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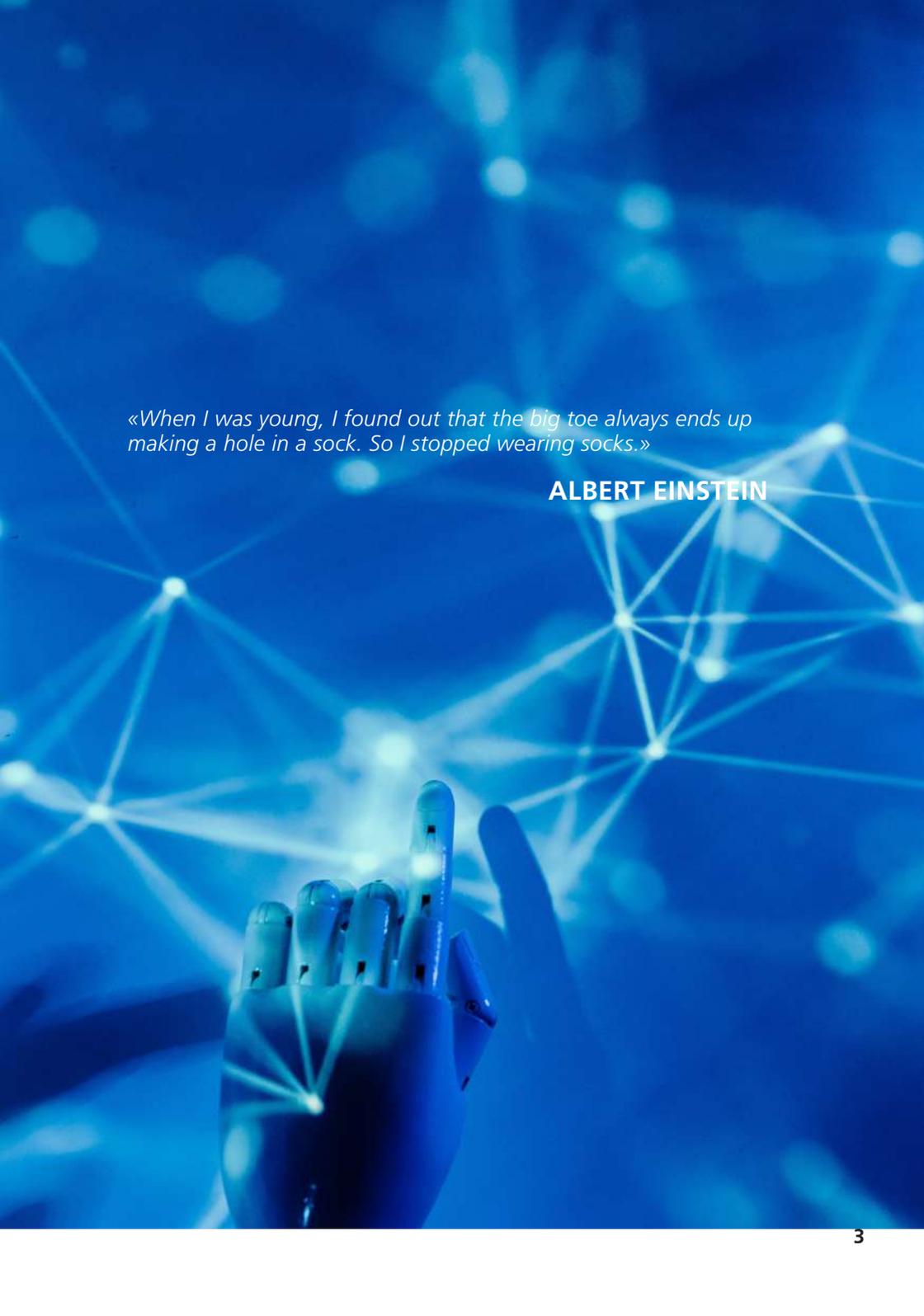


Introduction

Machine translation, information extraction, question answering and non-sense natural language generation performed by Natural Language Processing (NLP) algorithms are already part of everyday life. However, the new semantic understanding capabilities seen in recent trained models not only expand the NLP application space enormously, but also represent possible first steps towards consciousness and mind outside human and animal nerve systems.

