AI Engineering and Voice Assistants

Maschinelles Lernen & Deep Learning · Anbieter: IU Akademie IU Internationale Hochschule

FÖRDERUNG & KOSTEN

Kurspreis: auf Anfrage

Förderfähig über: Bildungsgutschein

AZAV-zertifizierter Bildungsträger — Förderung durch die Agentur für Arbeit möglich

Kursdaten auf einen Blick

Durchführung	Online
Lernformat	Self-Paced
Dauer	6 Monate in Vollzeit oder 12 Monate in Teilzeit
Unterrichtssprache	Deutsch, Englisch
Kursstart	Startet alle 14 Tage
Vorkenntnisse	Keine Vorerfahrung
Abschluss	Zeugnis auf Hochschulniveau
Inklusive	Berufscoaching, Notebook / Tablet (geliehen)

Bildungsträger & Kontakt

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Kurs online ansehen

01 Kursbeschreibung

Die Revolution digitaler Assistenten schreitet voran – und Du bist bereit. Nach Deiner Online-Weiterbildung AI Engineering and Voice Assistants wirst Du Sprachassistenten mit modernsten Methoden umsetzen. Du verwandelst Sprache in messbare Ergebnisse und gestaltest die Interaktion zwischen Mensch und Maschine aktiv mit. Du lernst, wie Maschinen durch Algorithmen lernen, nutzt neuronale Netzwerke und Deep Learning und erhältst fundierte Einblicke in Machine Learning sowie Reinforcement Learning. Auch agile Projektverwaltung und DevOps gehören zu Deinen Kompetenzen. Du schaffst skalierbare, cloudbasierte Lösungen und bist in der Lage, Sprachassistenten effizient zu entwickeln. Mit Deinem Know-how wirst Du zur treibenden Kraft für KI-gestützte Sprachsysteme. Hinweis: Der Abschluss verleiht keinen offiziellen Ingenieur-Titel.

02 Lehrplan & Module

1. Deep Learning

Neural networks and deep learning approaches have revolutionized the fields of data science and artificial intelligence in recent years, and applications built on these techniques have reached or surpassed human performance in many specialized applications.
After a short review of the origins of neural networks and deep learning, this course will cover the most common neural network architectures and discuss in detail how neural networks are trained using dedicated data samples, avoiding common pitfalls such as overtraining.
The course includes a detailed overview of alternative methods to train neural networks and further network architectures which are relevant in a wide range of specialized application scenarios.
Kursinhalte
Introduction to Neural Network and Deep Learning The Biological Brain
Perceptron and Multi-Layer Perceptrons
Network Architectures Feed-Forward Networks
Convolutional Networks
Recurrent Networks, Memory Cells and LSTMs
Neural Network Training Weight Initialization and Transfer Function
Backpropagation and Gradient Descent
Regularization and Overtraining
Alternative Training Methods Attention
Feedback Alignment
Synthetic Gradients
Decoupled Network Interfaces
Further Network Architectures Generative Adversarial Networks
Autoencoders
Restricted Boltzmann Machines
Capsule Networks
Spiking Networks
Fakten zum Modul: Niveau: Master · Unterrichtssprache: English · 5 ECTS-Punkte · Modulprüfung: Mündliche Prüfung

2. Reinforcement Learning

Reinforcement learning allows computers to derive problem-solving strategies without being explicitly programmed for the specific task, similar to the way humans and animals learn.
After introducing the concepts of reinforcement learning, the course discusses the properties of Markov chains and single- and multi-armed bandits in detail. Special attention is given to the understanding of value functions and discounted value functions.
The course connects reinforcement learning with neural networks and deep learning and discusses how Q-Learning approaches can be used to utilize deep learning methods in reinforcement learning problems, including extensions such as double Q-Learning, hierarchical learning, and actor-critic learning.
Finally, the course discusses reinforcement learning approaches such as model-free and model-based learning and the tradeoff between exploration and exploitation.
Kursinhalte
Introduction to Reinforcement Learning Understanding Reinforcement Learning
Components of Reinforcement Learning Systems
Markov Chains Markov Decision Process & Markov Property
Value Functions and Discounted Value Functions
General Utility Function
Actions & Policy
Bellman’s Equation
Value Iteration
Markov Chain Monte Carlo (MCMC)
Bandit Single-Arm Bandit
Multi-Arm Bandit
Q-Learning Time-difference Learning
Reinforcement Learning with Neural Networks & Deep Q Learning
Experience Replay
Double Q-Learning
Delayed Sparse Rewards
Hierarchical Learning
Value- vs Policy-Based Learning
Actor Critic Learning
Reinforcement Learning Approaches Model-Free Learning
Model-Based Learning
Exploration vs Exploitation
Fakten zum Modul: Niveau: Master · Unterrichtssprache: English · 5 ECTS-Punkte · Modulprüfung: Hausarbeit

