Course Introduction

What (and how) are we going to learn?

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Course Objectives

Teaching computers how to do stuff

Course Objectives

- Learn the basics of how data modelling works
- Learn what machine learning is and how it helps make decisions, automate tasks, etc.
  - Apply mathematical intuition
- Learn what the basic algorithms are and how they work
- Apply machine learning to real data to get insights
- Do at least one complete project
  - Data preparation
  - Choosing algorithms
  - Model training, improvement, and selection
  - Presenting a complete solution
    - Communicating results and ensuring reproducibility

Prerequisites
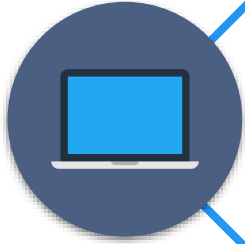
Programming Basics

- Familiarity with Python is required
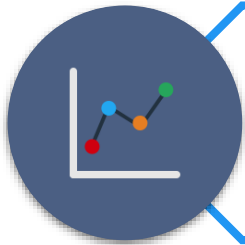- Software development experience is a plus

Math Concepts

- Know some algebra, statistics, and calculus
- Have basic logic and intuition

Intermediate English

- Understand what is written on the slides

Scientific Mindset

- Know how to work with data
- Be open to (and not afraid of) challenges

Course Format Details

Curriculum, schedule, trainer, lecture format, exam

Curriculum

- Introduction to machine learning
- Linear and logistic regression
- Model training and improvement
- Tree and ensemble models
- Support vector machines
- Clustering
- Dimensionality reduction
- Introduction to neural networks

Course Schedule

- Lessons
  - 10 lectures x ~ 3 hours each on-site
- Homework
  - Quiz: 0.25 – 0.5 hours
    - Questions to check your understanding
  - Lab: 2 – 4 hours
    - "Real-life" practice
- Extracurricular activities: 0+ hours
  - The more – the better :)
- Practical exam
  - Preparation at home – 4+ hours
  - On-site defense: 10 minutes

Final Exam

- 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
  - Train one or more machine learning algorithms
    - Select and improve models
    - Document all your findings
  - Communicate the results
  - Optionally... do whatever you like :D
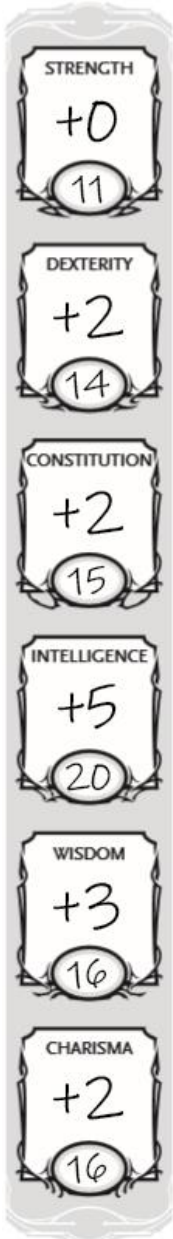
Grading Scheme

- Quizzes: up to 20%
  - Due 2 weeks after the lecture date
  - Most questions allow for 3 attempts
- Labs: up to 10%
  - Due at the end of the course
  - "Unlimited" attempts
- Final exam: up to 70%
  - Develop at your own pace
  - Upload deadline: 1 November 2019, 12:00:00 GMT+2
  - On-site defense: 3 November 2019, 09:00:00 GMT+2
  - To qualify: at least 4 / 20 points from quizzes and labs
- Forum / Facebook group activity: bonus up to 10%

Grading and Course Certificate

- 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) on the course will get a certificate from SoftUni
  - 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

COURSE CERTIFICATE

Teodor Ivanov Kurtev

QA Fundamentals

Who Am I?

STRENGTH
+0
11

DEXTERITY
+2
14

CONSTITUTION
+2
15

INTELLIGENCE
+5
20

WISDOM
+3
16

CHARISMA
+2
16

YORDAN DARAKCHIEV
CHARACTER NAME

HUMAN, 25
CLASS & LEVEL

RESEARCHER
BACKGROUND

- 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 (July 2016), MSc (February 2018) in Astrophysics
  - Currently pursuing a PhD

Learning Resources

Learn more
and share your knowledge

SoftUni Course Pages

- Official Web page of this course
  - https://softuni.bg/trainings/2317/machine-learning-september-2019
- Forum category
- Facebook group

- 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
  - A **critical part** of software development and science

Online Resources

- Books
  - "How not to be wrong" – Jordan Ellenberg
  - "The Elements of Statistical Learning" – Stanford (free PDF)
  - Some parts of 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, Siraj Raval, AsapSCIENCE, Veritasium, Vsauce, TedEd, CrashCourse, Mind Your Decisions, Infinite Series, Numberphile, Computerphile, Vi Hart, 3Blue1Brown, blackpenredpen, Mathologer, and many more