The field Natural Language Processing belongs to both computational linguistics as its engineering domain and artificial intelligence as an increasingly important subdomain. The applications based on deep neural networks have reached a performance level which cannot be ignored by any field that is processing natural languages.

The program is organised into six modules, running over 18 course days from August to January and targets practitioners who aim for an overview of the NLP domain with focus on recent developments (deep learning models) and hands-on learning. The difficulty is at a university master level and assumes own basic machine learning experience, programming skills and a higher education degree.



«When I was young, I found out that the big toe always ends up making a hole in a sock. So I stopped wearing socks.»

ALBERT EINSTEIN



Target Groups

Aimed at students and professionals from the public/private sector that hold a degree from a university or a university of applied sciences (e.g. BSc, MSc, PhD).

SUITABLE AND INTENDED FOR PRACTITIONERS AND RESEARCHERS:

Gain an overview of the Natural Language Processing domain with a focus on recent developments (deep learning models) and hands-on learning.

Standard data sets are provided, but participants are encouraged to bring or acquire their own. If you have any questions regarding whether this program could work for you, please do not hesitate to contact us.



Objectives

Course competence is developed throughout six modules and a CAS project work. On completion, the graduates will

Have an overview of the NLP domain and common applications

Be able to perform relevant preprocessing tasks needed for advanced NLP

Be able to understand neural networks and practice them on their own NLP applications

Be able to understand transformers and practice transfer learning with transformers for their own applications

Know discussions related to philosophical and ethical aspects around NLP and artificial intelligence

Be familiar with active research in the NLP domain

CAS Natural Language Processing

Summary

CAS Natural Language Processing

Degree

Certificate of Advanced Studies in Natural Language Processing NLP
University of Bern (CAS NLP Unibe)

Scope

16 ECTS

Duration

2023-08 - 2024-07
(2 years is possible)

Start

2023-08

Admission

A degree from an university or an university of applied sciences

Cycle

Annual

Language

English

Further information

www.unibe.ch/continuing_education_programs/cas_natural_language_processing

Locations

All courses take place in walking distance from the Bern railway station. The exception is Module 3 which takes place on the mediterranean coast and Module 6, which takes place in the ski resort Mürren two train hours from Bern city.

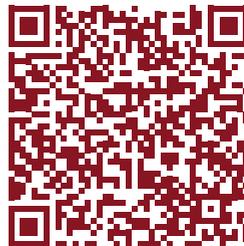
All courses are additionally held online. Remote participation is possible (via Zoom).

Teaching methods

Our teaching methods are modern and peer oriented. The modules use online platforms with multimedia materials, tutorials and assessments to aid learning, along with classes for discussion, feedback and a chance to deepen knowledge. Main tool and language is Python.

Workload

The duration of all modules corresponds to approximately 20 classroom hours each and module work (expected effort is 30 hours), with each complete module qualifying for 2 ECTS points. The expected workload for the final CAS Project (4 ECTS) is 120 hours.





Modules

Module 1

NLP Fundamentals

In this module, linguistics and machine learning concepts are introduced and an overview of the NLP field and common applications is given.

Module 2

Preprocessing and basic analysis

In this module, participants learn to perform basic preprocessing and analysis of natural language.

Module 3

Neural networks

In this module, participants learn how neural networks work, are trained, tuned, assessed and applied for NLP tasks

Module 4

Transformers

In this module, participants study transformers and learn why they have changed the NLP field.

Module 5

Philosophical and ethical aspects of NLP

In this module, participants study and discuss ethical and philosophical aspects related to machines being capable of natural language processing.

