Deep Learning for Visual Computing

Introduction

Christopher Pramerdorfer

Computer Vision Lab, TU Wien

Image from stability.ai

explain the term "deep learning" like a pirate would

Arrr matey, let me tell ye about deep learnin'! 'Tis like a magical treasure map fer computers, allowin' 'em to navigate through vast amounts of data to find hidden treasures. Instead of relyin' on simple rules, deep learnin' teaches computers to recognize patterns and make decisions on their own, like a seasoned pirate navigatin' through stormy seas. 'Tis a powerful tool that can help ye find the booty ye seek, whether it be buried treasure or valuable information hidden in complex data sets. So hoist the jolly roger, me hearties, and let's set sail into the deep waters of deep learnin'!

Motivation

AI

- Is everywhere
- Is here to stay

Deep learning is what makes this possible

- Has revolutionized computer vision & machine learning
- Beats humans at many complex tasks
- Enables novel applications (e.g. ChatGPT, StableDiffusion)

Goals

Goal is to teach you

- How deep learning works
- How it can be used to solve various problems
- How to apply deep learning in practice
- How it is related to machine learning & computer vision

Lecture Topics

Introduction

- Recap of computer vision and machine learning
- Feedforward neural networks, backpropagation

Deep learning

- Convolutional neural networks
- Generative neural networks
- Transformers
- Ethical apsects & XAI

Lecture

Usually Tuesdays, 15:15 to 16:45 at EI 1 (here)

- Changes will be communicated via TISS

Slides will be available on TUWEL

- Usually the morning before the lecture

Assignments

Apply what you've learned in the lecture

Three assignments in groups of two (no exceptions)

- Code in Python 3 and PyTorch (reference available)
- Write short report explaining what you did

Code at home, in the cloud, or on our servers (details later)

Hand in via TUWEL

Initial Assignment

Initial assignment

- Must be handed in until March 14
- Done solo (before group registration)
- Required for positive grade
- People who submit will get a grade

If you don't want to continue

- Unsubscribe from course today
- Don't hand in the initial assignment

Prerequisites

Studies

- Be a MSc or PhD student

Skills

- Proficiency in Python
- Basic knowledge of statistics, linear algebra, calculus
- Basic knowledge of image processing and machine learning

Grading

Assignments (50%)

- All assignments must be positive (50% or more points)
- Penalties for late submissions (up to one week)

Written exam (50%)

- 60 minutes
- List of questions available
- German or English

Both must be positive to pass

Registration

Register via TISS until tomorrow at 23:00

Course is completely full

- If you can't make it to lectures, please unsubscribe
- There will be no recordings or video streams

Current registration status is temporary

- Priority is MSc $>$ PhD $>$ BSc
- Registrations will be finalized after deregistration period

Support

Support

- After lectures
- Via TUWEL course forums

Questions

Questions?