Vorlesungsverzeichnis

M.Sc. Digital Engineering

SoSe 2023

Stand 20.04.2023

Project **26**

M.Sc. Digital Engineering

Faculty Welcome for Master's Students Digital Engineering
Monday, 3rd April 2023, 11.00 a.m., Schwanseestraße 143, room 3.31

Project fair
Monday, 3rd April 2023, 5 p.m., Steubenstraße 6, Audimax

Fundamentals (F)

Algorithms and Datastructures

4555211 Algorithmen und Datenstrukturen

C. Wüthrich, F. Andreussi, Projektbörse Fak. KuG Veranst. SWS: 4
Vorlesung
Di, wöch., 13:30 - 15:00, Coudraystraße 9 A - Hörsaal 6, Vorlesung, ab 11.04.2023
Mi, wöch., 09:15 - 10:45, Coudraystraße 9 A - Hörsaal 6, Übung, ab 12.04.2023

Beschreibung

Das Lernziel dieser Veranstaltung soll zum einen der generelle Umgang und die selbstständige Entwicklung, Analyse, und Optimierung von Algorithmen und Datenstrukturen sein. Zum anderen soll ein Überblick über gängige problemspezifische Verfahren und deren Anwendung in der Praxis vermittelt werden.

engl. Beschreibung/ Kurzkommentar

Algorithms and Data Structures

The lecture deals with the principle and the implementation of basic algorithms and data structures. The course teaches among all, the Strings, geometric problems, graphs, mathematical algorithms and NP-complete problems.

Leistungsnachweis

Beleg, Klausur

Applied Mathematics and Stochastics

Introduction to Mechanics

Mathematics for Data Science

301017 Mathematics for data science

B. Rüffer, M. Schönlein Veranst. SWS: 4
Vorlesung
Mi, Einzel, 13:30 - 16:45, Coudraystraße 13 B - Hörsaal 3, 05.04.2023 - 05.04.2023
Mo, wöch., 09:15 - 12:30, Coudraystraße 13 A - Hörsaal 2

Beschreibung

After the course the students will be familiar with the fundamental concepts of data science. The participants can analyse given data sets with respect to dimensionality reduction and clustering. They also know the basic structure of neural networks and support vector machines to solve classification tasks. The participants know relevant methods from linear algebra and optimization and can apply these techniques. This embraces the design of appropriate algorithms and the implementation of different numerical methods to solve the corresponding problems.

Bemerkung

Examples of complex dynamics. Models for dynamical systems in continuous and discrete time. Computer simulation. Control and Feedback. Stability, stabilization, and Lyapunov functions. Coupled systems: Disturbance or Cooperation? Networks of systems. Consensus. Synchronization.

The topics will be presented in a lecture, deepened by exercises. Some of the exercise include computer programming and simulation.

Voraussetzungen

B. Sc.; Analysis and Linear Algebra at Bachelor level, knowledge of Matlab or Python

Leistungsnachweis

1 written exam

”Complex dynamics”

120 min (100%) / **SuSe** + WiSe

Object-oriented Modeling and Programming in Engineering

Software Engineering

417290000 Software Engineering

J. Ringert Veranst. SWS: 4

Vorlesung

Di, wöch., 09:15 - 10:45, Schwanseestraße 143 - Seminarraum 2.16, lecture, ab 04.04.2023
Fr, wöch., 11:00 - 13:00, Schwanseestraße 143 - Seminarraum 2.16, lab class, ab 14.04.2023

Beschreibung

We introduce the most important aspects of software engineering.

