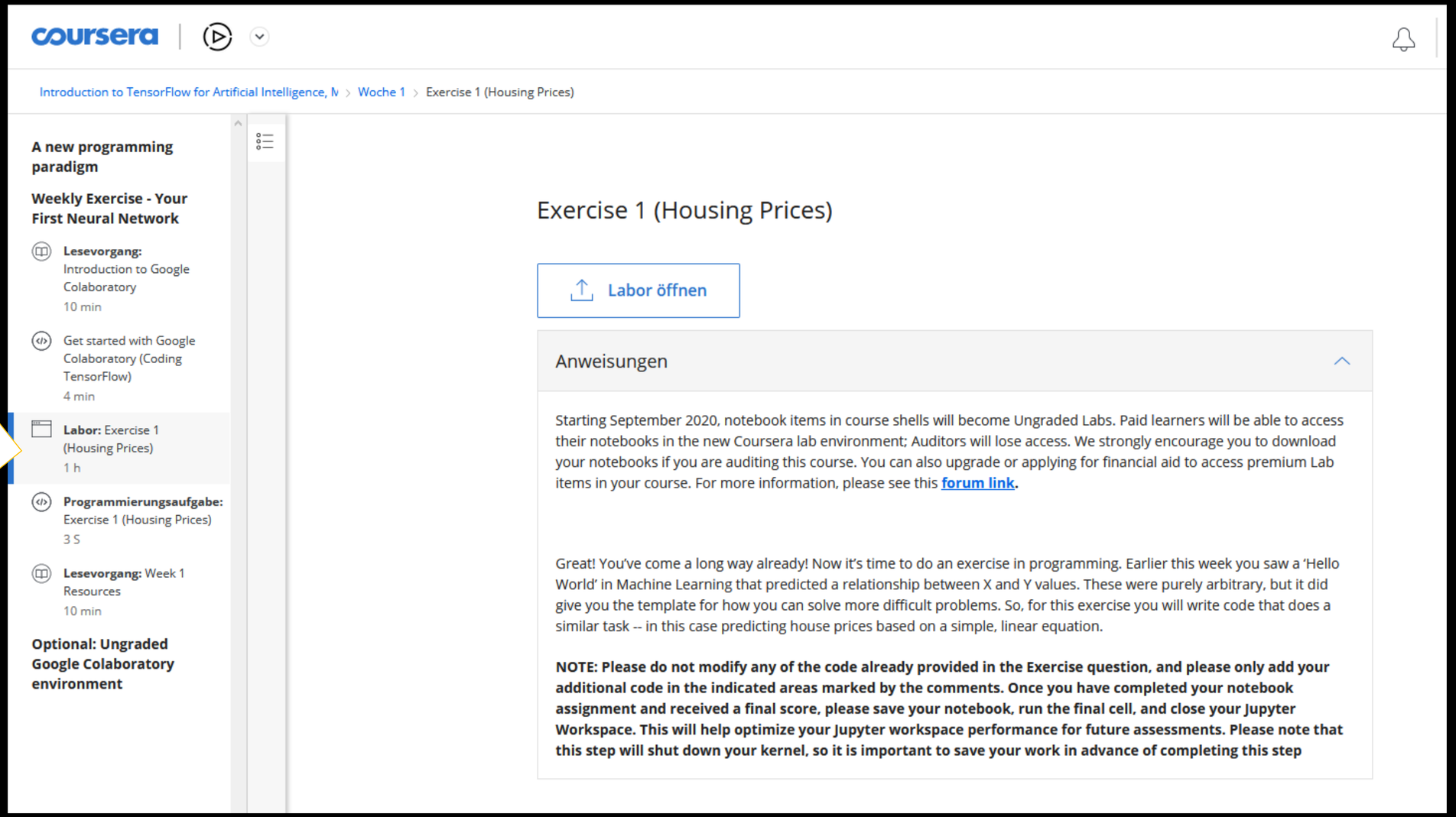
About | How It Works | Courses | Instructors | Enrollment Options | FAQ

