Master Computer Vision & Data Science

Overview Learning resources

Academic year 2025-2026

Topics

The knowledge and skills stage aims to give the student the basics necessary for understanding of the state-of-the-art topics encountered in the field of work. In the project stage the specific knowledge and skills are further expanded, deepened and integrated by working on a real-life research project. Knowledge and skills are arranged in topics, which are essentially small packages of teaching material with a global theme.

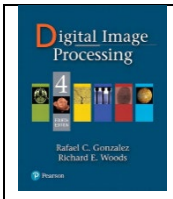
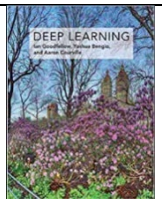
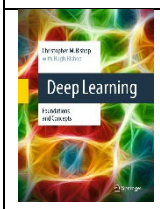
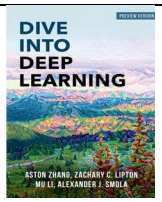
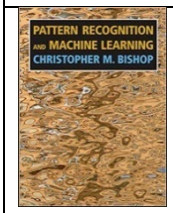
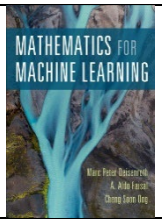
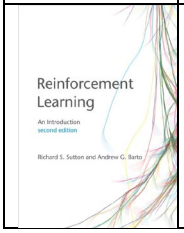
Learning resources

The Computer Vision & Data Science master's programme covers a range of topics in both Computer Vision and Data Science literature. Within each topic, students are provided with a list of self-study resources and exercises. These study materials per each topic are purposefully suggested to not only cover the main book references of Computer Vision & Data Science, but also more recent, diverse and dynamic resources such as freely available online courses offered by the world-wide renowned technical universities, scientific papers and online learning tools and blogs.

Following we summarize the main resources used within the master's programme. In the Jupiter Notebooks per topic you will find a detailed overview of the resources per topic. This provides the student with an overview of the relevant book chapters and online course chapters. The main tool for the student is their personal laptop, this why we also provide an additional advise on the laptop requirements.

Books

Main resources

	Gonzales, Rafael C., and Richard E. Woods. *Digital image processing*.		Goodfellow, I., Bengio, Y., Courville, A., & Bengio, Y. *Deep learning*. Cambridge: MIT press. (e-book version freely available at https://www.deeplearningbook.org/)
	Bishop, Christopher M. *Deep Learning, Foundations and Concepts*. Springer		Zhang A., Lipton Z.C., Li M., Smola A.J. Dive into Deep Learning (e-book version freely available at: https://d2l.ai/)
	Bishop, Christopher M. *Pattern recognition and machine learning*. Springer.		Deisenroth, Marc Peter, A. Aldo Faisal, and Cheng Soon Ong. *Mathematics for machine learning*. Cambridge University Press (e-book version freely available at https://mml-book.github.io/book/mml-book.pdf)
	Richard S. Sutton Reinforcement Learning – An Introduction		

Additional resources

- Kolter, Zico. *Linear algebra review and reference*.
- Batchelor, Bruce G., ed. *Machine Vision Handbook*. London, UK:: Springer.

Online courses

Main resources

The main online courses used in the master's programme are:

- Stanford University CS230
- Stanford University CS231n
- Stanford University CS229
- Udacity, Introduction to Neural Networks - part 1

Additional resources

The list of the freely online learning materials continues, with (when appropriate) references to Coursera courses, NVIDIA tutorials, Medium blog posts, TowardsDataScience posts, online tools and python library tutorials (scikit-learn, OpenCV).

Scientific papers

Often state-of-the-art papers used within the programme can be found on https://arxiv.org.

Laptop and Virtual Machine

When working on the topics and project a student will work on their own personal laptop. Most modern laptops should be suitable, as the programme provides the student with a dedicated virtual machine for the computational capacity the course requires. As guideline the following laptop requirements can be used to check the suitability of the laptop:

- Operating system: Windows (Mac/Linux should also work, but usually require a bit of additional work and expertise to get some required software to run. We cannot provide support for that)
- CPU: Any modern 64-bit CPU with at least two cores
- Memory: 8GB minimum, 16GB recommended
- Graphics: No requirements, integrated graphics is already good enough
- Storage: SSD with at least 20GB of free space
- Display: 1024x768 resolution is absolute minimum. Full-HD (1920x1080) screen highly recommended.
- Network: Wi-Fi 5
- HDMI output
- Webcam and microphone

If a student would like to be able to train and run models on their laptop directly, the laptop should also meet the following specifications (note that this is in no way required or expected by the programme):

- CPU: at least four cores recommended
- Memory: 16GB minimum, 32GB recommended
- Graphics: Discrete NVIDIA GPU with at least 8GB memory, Pascal architecture or better. Certain AMD GPUs *might* also be usable.
- Storage: SSD with at least 100GB of free space