- Motivation and history of software engineering
- Lifecycle models for software development
- Requirements engineering
- Requirement notations
- Software modelling
- Software analysis
- Design patterns
- Testing
- Software quality
- Agile principles
- Open Source Software

After completion students will be able to

- Compare and evaluate software lifecycle models

- Read, create, and assess the quality of requirements
- Read common software modelling notations
- Evaluate and select appropriate software testing strategies

Understand principles of OSS

Statistics

301005 Statistics

N. Gorban, B. Rüffer Veranst. SWS: 4
Integrierte Vorlesung
Mo, wöch., 13:30 - 15:00, Schwanseestraße 143 - Seminarraum 3.09
Di, wöch., 17:00 - 18:30, Coudraystraße 11 C - Seminarraum (geologische Sammlung) 202

engl. Beschreibung/ Kurzkommentar

Statistics

Contents:
- Probability (Events, classical probability, axiomatic approach, conditional probability)
- Random variables (Discrete random variables, continuous random variables, limit theorems)
- Descriptive statistics (Graphical representation and frequency distributions, location and scattering parameters, bivariate and multivariate analysis: dependence and correlation, regression analysis)
- Inductive statistics
- Point and interval estimation
- Parameter testing
- Goodness-of-fit-tests
- Nonparametric tests
- Tests for independence and correlation

Voraussetzungen

B.Sc. in a related study field, Basic knowledge on random variables and the most important distributions

Leistungsnachweis

Written exam

Structural Dynamics

Modelling (M)

Advanced Building Information Modeling

303001 Advanced Building Information Modelling

C. Koch, M. Alabassy, J. Krischler Veranst. SWS: 4
Vorlesung
Mi, wöch., 11:00 - 12:30, Marienstraße 7 B - Student Design Studio – SDS 303, Exercise
Mi, wöch., 11:00 - 12:30, Coudraystraße 13 B - Pool Fak. B 007, Exercise
Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A, Lecture

engl. Beschreibung/ Kurzkommentar

Advanced Building Information Modelling

Content: Advanced geometric and parametric modelling, Interoperability and collaboration concepts (IFC, IDM, BEP), Advanced use cases (e.g. clash detection, as-built model-ing), BIM programming (incl. visual programming)

Target qualifications: This module introduces advanced concepts of Building Information Modelling (BIM) to provide students with advanced knowledge in order to understand, analyze and discuss scientific research approaches related to BIM. Within the frame of the mod-ule project (coursework) the students will choose a topic from a pre-defined list or come up with their own topic. Based on that they will do detailed research, imple-ment a representative concept in a software prototype and discuss findings and limi-tations. Also the students acquire skills of scientific working and presentation.

Bemerkung

NHRE: Possible as Elective Compulsory as from Intake 2022

Voraussetzungen

Recommended require-ments for participation: Basic knowledge of Computer-Aided Design, BIM concepts, and object-oriented programming

Leistungsnachweis

written report, presentation

Complex Dynamics

301016 Complex dynamics

B. Rüffer Veranst. SWS: 4

Vorlesung

Di, wöch., 07:30 - 10:45, Coudraystraße 13 A - Hörsaal 2

Beschreibung

After the course the students will be able to analyse mathematical models that describe dynamic behaviour, as they occur in engineering (e.g. mechanical coupling of building structures), in biology and in physics, but also in multi-agent systems in computer science, or as opinion dynamics in psychology. Based on examples from different disciplines, students learn to build simplified models that allow to answer questions on their long-term behaviour. Students will be able to apply methods of feedback design that help shape the dynamics of a given system, along with the relevant stability concepts. As several topics lend themselves for computer simulation, students of this course will develop a proficiency to both implement and analyse mathematical models using computational tools and software.

Bemerkung

Examples of complex dynamics. Models for dynamical systems in continuous and discrete time. Computer simulation. Control and Feedback. Stability, stabilization, and Lyapunov functions. Coupled systems: Disturbance or Cooperation? Networks of systems. Consensus. Synchronization.

The topics will be presented in a lecture, deepened by exercises. Some of the exercise include computer programming and simulation.

Voraussetzungen

B.Sc., knowledge in Matlab or Python

Leistungsnachweis

1 written exam

”Complex dynamics”

120 min (100%) / **SuSe** + WiSe

Computer models for physical processes - from observation to simulation

Macroscopic Transport Modelling

Modelling in the development process

Optimization

451002 Introduction to Optimization (L+E)

T. Lahmer Veranst. SWS: 3
Integrierte Vorlesung
Mo, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Lecture
Do, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise Dates by arrangement

Beschreibung

In engineering science, we are often faced with problems having potential for optimization. We learn how to formulate this in mathematical terms, and we will study techniques how to improve the situations, generally by involving numerical models. We will discuss classical optimization problems in the field of linear and nonlinear optimization, e.g. optimization of the use of resources, routing problems, calibration problems and structural optimization. In particular in structural optimization we learn techniques like dimensioning, shape and topology optimization. Optimized structures are discussed also in the context of additive manufacturing techniques.