WHAT YOU WILL LEARN

- Best practices for TensorFlow, a popular
- Handle real-world image data and explore

LEARNER CAREER OUTCOMES

EXERCISES (LABS)



EXERCISES

- Each week two to four of you will present the learnings from the exercises
- Each of you presents at least once
- Your presentation should take no longer than 6 minutes
- We will provide with a template for your presentation

OVERCOMING OBSTACLES

- Use this slide to present the challenges you faced during this exercise
- Describe the process of running into a problem and how you fixed it or why the problem still remains
- There are no wrong answers here, even if your problems seem trivial others might have had the same probelm and will benefit from your experience
- Make sure to include some screenshots of code highlighting what you are talking about (only a few lines)

UNEXCPECTED DISCOVERIES

- Use this slide to present what surprised you the most about this weeks exercise
- It can be something new, you didn´t know existed before or maybe a parameter you didn´t know you could set etc.
- Again there are no wrong answers here, if you can´t think of anything right away, think back to this weeks content and be creative. What exactly did you learn this week?

ANYTHING ELSE

- Use this slide to talk about remaining questions or topics that stuck with you during this weeks course
- If you already have a project idea you can use it to connect the exercises and talk about how the two relate
- If you had another obstacle you can talk about that
- It can also be something you found very importannt and want to know by heart

EXERCISES:
WHO WILL PRESENT NEXT WEEK?

PROJECTS

Option 1:

Bring your own idea and data

Option 2:

