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# Intro to the course

02476 Machine Learning Operations  
Nicki Skafted Detlefsen

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# Who am I

- Bachelor, master, PhD from DTU
- Currently: Postdoc
- Old focus:
  - Inductive biases in deep learning
  - Generative models
  - Geometry aware manifolds
- New focus:
  - MLOps
  - Efficient machine learning



# Who am I

- Eager open-source contributor
  - This course is open-source

- ML Engineer at <https://lightning.ai/>

**Nicki Skaftes Detlefsen**  
SkaftesNicki

Postdoc at section for Cognitive Systems (CogSys), Technical University of Denmark (DTU). Main focus: Generative models and geometrical deep learning.

129 followers · 3 following

Denmark  
skaftesnicki@gmail.com

**Achievements**

YoLo x2, TensorFlow x3, PyTorch x3

**Repositories** 38 **Projects** **Packages** **Stars** 72

You unlocked new Achievements with private contributions! Show them off by including private contributions in your Profile in settings.

**Pinned**

- ddtn** (Public) Python ☆ 50 🍴 7  
Repository for our upcoming code, that we used for our "Deep diffeomorphic transformer networks" paper (Accepted to CVPR 2018). Will be update during the spring of 2018.
- libcpab** (Public) Python ☆ 45 🍴 8  
CPAB Transformations: finite-dimensional spaces of simple, fast, and highly-expressive diffeomorphisms derived from parametric, continuously-defined, velocity fields in Numpy, Tensorflow and Pytorch
- dtu\_mlops** (Public) Jupyter Notebook ☆ 203 🍴 141  
Exercises and supplementary material for the machine learning operations course at DTU.

**824 contributions in the last year**

Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct

Mon  
Wed  
Fri

Happy Halloween! Learn how we count contributions

Less More

# Who else to know about



Søren Hauberg  
Co-responsible



Fabian Mager  
TA



Nikolaos Nakis  
TA



Alison Pouplin  
TA

# Course settings

- 5 ECTS
  - 3 weeks period
  - Level: Master
  - Grade Pass/not passed
  - Type of assessment:
    - Code hand-in
    - Weekly project updates
    - Final oral examination
- Recommended prerequisite
    - General understanding of machine learning (datasets, probability, classifiers, overfitting etc.)
    - Basic knowledge about deep learning (backpropagation, convolutional neural network, auto-encoders etc.)
    - Coding in Pytorch

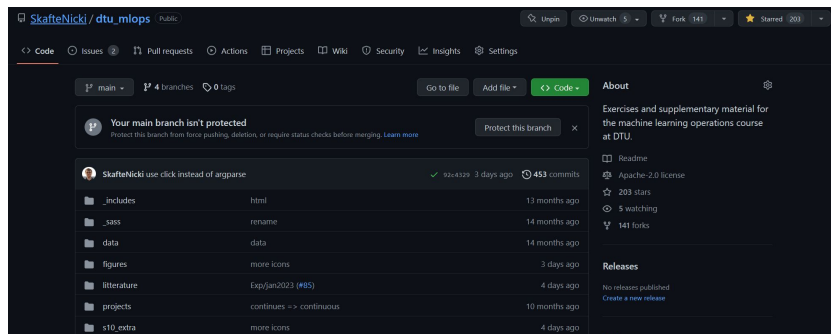
# Course webpage

Github:

[https://github.com/Skaftenicki/dtu\\_mlops/tree/january2022](https://github.com/Skaftenicki/dtu_mlops/tree/january2022)

Rendered page:

[https://skaftenicki.github.io/dtu\\_mlops/](https://skaftenicki.github.io/dtu_mlops/)



# Communication

Join the slack channel

[https://join.slack.com/t/dtumlops/shared\\_invite/zt-1j1zx8t4h-nTbUPibR9xCz58erDyyikw](https://join.slack.com/t/dtumlops/shared_invite/zt-1j1zx8t4h-nTbUPibR9xCz58erDyyikw)

- General announcements
- Asking questions
- Communication with team members

For non public info we use DTU learn

<https://learn.inside.dtu.dk>

# What is this course/What it is not

## What is this course:

*Introduce the student to a number of coding practices that will help them organization, scale, monitor and deploy machine learning models either in a research or production setting. To provide hands-on experience with a number of frameworks, both local and in the cloud, for doing large scale machine learning models.*

## Keywords:

- Organization
- Scalability
- Reproducibility
- Hands-on experience

## What this course is not:

- How different machine learning models works

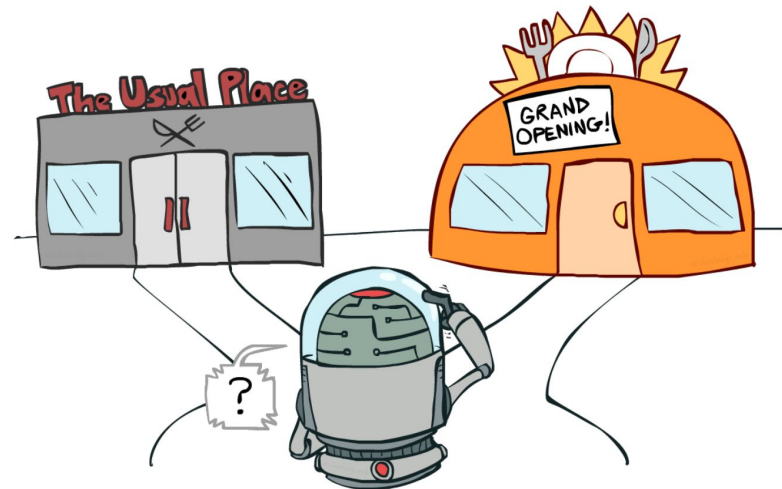


# What do I expect from you

The course is centered around two principals:

- Learning by doing
- Learning by exploration-exploitation

We provide lectures, exercises and guidance but encourage self study.



