
PROGRAM ROADMAP

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AGENDA

- Intro Round
- The DSR Roadmap
- Get You Ready for Data Science
- How to Set Up a Data Science Project
- An Example of a Data Science Project
- Cheat Sheets

INTRO ROUND

INTRO

- About me:
 - A data enthusiast - 7 years in the field
 - Did DSR to transition from BI Analyst to Data Scientist
 - <https://www.linkedin.com/in/iskriyanavasileva/>
- About this class:
 - You can ask questions at any time
 - If you'd like me to change something during the lecture – let me know
 - If you think of something after the lecture – write to me on LinkedIn or Slack

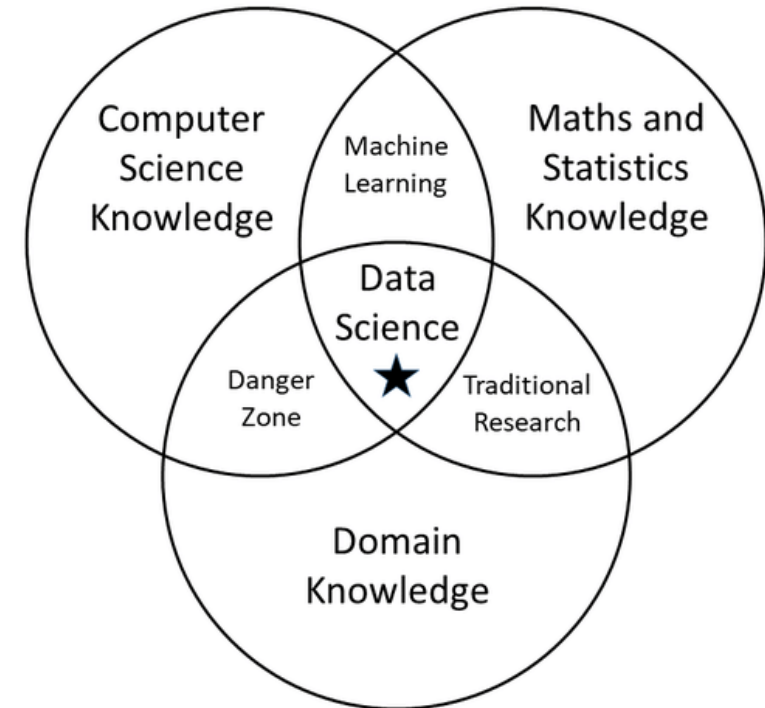
INTRO

- What about you?

THE DSR ROADMAP

THE DSR ROADMAP

- Theoretical & Technical Fundamentals
- Machine Learning Fundamentals
- Mini Competition
- Deep Learning (or the really “cool stuff”)
- Practical Data Science
- Soft Skills
- The Final Project



DSR ROADMAP: THEORETICAL & TECHNICAL FUNDAMENTALS

- Python
 - Git & Bash
 - NumPy
 - Pandas
 - SQL
 - Visualisation
 - Statistics, Probability
 - Docker & Databases
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DSR ROADMAP: THEORETICAL & TECHNICAL FUNDAMENTALS



Purpose – the tools enabling you to work as a data scientist



Tips - do not underestimate them!

Even if you know, use these lecture to refresh your skills & strengthen them

Prepare questions you encountered during your preparation for the bootcamp, but could not find the answer to them. It can be useful for everyone including your teachers



Useful literature

[Data Wrangling with Python](#) (Jacqueline Kazil, Katharine Jarmul)

[Python for Data Analysis](#) (Wes Mckinney)

DSR ROADMAP: MACHINE LEARNING FUNDAMENTALS

- DS Fundamentals
- ML fundamentals
- Trees
- Time Series



DSR ROADMAP: MACHINE LEARNING FUNDAMENTALS



Purpose

DS Fundamentals – helps you structure a data science project from a data perspective. You get to do steps such as exploratory data analysis (EDA), data cleaning & preparation (fill in NULL values, oversampling etc.), feature engineering, model development & training, model testing, results delivery

ML Fundamentals – here you go through the “classics” of ML such as linear regression, logistic regression, evaluation metrics of classification etc.

Trees & Time Series – dedicated lectures only for these topics



Tips – absolute must-haves

Some HRs may have questions with ready answers to filter out candidates already during the screening interview

If you get the chance, go through the notebooks in advance & identify questions or potential points you have to optimise

The best way to internalise these concepts is by coding – take a look at projects on Kaggle, towardsdatascience.com and re-do them. Even if you copy code, type it! Speaking from experience – it really does make a difference, as it makes you aware of things you would not notice if only copy-paste-ing!



Useful literature

[The Elements of Statistical Learning](#) (Jerome H. Friedman, Robert Tibshirani, & Trevor Hastie)

[Data Analysis and Data Mining: An Introduction](#) (Adelchi Azzalini & Bruno Scarpa)

DSR ROADMAP: MINI COMPETITION

- 3 days of real data science work 🥰💻💻



DSR ROADMAP: MINI COMPETITION



Purpose – during the competition you get to experience:

How to work in a team – both technically (repository) & conceptually (task distribution, tackling dependencies, data strategy)

The difference stages of a data science project – data exploration, data cleaning & preparation, feature engineering, model choice, model training, model testing & results delivery

Working on a realistic project



Tips

Enjoy it!