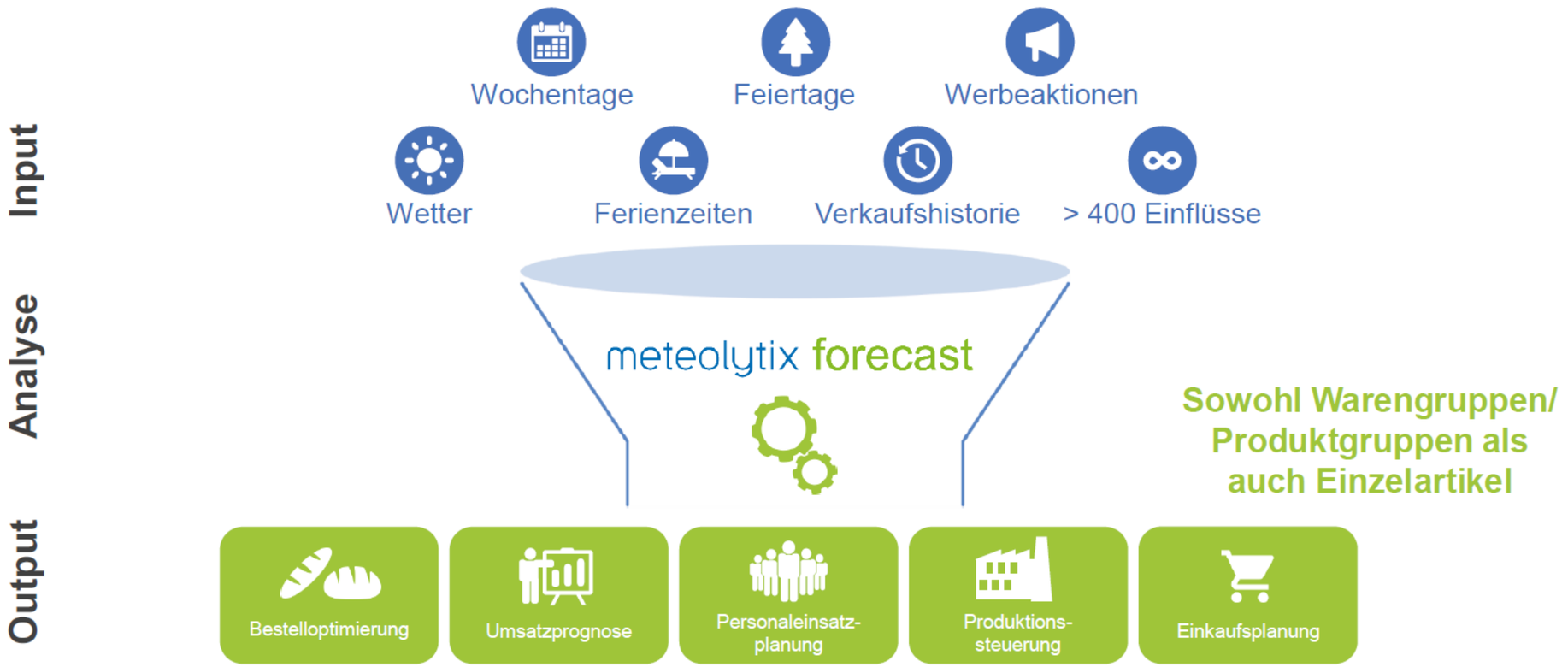
Do one of the two default projects

DEFAULT PROJECT

- Time series prediction
- Based on sales data from a local bakery chain
- Prediction of future sales for three different stores and different product groups

meteolytix forecast analysiert die Datenzusammenhänge von mehr als 400 Einflussfaktoren und liefert Absatzprognosen für viele Einsatzfelder.

WAS WIR MACHEN



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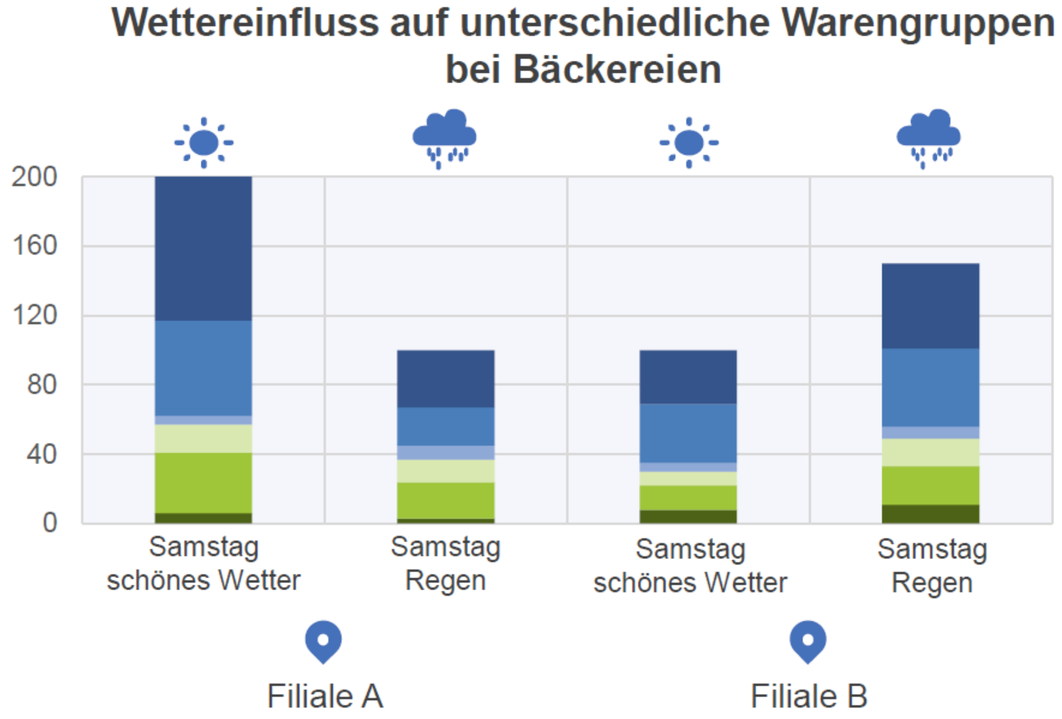
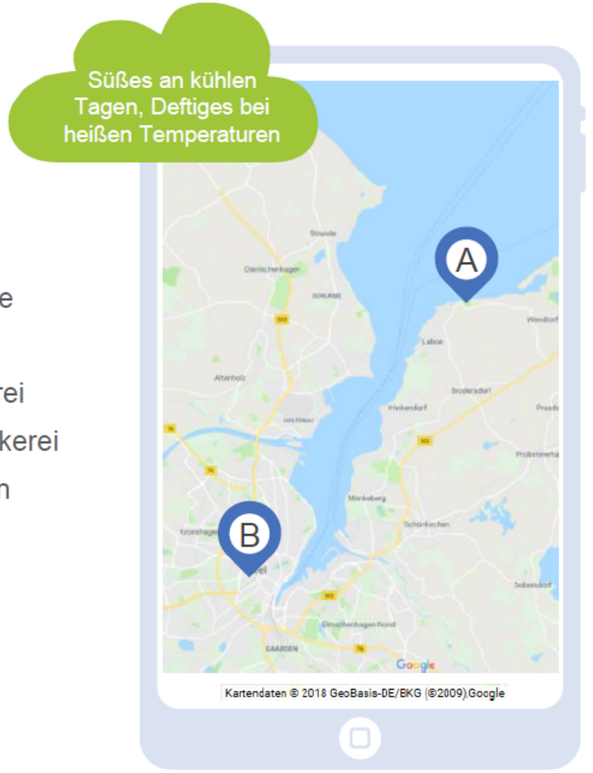
Die Stärke des Wettereffekts variiert von Ort zu Ort und wird jeweils filialindividuell berücksichtigt.