Bemerkung

Introduction to Optimization (summer semester):

Definitions, Classification of Optimization Problems,

Linear Problems, Simplex Method, Nonlinear Problems: Constrained and unconstrained continuous problems, descent methods and variants. (Robust) Structural Optimization (including Shape and Topology Optimization)

Voraussetzungen

B.Sc.

Leistungsnachweis

1 written or oral exam (depending on the number of participants)

”Introduction to Optimization” (3 credits) / **SuSe** + WiSe

451006 Optimization in Applications (P)

T. Lahmer Veranst. SWS: 3
Projektmodul/Projekt

Beschreibung

In engineering science, we are often faced with problems having potential for optimization. We learn how to formulate this in mathematical terms, and we will study techniques how to improve the situations, generally by involving numerical models. We will discuss classical optimization problems in the field of linear and nonlinear optimization, e.g. optimization of the use of resources, routing problems, calibration problems and structural

optimization. In particular in structural optimization we learn techniques like dimensioning, shape and topology optimization. Optimized structures are discussed also in the context of additive manufacturing techniques.

Bemerkung

Optimization in Applications (summer semester):

Optimization in Applications is generally a project assigned to the students including own programming and modelling. E.g. innovative optimization strategies are to be implemented in Matlab, Python or similar. Alternatively, engineering models could be subjected to optimization software.

Leistungsnachweis

1 project ”Optimization in Applications” (3 credits) / **SuSe** + WiSe

Simulation and Validation (SaV)

Design and Interpretation of Experiments / Signal Processing

Experimental Structural Dynamics

401009 Experimental structural dynamics and Structural monitoring (P)

V. Zabel Veranst. SWS: 4
Projekt
Di, wöch., 07:30 - 12:30, Marienstraße 7 B - Projektraum 301

Beschreibung

The students obtain deepened knowledge in structural dynamics, structural dynamic analysis, data processing, dynamic test equipment and its handling. They learn to analyse the dynamic behaviour of a structure utilizing both numerical and experimental state-of-the-art methods. Furthermore, the students have to develop strategies and concepts of investigation. The work in small groups enhances the social competence of the students.

Operational modal analysis, sensor types, sensor positioning, data analysis and assessment, assessment of structural changes, structural modelling, model updating

Bemerkung

14 students from NHRE only

Voraussetzungen

Structural dynamics

Leistungsnachweis

1 Project report + intermediate and final presentations

„ Experimental structural dynamics”

(100%) / **SuSe**

Extended Finite Elements and Mesh Free Methods

Finite Element Methods (FEM)

2401012 Applied Finite element methods (Exercise)

T. Rabczuk, M. Bianco, A. Habtemariam, J. Lopez Zermeño, F. Tartaglione Garcia Veranst. SWS: 1

Seminar

Mi, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 301, Tutorium
Mi, wöch., 13:30 - 15:00, Marienstraße 7 B - Seminarraum 205, Tutorium
Fr, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Exercise

2401012 Applied Finite element methods (Lecture)

T. Rabczuk, C. Könke Veranst. SWS: 2

Vorlesung

Mo, wöch., 07:30 - 09:00, Marienstraße 7 B - Seminarraum 205

Modelling of Steel Structures and Numerical Simulation

205007 Modelling of steel structures and numerical simulation (L + E)

M. Kraus, S. Ibañez Sánchez, S. Mämpel Veranst. SWS: 4

Vorlesung

1-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Exercise
1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise
2-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 302, Exercise
2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Exercise
Mo, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D, Exercise
Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Exercise

Beschreibung

The students will be familiar with skills and expertise in the field of nonlinear structural analyses. Extensive knowledge of theoretical basics and modern modelling methods including numerical representations are the aim of the course. The students will acquire skills in handling advanced tools for the analysis and the design of structures.

