Data Science Summer School 2022

Introduction to Machine Learning for Engineering Sciences

4 – 8 July 2022, Leoben, Austria

The summer school is organized by the Data Science Hub Leoben at the Montanuniversität Leoben and TU AUSTRIA. The goal is to introduce machine learning and its application in engineering and physical sciences. We welcome PhD, Master, and advanced Bachelor students for an intensive five days of lectures, workshops and networking.

The future importance of machine learning and data analytics is indisputable; it provides a means of creating added value from data. In the context of engineering, the data emanates from physical, chemical and mechanical systems and/or processes, which must obey the laws of physics. Consequently, a special branch of machine learning that incorporates models of these processes is required. Such model-based machine learning approaches enable the integration of dependencies, interactions and constraints which are essential for consistent, predictive and noise robust ML systems.

The summer school will give a general introduction to machine learning. This will include aspects such as: data preparation, representations for data, different ML architectures and quality assessment of learned solutions. There will be a focus on applications in the areas of: robotics, machine monitoring, and material science.

Date

Montanuniversität Leoben will host the summer school
from **Monday, July 4th to Friday, July 8th, 2022**.
Expected arrival is Sunday, July 3th, 2022.

Application

If you are interested in participating in the summer school, please send your application to dshl@unileoben.ac.at. Please note that the number of participants is limited.

Application deadline: **Saturday, May 14th, 2022**.

Your application should include the following:

- Complete CV
- Motivation Letter: Please tell us why you want to participate and which related expertise and experience you have. Please mention any programming skills or other experiences with machine learning and related approaches.

We expect fluent English and an academic background in engineering or physical sciences.

Notification of Acceptance: May 31th, 2022

Costs

Participation fee: €100
The participation fee includes:

- all course material and lecture notes
- coffee breaks
- social events

Travel- and accommodation costs need to be covered by the students individually. Accommodation costs for the week will be around €200.

Please bring your own Laptop for the workshops.

Certificate

You will get a certificate of participation, also stating the number of hours worked. No ECTS points will be granted.

Contact Persons

Organizers

Prof. Dr. Peter Auer, auer@unileoben.ac.at

Administration

Andrea Eichelberger, dshl@unileoben.ac.at

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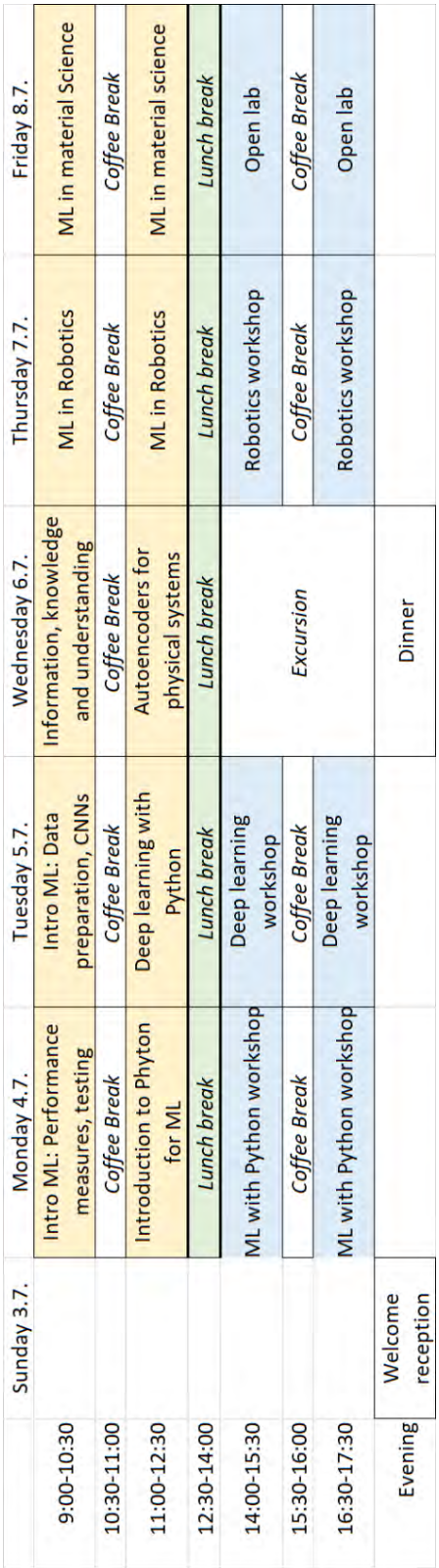

	Sunday 3.7.	Monday 4.7.	Tuesday 5.7.	Wednesday 6.7.	Thursday 7.7.	Friday 8.7.
9:00-10:30		Intro ML: Performance measures, testing	Intro ML: Data preparation, CNNs	Information, knowledge and understanding	ML in Robotics	ML in material Science
10:30-11:00		*Coffee Break*	*Coffee Break*	*Coffee Break*	*Coffee Break*	*Coffee Break*
11:00-12:30		Introduction to Phyton for ML	Deep learning with Python	Autoencoders for physical systems	ML in Robotics	ML in material science
12:30-14:00		*Lunch break*	*Lunch break*	*Lunch break*	*Lunch break*	*Lunch break*
14:00-15:30		ML with Python workshop	Deep learning workshop	*Excursion*	Robotics workshop	Open lab
15:30-16:00		*Coffee Break*	*Coffee Break*		*Coffee Break*	*Coffee Break*
16:30-17:30		ML with Python workshop	Deep learning workshop		Robotics workshop	Open lab
Evening	Welcome reception			Dinner		

Schedule (tentative)

The week of this summer school will consist of morning lectures and afternoon hands-on workshops. It will cover foundational topics of machine learning and applications in various technical areas. We start with an optional get-together on Sunday evening and are also planning an outdoor excursion on Wednesday, which will conclude with dinner.