WAS WIR MACHEN





PROJECT INTERESTS

Time Series Prediction
Lehren und Lernen mit KI
Archive

EVENTS

Coding.Waterkant 2023
Prototyping Week

PROJECTS

Requirements
Possible Projects
Past Projects
Project Template

ADDITIONAL RESOURSES

Glossary
Coursera
Selecting the Optimizer
Choosing the Learning Rate
Learning Linear Algebra
Learning Python
Support Vector Machines
Powered By GitBook

Possible Projects

There are different options for you to define or select your course project:

- **Bring your own data and project idea** to the course. Simply talk to your course lead about your idea and the goal of the project until the end of the semester.
- **Choose a project from the list** of current projects provided in the table at the end of this page.
- **Talk to local companies or chairs at your local higher education institutions** if they are interested in a machine learning protoytpe for some of their production or research tasks and would like to share the corresponding data. If you find a partner that would be interested in such a project, we will be happy to support you in the definition of the project together with the partner and also, for example, with setting up a non-disclosure agreement for the provided data.
- **Look for an interesting dataset on the Internet** and define yourself a project based on this dataset. However, we would very much recommend you to choose one of the before mentioned options. With datasets from the Interenet (e.g. from Kaggle competitions) your main challenge is typically limited to optimizing the model with an already prepared dataset. However, in practice the challenge is more often to construct the right training and validation datasets and construct the right features.

General Comments

- For a text classification task usually a few hundred labeled cases are already sufficient.
- Daily sales or usage data is also always interesting, you can then try to predict solely based on the given characteristics of a day and the sales before this day (which week of the day, beginning/end of the month, during holidays, sales on the same day a week earlier, sales on the day before, and many more). Minimum for such time series analyses is around 1000 cases (i.e. about 3 years).
- Considering the work with images it is also an option for a project to take a set of a maybe just 100 unlabeled images with similar objects and generate new images from these using a Generative Adversarial Network (GAN).

Data Resources

Time Series Prediction
Lehren und Lernen mit KI
Archive

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Requirements

In order to receive ECTS for a course you have to **complete a machine learning project in a team** with a maximum of 4 participants and miss less than 2 sessions of the course.

Usually the project starts in the middle of the course, the exact date may depends on the course. It will be discussed in the first sessions

> This is a general page. Projects may varies slightly in each course.
> If your course instructor is giving you different information, please follow those.