# Organisation of material

- 1 day = 1 session (S)
- 1 session = multiple modules (M)
- Core modules:
  - Essential in some way
- All other modules are highly recommend
- S10 contains additional modules

[Homepage](#)  
[Timeplan](#)  
[S1 - Development environment](#)  
[M1 - Terminal](#)  
[M2 - Conda](#)  
[M3 - Editor](#)  
[M4 - Deep Learning Software](#)  
[S2 - Organization and version control](#)  
[S3 - Reproduceability](#)

Search dtu\_mlops

[S1 - Development environment](#) / [M1 - Terminal](#)

## The terminal

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1 [Exercises](#)

**IMPORTANT**

Core module

# What I hope from this course

- Have fun!
- That you get to fill your toolbox with useful frameworks
- (Maybe) Learn something along the way

People with no idea  
about AI, telling me my  
AI will destroy the world



Me wondering why my  
neural network is  
classifying a cat as a dog..



## hygge

[huc-gah] *noun*

An atmosphere of warmth, wellbeing, and cosiness when you feel at peace and able to enjoy simple pleasures and being in the moment.

# A typical day in this course

## Exercise days:

- Meet in at 9:00
- Lecture for 15-30 mins
  - I am still learning how to do lectures
  - Lectures are not meant to give teach you anything, but provide some context to the topic of the day
- Exercises until 14:00-17:00
  - Remember to take a lunch break
  - Workload will depend on you

## Project days

- Sometimes a small lecture or company presentation
- Rest of the day you work on projects
- Office hour (may be virtual)

Can I work from home?

Yes, but we will primarily give support for students physically on campus

Project days you decide internally in the group.

# Projects

- Approximately 1/3 of the course time is spend on project work
- More info here: [https://skaftenicki.github.io/dtu\\_mlops/projects](https://skaftenicki.github.io/dtu_mlops/projects)
- Already now you are recommended to think about forming groups
  - 4 people (3 and 5 is also acceptable)
  - Thursday we will do some speed dating to form groups for people not already having one.
  - Also feel free to write in the *#find-a-group* slack channel.

# Exam

Due to increase in students the exam format has been changed.

Two parts:

1. Written part: An template with ~30 questions that you can fill out as you work on your projects. It will be part of your project Github repository.
2. Oral part: 5 min per group, you get to show us a running demo of your project. Probably quick question for all members.

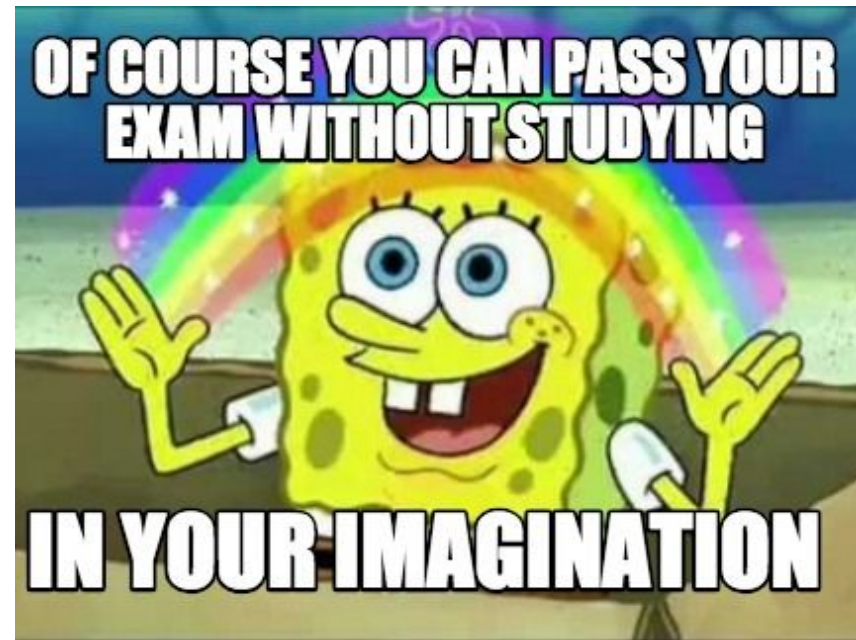
More on this on Friday.

# How to pass

- Meet in and do the exercises
- In the final project:

*Show that you can use the tools you learn about throughout the course*

We still have a 100% pass rate after approx ~180 students.



# Hands-in

<input type="checkbox"/>	Assignment
<input type="checkbox"/>	No Category
<input type="checkbox"/>	Exercises ▼
<input type="checkbox"/>	Project description ▼

<input type="checkbox"/>	
	<p>🚩  <a href="#">mygithub link.txt</a> (37 Bytes)</p> <p>🚩  <a href="#">mlops_gcloud_exercise.zip</a> (157.13 MB)</p>

Big zip file with everything + github link

	<p><b>Text Submission 1</b></p> <p><span>Unevaluated</span> Friday, 7 January 2022 2:13 PM</p> <p><a href="#">https://github.com/[redacted]/Project-MLOps-[redacted]</a></p>
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Github link



# Memes

**LEARNING ML,DL  
FROM UNIVERSITY**



**ONLINE COURSES**



**FROM YOUTUBE**



**FROM ARTICLES**



**FROM MEMES**