3. Software Engineering for Data Intensive Sciences

Building a successful data-based product requires a significant amount of high-quality code which needs to run in a professional production environment. This course starts by introducing the agile approaches Scrum and Kanban and then discusses the shift from more traditional software development approaches to the DevOps culture.
Special focus is given to the discussion and understanding of techniques and approaches for producing high-quality code such as unit and integration testing, test-driven development, pair programing, and continuous delivery and integration.
Since many software artefacts are accessed via APIs, this course introduces concepts of API design and paradigms.
Finally, this course addresses the challenges of bringing code into a production environment, building a scalable environment, and using cloud-cased approaches.
Kursinhalte
Agile Project Management Introduction to SCRUM
Introduction to Kanban
DevOps Traditional lifecycle management
Bringing development and operations together
Impact of team structure
Building a DevOps infrastructure
Software Development Unit & integration test, performance monitoring
Test-driven development & pair programing
Continuous delivery & integration
Overview of relevant tools
API API design
API paradigms
From Model to Production Building a scalable environment
Model versioning and persistence
Cloud-based approaches
Fakten zum Modul: Niveau: Master · Unterrichtssprache: English · 5 ECTS-Punkte · Modulprüfung: Mündliche Prüfung

4. Machine Learning

Machine learning is a field of scientific study concerned with algorithmic techniques that enable machines to learn performance on a given task via the discovery of patterns or regularities in exemplary data. Consequently, its methods commonly draw upon a statistical basis in conjunction with the computational capabilities of modern computing hardware.
This course aims to acquaint the student with the main branches of machine learning and provide a thorough introduction to the most widely used approaches and methods in this field.
Kursinhalte
Introduction to Machine Learning Regression & Classification
Supervised & Unsupervised Learning
Reinforcement Learning
Clustering Introduction to clustering
K-Means
Expectation Maximization
DBScan
Hierarchical Clustering
Regression Linear & Non-linear Regression
Logistic Regression
Quantile Regression
Multivariate Regression
Lasso & Ridge Regression
Support Vector Machines Introduction to Support Vector Machines
SVM for Classification
SVM for Regression
Decision Trees Introduction to Decision Trees
Decision Trees for Classification
Decision Trees for Regression
Genetic Algorithms Introduction to Genetic Algorithms
Applications of Genetic Algorithms
Fakten zum Modul: Niveau: Master · Unterrichtssprache: English · 5 ECTS-Punkte · Modulprüfung: Examen, 90 Minuten

5. Natural Language Processing

In this course, traditional, state-of-the-art basic and advanced approaches to Natural Language Processing (NLP) will be taught. To achieve this goal, techniques, challenges, and solutions are presented with a comprehensive overview of related topics. Additionally, it will be shown how NLP can be used successfully in different use-case scenarios–both theoretically and with practical examples.
Kursinhalte
Introduction to NLP What is NLP?
Syntax, Semantics and Prosodics
Phonetics and Speech
Evaluation of NLP Systems
Text Processing Word Vectors and Word Embeddings
Regular Expressions
Statistical Approaches
Recurrent Neural Network based Approaches
Transformer based Approaches
Speech Processing Statistical Speech Recognition and Synthesis
Speech Recognition and Synthesis with Deep Learning
Application Scenarios Speech Recognition, Speech Synthesis and Machine Translation
Information Extraction and Text Understanding
Chatbots and Voice Assistants
NLP in Education
NLP with Python
Challenges in NLP Data for NLP
Domain and Language Adaptation
Explainability
Bias
Fakten zum Modul: Niveau: Master · Unterrichtssprache: English · 5 ECTS-Punkte · Modulprüfung: Mündliche Prüfung

6. Project: Voice Assistants

In this course, the implementation of voice assistants with state-of-the-art methods and frameworks will be taught. To achieve this goal in a structured manner, the student will step-wise submit deliverables in a conception phase, a development/reflection phase, and in a finalization phase. In each phase the student will get feedback by the tutor to iteratively enhance and extent the implementation.
Kursinhalte
The practical implementation and development of a voice assistant with digital documentations is combined as part of a portfolio which is designed and carried out individually but supervised by the responsible tutor. The implementation consists of three phases–the “conception phase”, the “development/reflection phase” and the “finalization phase”–which are intended to illustrate the individual work or development steps and the adopted approach. In the conception phase, the concept or core idea should be introduced as well as the initial motivation. Implementation of the basic ideas takes place in the implementation/reflection phase. In the finalization phase, the final product and/or a final version of the written assessment are developed and delivered.
Fakten zum Modul: Niveau: Master · Unterrichtssprache: English · 5 ECTS-Punkte · Modulprüfung: Portfolio

03 Enthaltene Zertifikate

Trägerzertifikat: Zeugnis auf Hochschulniveau

04 Voraussetzungen

Vorkenntnisse

Niveau: Keine Vorerfahrung

Zulassungsvoraussetzung: gute Deutschkenntnisse auf B2-Niveau.

Zugangsempfehlung: Englisch auf B2 Niveau

Die Weiterbildung ist auf dem inhaltlichen Niveau eines Master Studiengangs. Eine Weiterbildung auf Master-Niveau ist anspruchsvoller als auf Bachelor-Niveau. Vorhandenes Grundlagenwissen im gewählten Fachbereich ist deshalb von Vorteil.

Technische Voraussetzungen

Laptop mit Internetzugang.

05 Zielgruppen & Berufsperspektiven

- Arbeitssuchende
- Fachkräfte

Mögliche Berufsbilder: Machine Learning Engineer, KI-Entwickler, KI-Spezialist

NÄCHSTER SCHRITT

Kursdetails online ansehen und Anbieter kontaktieren

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