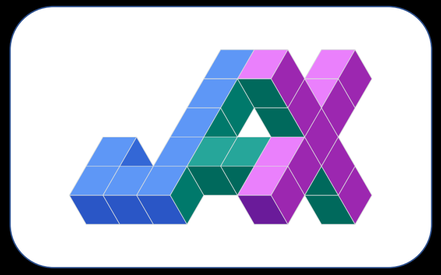
The requirements are:

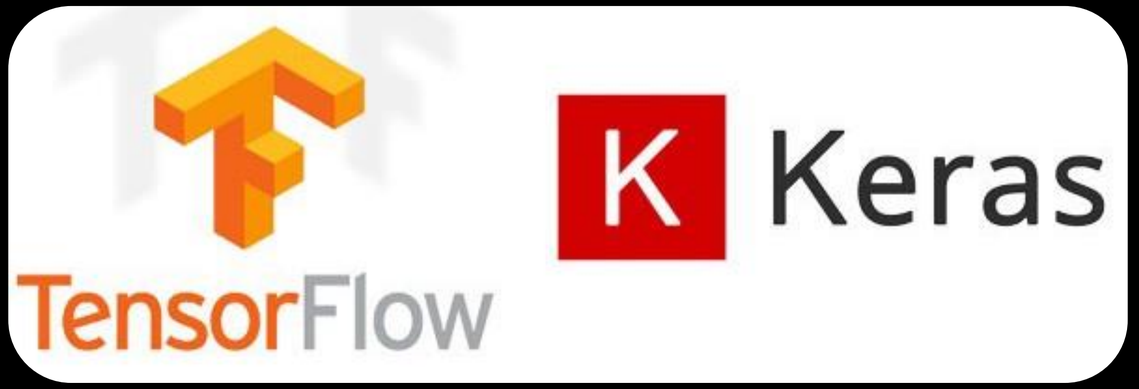
1. The Code, which should include
   - the python code (notebook .ipynb or .py are accepted)
   - comments to make the code clear and readable
   - the definition of the environment (dependencies)
   - text explaining the project divided in sections (Introduction, Data and Methods, Results, Baseline)
2. The project has to be presented in class during the last sessions.
   This can be done during the class or a short video can be recorded. For example, a screen recording of the notebook with an explanation of the project, the code and the results would work.
   The length of the presentation and/or the video will be discussed in each course, it usually is around 15 minutes.

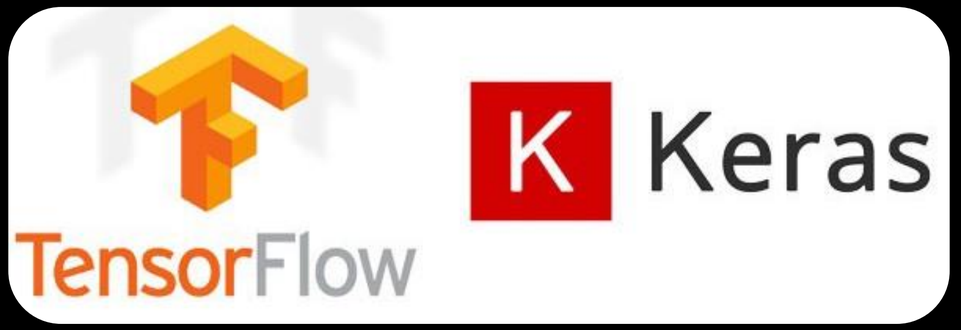
> If you do not specify anything, we will release the code in our repository alongside with the other projects. If you want, you can add a statement that the code is released as open source software and a license which explains how the code can be re-used.
> The data you use in your project can remain private if you wish.

PYTORCH

scikit
learn




TensorFlow
K
Keras



- **Feb 2017:** TensorFlow 1.0 (Estimator API)
- **Nov 2017:** TensorFlow 1.4 (Estimator API, Keras API)
- **Jan 2019:** TensorFlow 2.0 (Estimator API, Keras API)

DEVELOPMENT ENVIRONMENTS

TASKS UNTIL NEXT WEEK

- Completion of the learning material of week 1 and 2 of the course "introduction to TensorFlow“
- Complete Exercises 1 and 2 given in the Coursebook
  - Who presents?
- Bring questions!