Module 6

Frontier and applications

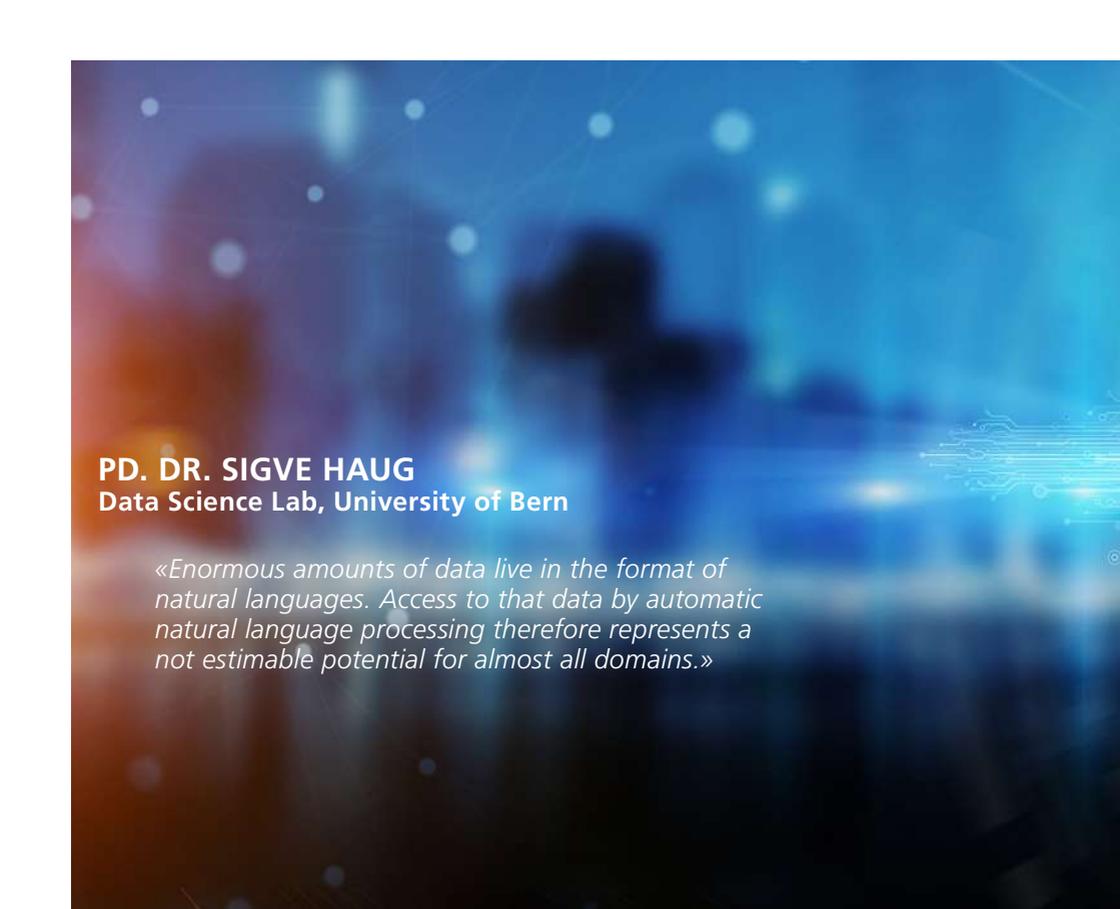
This module consolidates the knowledge obtained from previous modules to focus on prominent NLP topics and applications.

Final Project

CAS Thesis

Consolidate all gained knowledge in your final CAS Project. Team work and usage of own data are encouraged.





PD. DR. SIGVE HAUG
Data Science Lab, University of Bern

«Enormous amounts of data live in the format of natural languages. Access to that data by automatic natural language processing therefore represents a not estimable potential for almost all domains.»

Final Project

Participants define and perform a 4 ECTS project work, individually or in teams during the CAS. Support is provided by the CAS lecturers. Output is a report, computational notebooks and a presentation. The use of own data from profession or research is encouraged.



**To check if registration
is currently possible,
visit**



Cost

Regular CAS program: CHF 9600

**Employees and students of
University of Bern:** CHF 5600

Inclusive of all modules, performance assessments, certificates, materials and teaching platforms, coffee breaks, full pension hotel (Module 3), full pension hotel in Mürren (Module 6) and diploma apero.

Participants must supply their own laptops.

Registration

Register via https://www.unibe.ch/continuing_education_programs/cas_natural_language_processing

Registration opens in November and a maximum of 20 registrations can be accepted each year. Registrations are processed in the order of arrival. The CAS can only be offered if there are sufficient registrations by the deadline.

Registered participants will receive acceptance confirmation by email and will be invited to one of the next Introduction events. Attendance to one Introduction is mandatory. Participants can cancel their registrations before the deadline without any costs. After the deadline the regulations apply. Individual modules and electives can be attended before the registration.