Design of steel structures using finite element methods; basics of the design; modelling of structures and loads; nonlinear material behaviour, numerical analyses of steel-members and structures regarding geometric and physical nonlinearities; stability behaviour of members including flexural and lateral torsional buckling

Leistungsnachweis

1 Project report

”Modelling of steel structures and numerical simulation” (0%) / **SuSe**

1 written exam

”Modelling of steel structures and numerical simulation”/ 120 min (100%) / **SuSe** + WiSe

Simulation Methods in Engineering

303002 Simulation Methods in Engineering

C. Koch, M. Artus Veranst. SWS: 4

Vorlesung
Fr, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A
Fr, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 301, Exercise
Fr, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 302

engl. Beschreibung/ Kurzkommentar

Simulation Methods in Engineering

Content:

- System analysis and modelling
- System dynamics
- Discrete event simulation
- Multi-agent simulation
- Input data and stochastic simulation
- Simulation based optimization
- Introduction to the software AnyLogic

Target qualifications:

This module provides students with comprehensive knowledge about computer based simulation concepts to address practical challenges in engineering. Modern simulation and optimization software is introduced within tutorials. The module project (coursework) offers an opportunity to students to work in groups on current problems in the context of civil and environmental engineering (e.g. production logistics, pedestrian simulation, pollutant dispersion). Using object-oriented simula-tion software the students will analyze, model and simulate different engineering systems. The programming is carried out using Java. Also the students acquire team working and presentation skills.

Voraussetzungen

Recommended require-ments for participation: Basic knowledge of programming

Leistungsnachweis

Short group report, group presentation, written exam

Stochastic Simulation Techniques and Structural Reliability

451007 Stochastic Simulation Techniques and Structural Reliability (L+E)

T. Lahmer Veranst. SWS: 3
Integrierte Vorlesung
Di, wöch., 11:00 - 12:30, Coudraystraße 13 A - Hörsaal 2, Lecture
Fr, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise dates by arrangement

Beschreibung

Soils, rocks and materials like concrete are in the natural state among the most variable of all engineering materials. Engineers need to deal with this variability and make decisions in situations of little data, i.e. under high uncertainties. The course aims in providing the students with techniques state of the art in risk assessment (structural reliability) and stochastic simulation.
The course topics comprise
- (a very brief review) of probability theory
- discrete and continuous random processes and fields
- estimation of statistical parameters
- stochastic simulation techniques (Monte Carlo Samplings)
- reliability-based design
- sensitivity analysis
- structural safety

- Risk assessment and stochastic modelling in practice

Bemerkung

The lecture consists of weekly lectures by Prof. Tom Lahmer (Bauhaus University Weimar) throughout the semester and an intensive practical training (Blockkurs) on applications by Dr. Thomas Most (DYNARDO, Weimar)
Please indicate your interest in the course via an E-Mail to Prof. Tom Lahmer (tom.lahmer@uni-weimar.de) by briefly citing the title of the lecture and providing your name until **April 1st, 2023** as this will make the organization of rooms, course material, etc. much easier.

Possible combinations with other lectures acc. to the NHRE-Modulguide.

Voraussetzungen

Basic knowledge in probability theory

Leistungsnachweis

1 written or oral exam (depending on the number of participants)

”Stochastic Simulation Techniques and Structural Reliability” / (50%) / **SuSe** + WiSe

451011 Stochastic Simulation Techniques and Structural Reliability (P)

T. Lahmer Veranst. SWS: 3
Projektmodul/Projekt

Beschreibung

The course topics comprise

- (a very brief review) of probability theory
- discrete and continuous random processes and fields
- estimation of statistical parameters
- stochastic simulation techniques (Monte Carlo Simulation)
- reliability-based design
- sensitivity analysis
- structural reliability (FORM, FOSM, Subset Simulation, …)
- Risk assessment and stochastic modelling in practice

The project (extra 3 credits) involves own programming of stochastic simulation algorithms, e.g. generators of random fields, methods to assess structural reliability, and combination of stochastic simulation techniques with engineering models.

