JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

GGS Gießener Graduiertenzentrum Sozial-, Wirtschafts- und Rechtswissenschaften

[Online] Workshop

Introduction to Machine Learning

Organizational details

Instructor:	Dr Tobias Keller
Dates:	January 13, 14 and February 4, 2022, 9.00 am – 5.00 pm
Venue:	Webex Conference Room (more information follows registration)
ECTS:	4
Max. participants:	10

Objectives

After this workshop, participants understand the basic concepts and typical process of machine learning and how it enables artificial intelligence systems. On the basis of examples from practice and research, participants will learn to think like data scientists, and to ask the right questions. They will also learn to apply and evaluate algorithms for supervised and unsupervised machine learning tasks using the open source software KNIME, which does not require programming knowledge. Since there will be no need to learn a programming language during the course, more time will be allocated to understanding the algorithms on an intuitive, non-formal level.

Content and methods

The course consists of lectures to build the theoretical background as well as hands-on tutorials and exercises using the machine learning software KNIME. Participants will learn by examples and exercises from the instructor's experience in research and practice.

Hands-on tutorials and exercises will make up about 40 per cent of the course time. Students will complete those using their own computers. Please see the preparation requirements below for a list of software that needs to be installed to that end. The exercises will be based on exemplary datasets that will be provided to the participants before the course.

Structure

1. Introduction
2. Definitions and Examples from Practice
3. The Machine Learning & Data Science Process
4. Introducing the Case Study and KNIME
5. Supervised Learning: Classification
6. Supervised Learning: Regression
7. Evaluating Machine Learning Models
8. Unsupervised Learning: Clustering
9. Unsupervised Learning: Dimensionality Reduction
10. Neural Networks / Deep Learning

To gain the ECTS credit points participants have to:

- Download and install the open source software KNIME, which is free to use: https://www.knime.com/downloads
- Download the data with which we will be working from here: https://archive.ics.uci.edu/ml/datasets/wine+quality
- Download and extract the course material and exemplary datasets that will be provided in time before the course.
- Actively participate during the workshop
- Complete an assignment between the second session and the final session. The assignment will involve solving a machine learning task using the software KNIME. The respective KNIME workflows will have to be handed in by February 1, 2022.

Target group

Doctoral candidates or postdoctoral researchers doing empirical research or intending to work as data scientists.

Course language

English (German, if only German participants)

Please note: As this is not an English language course proficiency in English at the C1 level of competency is required.

About the Instructor

Dr Tobias Keller has been working as data scientist at ZERO.ONE.DATA, the big data startup of Deutsche Bahn AG since 2016. He consults on and applies machine learning and statistics for artificial intelligence systems in a big data environment. Furthermore, he teaches data science at Deutsche Bahn, in the doctoral education programmes at Justus Liebig University Giessen, and in the doctoral programme and master programme at WHU – Otto Beisheim School of Management. His research interests include machine learning and artificial intelligence, finance and accounting, strategic management.

Registration

By January 3, 2022 via e-mail at info@ggs.uni-giessen.de.