Course Introduction

What (and how) are we going to learn?

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#DeepLearning

Table of Contents

- Course objectives
- Prerequisites
- Curriculum
- Course schedule
- Trainer
- Lecture format
- Final exam
- Some learning resources

Course Objectives

Achieving state-of-the art results by learning like a human

Course Objectives

- Learn how neural networks are used in the real world
- Get insights on structuring a deep learning algorithm
  - Architecture and hyperparameters
  - Working with data efficiently
  - Troubleshooting and debugging
- Learn how to manage a deep learning project
  - E.g. utilizing big data, error analysis, experiment design
- Learn and apply concepts related to deep learning tasks
  - E.g., images, text, spatial data, audio, playing games, generation
- Explore and use popular architectures
- Learn what's new in DL
- Do at least one complete project

Prerequisites

Programming Basics

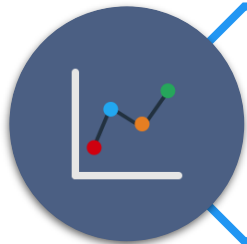- Familiarity with **Python** is required
- Working with data

Maths and Machine Learning

- Some algebra, calculus and statistics
- Knowing the foundations of **machine learning** is required

Intermediate English

- Understand what is written on the slides
- Understand scientific articles and some professional jargon

Scientific Mindset

- Be able to "jump" between different layers of abstraction
- Be open to (and not afraid of) challenges

Course Format Details

Curriculum, schedule, trainer, lecture format, exam

Curriculum

- Introduction to deep learning. Basic models
- Training and improving neural networks
- Neural networks for images
- Neural networks for language processing
- Advanced neural network architectures
- Generative models
- Reinforcement learning
- Exam preparation: end-to-end project
- Deep learning Q & A / AI module wrap-up

Course Schedule

- Lessons
  - 9 lectures x ~ 4 hours each on-site
- Homework: 0+ hours
  - You're on your own!
  - Try reading papers
    - Even scientific articles
  - Try out different possibilities
    - Architectures, models, model compositions, loss functions, etc.
- Extracurricular activities: 0+ hours
- Practical exam
  - Preparation at home – 10+ hours
  - Project defense: 10-15 minutes

Time Allocation

- Course
  - 7 December 2023 – 5 February 2024
- Exam
  - Group 1: 11 February 2024, 09:00-23:59, GMT+2
- Retake exam
  - 25 February 2024, 09:00-23:59, GMT+2

Final Exam

- Quiz (theoretical exam)
  - 10 questions for 30 minutes
- Practical project
  - Work on your own
    - No teams allowed
  - Present your results (documentation, code, models, Web services, etc.) in a limited amount of time
- Work on a given assignment
  - Perform research
    - Scientific papers, community forums, etc.
  - Analyze the data
  - Choose or create an architecture
    - Perform several iterations of modelling
    - Document all your findings
  - Communicate the results
  - Optionally... do whatever you like :D

Grading Scheme

- **Scientific articles:** up to 20%
  - This is a part of the exam
    - If you skip it, you won't get a passing grade
  - Due at the end of the course
- **Final exam:** up to 80%
  - Theoretical exam (quiz): 30% (24% of total grade)
  - Practical exam (project): 70% (56% of total grade)
  - Develop at your own pace
  - **Upload deadline:** Friday before the exam date; 12:00 PM GMT+2
  - Project defense
- **Discord / Facebook group activity:** bonus up to 10%
- **Other bonuses:** up to 10%

Grading and Course Certificates

- All students will be graded on a scale from 2,00 to 6,00
  - The same way the standard grading in Bulgaria works
- Everyone who scores ≥ 5,00 (total) will get a certificate from SoftUni
- Everyone who scores ≥ 3,00 (on both theory and practice) can get a MoES certificate as well
  - You need to apply explicitly within a limited time

Why bother?

- Starting point for a **new career**
or **continuing education** in your current field
- **Career assistance**
  - The SoftUni career center will help you find work
- Official and recognizable
  - Employers value certificates
- Proof of hard work :)
  - Shareable and verifiable

- We make sure that everyone who scores ≥ 5,00
knows what they're doing :)

DUNGEONS & DRAGONS®

Yordan Darakchiev
CHARACTER NAME

Trainer	Researcher
CLASS	BACKGROUND
Human	Lawful Good
RACE	ALIGNMENT

STRENGTH
+0
11

DEXTERITY
+2
14

CONSTITUTION
+2
15

INTELLIGENCE
+6
22

WISDOM
+4
18

CHARISMA
+3
16

FEATURES & TRAITS

- Programmer
  - .NET / full-stack Web developer
- Machine learning engineer
  - Multiple projects, mainly image processing
- Trainer
  - Various programming courses
  - Scientific (and popular) lectures
- Scientist / Enthusiast
  - BSc & MSc in Astrophysics
  - Currently pursuing a PhD

PROFICIENCIES & LANGUAGES

- Machine learning
- Research
- Teaching
- Software engineering

- Python
- C#
- JavaScript

Learning Resources

Learn more
and share your knowledge

SoftUni Resources

- [AI module page](#)
- [Official Web page of this course](#)
- [Facebook group](#)
- [Discord server](#)
- Guidelines
  - Ask and answer questions
    - I will try to answer your questions as well
  - Post what you've learned
    - Links to resources, code snippets, ideas, tips and tricks
  - Share your problems (homework or not) and help solve them
  - Create and maintain a community

Online Resources

- Books
  - ["How not to be wrong"](#) – Jordan Ellenberg
  - [Deep Learning](#) – Ian Goodfellow
  - … and anything else you can find
- Websites
  - Communities: [Kaggle](#), [Quora](#), [Stack Exchange](#)
  - Online courses: [Coursera](#), [edX](#), [MIT OCW](#), [Stanford](#), etc.
  - "Big players": [Microsoft](#), [Google](#), [Facebook](#), [Amazon](#), [IBM](#), [Apple](#), etc.
- YouTube
  - [FunFunFunction](#), [Daniel Shiffman](#), [AsapSCIENCE](#), [Veritasium](#), [Vsauce](#), [TedEd](#), [CrashCourse](#), [Mind Your Decisions](#), [Infinite Series](#), [Numberphile](#), [Computerphile](#), [Vi Hart](#), [3Blue1Brown](#), [blackpenredpen](#), [Mathologer](#), and many more