

Course Introduction

What (and how) are we going to learn?

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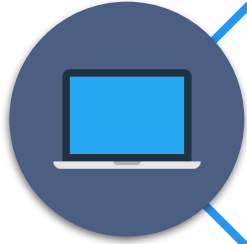
Course Objectives

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.
- 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



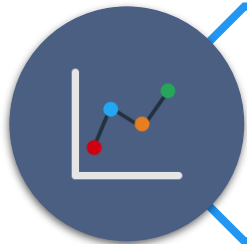
Math Concepts

- 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
 - 8 lectures x ~ 3 hours each on-site
- Homework
 - 4 hours+ → the more, the better
 - Quiz – 0.25 – 0.5 hours
 - Questions to check your understanding
 - Lab – 1-6 hours
 - Problems related to real-life data science
- Extracurricular activities: 0+ hours
- 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 10%
 - Due 2 weeks after the lecture date
 - Most questions allow for 3 attempts
- Labs: up to 20%
 - Due 2 weeks after the lecture date
- Final exam: up to 70%
 - Develop at your own pace
 - Upload deadline: 19 October 2018, 12:00:00 GMT+3
 - On-site defense: 21 October 2018, 09:00:00 GMT+3
 - To qualify: at least 5/30 points from quizzes and labs
- Forum 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



Who Am I?

- Programmer
 - .NET / full-stack Web developer
- Trainer
 - Various programming courses
 - To beginners and experienced developers
 - Scientific (and popular) lectures
- Scientist / Enthusiast
 - BSc (July 2016), MSc (February 2018) in Astrophysics
- Overall nerd
 - Curious and skeptical



Learning Resources

**Learn more
and share your knowledge**

SoftUni Course Pages

- Official Web page of this course
 - <https://softuni.bg/trainings/1920/machine-learning-august-2018>
- Forum category
 - Open courses > Machine Learning
 - 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
- ML Bulgaria Facebook group
 - <https://www.facebook.com/groups/machine.learning.bg/>

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

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Questions?