Schedule

2023/2024

Module 1	NLP Fundamentals	2023-08-22 - 2023-08-25
Module 2	Preprocessing and basic analysis	2023-08-29 - 2023-09-01
Module 3	Neural networks	2023-10-09 - 2023-10-13
Module 4	Transformers	Weekly from 2023-10-20 until 2023-12-15
Module 5	Philosophical and ethical aspects	Weekly from 2023-11-24 until 2023-12-15
Module 6	Frontier and applications	2024-01-29 - 2024-02-02

Further introductory courses:

Algorithms and programming are important tools in data driven research. Python is a good scripting language widely used to make pipelines of tasks typical for large computations and analysis on large datasets. It suits the purpose of starting programming in it, as well.

For students who wish to refresh their Python programming knowledge or who are new to the Python programming language, we recommend attending the course

Introduction to Programming (Python)
on 2023-08-14.



CONTACT



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Director of Studies
sigve.haug@unibe.ch



Claire Dove
Education and
Communication Manager
claire.dove@unibe.ch

Lecturers

Our lecturers are local or external experts. Currently, lecturers include

- Prof. Dr. Dr. Claus Beisbart
- Prof. Dr. Tobias Hodel
- Dr. des. Christa Schneider
- PD Dr. Sigve Haug
- Dr. Kinga Sipos
- Dr. Mykhailo Vladymyrov
- M.Sc. Joel Niklaus
- M.A. Phillip Ströbel

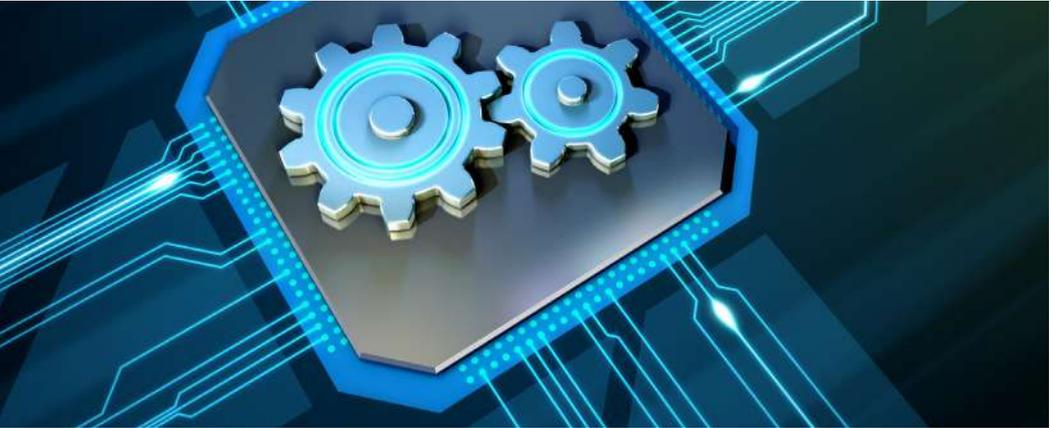
Program management

The Certificate of Advanced Studies (CAS) in Natural Language Processing (NLP) is offered by the Mathematical Institute.

- Prof. Dr. Paolo Favaro
- Prof. Dr. Jan Draisma
- Prof. Dr. Tobias Hodel
- PD Dr. Sigve Haug (Director of Studies)
- Prof. Dr. Christiane Tretter (Chair)
- Prof. Dr. Thomas Wihler



Further Studies: Extended Intelligence



DAS Extended Intelligence

The CAS Natural Language Processing (NLP) can be combined with the CAS Advanced Machine Learning (AML) or the CAS Applied Data Science (ADS) into a Diploma of Advanced Studies in Extended Intelligence - the DAS XI.

The scope of the DAS XI comprises 38 ECTS:

- 16 ECTS from CAS ADS/AML/NLP**
- 16 ECTS from CAS ADS/AML/NLP**
- 2 ECTS from DAS Module**
- 4 ECTS from DAS Thesis**

MAS Extended Intelligence

The CAS Natural Language Processing (NLP) can be combined with the CAS Advanced Machine Learning (AML) and the CAS Applied Data Science (ADS) into a Master of Advanced Studies in Extended Intelligence - the MAS XI.

The scope of the MAS XI comprises 62 ECTS:

- 16 ECTS from CAS ADS**
- 16 ECTS from CAS AML**
- 16 ECTS from CAS NLP**
- 2 ECTS from MAS Module**
- 12 ECTS from MAS Thesis**



University of Bern

Mathematical Institute

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Schweiz

www.math.unibe.ch