If you have the time after that, develop a clean solution on your own. It can be a good template for future reference

DSR ROADMAP: DEEP LEARNING

- Backpropagation
 - Sequences
 - Deep Learning Basics
 - Natural Language Processing (NLP)
 - Computer Vision
 - Transfer Learning
 - Reinforcement Learning
-



DSR ROADMAP: DEEP LEARNING



Purpose – this is where the real fun starts! Most probably this is why you chose this bootcamp

Backpropagation – central in deep learning – a mathematical technique for quickly calculating derivatives (the gradients).

Deep Learning Basics – shows you the “deep” in deep learning layers of increasingly meaningful representations. The number of layers define the depth of the model.

Computer Vision – you will get to know things such as how image recognition work, etc. models such as Conv2D for images, Conv3D for videos.

Natural Language Processing (NLP) – how to do a sentiment analysis, what are word embeddings, different NLP models – bag-of-words, LSTM, Conv1D

Transfer Learning – how to use pre-trained models

Reinforcement Learning - an agent receives information about its environment and learns to choose actions that will maximize some reward. For instance, a neural network that “looks” at a video- game screen and outputs game actions in order to maximize its score can be trained via reinforcement learning.



Tips

If you can, prepare before the lectures. Do an online course in deep learning. For ex. [Coursera's Deep Learning](#)

Definitely pay attention in these lectures – for some of you, it can be a lot to take in. Take some time after the lectures to revisit what was done during the day

[PyTorch vs. Tensorflow before](#) & [PyTorch vs. Tensorflow now](#)

Try to set a GPU on your own (see literature section). If you decide to do a project with deep learning, you will most probably need a GPU.



Useful literature

[Deep Learning](#) (Ian Goodfellow, Yoshua Bengio, Aaron Courville) – THE BIBLE of deep learning

[Deep Learning with Python](#) (François Chollet)

[Set a GPU on AWS](#)

[Set a GPU on Google Cloud](#)

DSR ROADMAP: PRACTICAL DATA SCIENCE

- Debugging
- Serverless
- Practical Aspects of Data Science
- Practical Aspects of Machine Learning



DSR ROADMAP: PRACTICAL DATA SCIENCE



Purpose – practical advice, real-life project approach, deployment



Tips

Try not to skip these lectures. They showcase what you have to deal with once you start working as a data scientist.

Debugging is extremely useful. In this class you will also get to know PyCharm.

DSR ROADMAP: SOFT SKILLS

- Communication
- Career Support



DSR ROADMAP: SOFT SKILLS



Purpose – what to expect at interviews, strategy & effective communication. Both teachers are extremely capable & know their stuff.



Tips

Prepare questions for the Career Support Class

Please, do respond on time for the preparation of the communication class.
Kevin prepares accordingly

For the communication class, pick a topic / situation that was challenging for you. You will get very useful feedback & actionable advise.

DSR ROADMAP: THE FINAL PROJECT



DSR ROADMAP: THE FINAL PROJECT



Purpose

”Probieren geht über Studieren” (“The proof of the pudding is in the eating.”) - practice all you have learned so far.

Data science is about doing and showcasing your skills with meaningful projects:

- you found a topic, for which data science offers a solution / optimisation / invention
- you dealt with the issue of finding or creating data
- you delivered some kind of result



Tips

Think of what you’d like to work on, what would be interesting for you

The most complex model is not always the best one. Start with simple & quick solutions to test your approach

Your results may not always be what you’d expect them to be. However, the way to them is also interesting. Share this!

If you need a GPU, try to set up one before that

GET YOU READY FOR DS

GET YOU READY FOR DS

- [Shell](#)
 - A computer program which exposes an operating system's services to a human user or other program. It is named a shell because it is the outermost layer around the operating system. You can steer Anaconda, Python, Git etc. with it.
 - You access it via a [terminal emulator](#) – ex. for macOS - Terminal, iTerms. [List of Terminals](#)
 - command-line interface shells use specific scripting language - bash / zsh
- [Anaconda](#) – the platform, from which you start & with which you steer most of your data science work
- [Git](#) – a version control tool. “Version control is a system that records changes to a file or set of files over time so that you can recall specific versions later.”
- Integrated Development Environment (IDE) – [PyCharm](#), [Spyder](#)
- [Jupyter Lab / Jupyter Notebook](#) – Interactive data science environment – more visual than IDE, therefore it is used for educational & presentation purposes

GET YOU READY FOR DS

- Useful:
 - Terminal for Mac users – [iTerms](#) ([features](#))
 - [Terminal modification](#), if you'd like it to be more colourful
 - [Bash vs. zsh](#)
 - [Difference between conda and pip](#)
 - [Git in a nutshell](#)
 - [Fundamentals of computing & programming](#)

HOW TO SET UP A DATA SCIENCE PROJECT

HOW TO SET UP A DATA SCIENCE PROJECT

Let's set a Data Science Project from scratch by following the instructions here: <https://github.com/Iskriyana/dsr-teaching-setup>



- Maintain a learning structure - all of the notebooks can be used for future reference while you are preparing for an interview or when you are working on a future task
- My approach
 - Environment per lecture – most of the teachers already have it in their prep instructions
 - Folder / Repo per lecture
 - Notes per lecture
 - Bookmarks per lecture

A DS PROJECT

A DS PROJECT

<https://github.com/Iskriyana/nlp-product-sentiment-classification>

CHEAT SHEETS

CHEAT SHEETS

- [Anaconda](#):
- [ohmyzsh](#):
- More:
 - <https://github.com/Iskriyana/dsr-teaching-setup/tree/main/cheatsheets>
 - <https://github.com/ADGEfficiency/programming-resources/tree/master/cheat-sheets>

THANK YOU & HAVE FUN!