Bemerkung

Possible combinations with other lectures acc. to the NHRE-Moduleguide.

Voraussetzungen

Basic knowledge in probability theory

Leistungsnachweis

1 written or oral exam (depending on the number of participants)

”Stochastic Simulation Techniques and Structural Reliability” / (50%) / **SuSe** + WiSe

Visualization and Data Science (VaDS)

Complexity Theory

422150032 Complexity Theory

A. Jakoby Veranst. SWS: 4

Vorlesung

Di, wöch., 11:00 - 12:30, Lecture SR 3.31, Schwanseestraße 143, ab 04.04.2023
Do, wöch., 09:15 - 10:45, Lab class Lecture Hall 2 , Coudraystr. 13A, ab 06.04.2023

Beschreibung

The aim this course is to impart basic knowledge on concepts of complexity theory. The course present knowledge on the limits of information processing.

Key topics include

- Complexity Classes
- Reductions
- Efficiency versus Intractability
- NP complete problems
- Approximability

engl. Beschreibung/ Kurzkommentar

Complexity Theory

The aim this course is to impart basic knowledge on concepts of complexity theory. The course present knowledge on the limits of information processing.

Key topics include

- Complexity Classes
- Reductions
- Efficiency versus Intractability
- NP complete problems

Voraussetzungen

Diskrete Mathematik

Leistungsnachweis

Klausur

Generative Software Engineering

422150031 Generative Software Engineering

J. Ringert Veranst. SWS: 4

Vorlesung

Mi, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A, Lecture
Fr, wöch., 13:30 - 15:00, Coudraystraße 9 A - Hörsaal 6, Lab class

Beschreibung

We introduce main approaches and techniques to generative software development.

- Model Driven Engineering
- Software Modeling languages for structure and behavior
  - Class Diagrams, Object Diagrams, OCL
  - Sequence Diagrams and State Machines
- Software model consistency and semantics
- Code Generation from class diagrams
- Code generation from State Machines
- Reactive Synthesis from temporal specifications
- Software Product Lines
- Domain Specific Languages
- Model Transformations

After completion students will be able to

- Contrast different modelling languages and chose based on purpose
- Analyze model consistency
- Evaluate and apply code generators
- integrate generated code in software projects
- create and analyze temporal specifications
- synthesize software from temporal specifications
- understand domain specific languages and model transformations

Bemerkung

Lecturer: Prof. Ringert

Image Analysis and Object Recognition

4336010 Image Analysis and Object Recognition

V. Rodehorst, C. Benz Veranst. SWS: 3

Vorlesung

Di, wöch., 15:15 - 16:45, Coudraystraße 9 A - Hörsaal 6, Lecture, ab 04.04.2023
Do, wöch., 11:00 - 12:30, Coudraystraße 9 A - Hörsaal 6, Lab class, ab 13.04.2023

Beschreibung

Bildanalyse und Objekterkennung

Die Vorlesung gibt eine Einführung in die Grundlagen der Mustererkennung und Bildanalyse. Behandelt werden unter anderem die Bildverbesserung, lokale und morphologische Operatoren, Kantenerkennung, Bilddarstellung im Frequenzraum, Fourier-Transformation, Hough-Transformation, Segmentierung, Skelettierung, Objektklassifizierung und maschinelles Lernen zur visuellen Objekterkennung.

engl. Beschreibung/ Kurzkommentar

Image analysis and object recognition

The lecture gives an introduction to the basic concepts of pattern recognition and image analysis. It covers topics as image enhancement, local and morphological operators, edge detection, image representation in frequency domain, Fourier transform, Hough transform, segmentation, thinning, object categorization and machine learning for visual object recognition.

Leistungsnachweis

Erfolgreiche Bearbeitung der Übungen und Klausur (sowie des Final Projects für das Erreichen der 6 ECTS)

Introduction to Machine Learning

Photogrammetric Computer Vision

Randomized Algorithms

Real-time Rendering

Visualization

4555262 Visualisierung

B. Fröhlich, D. Kiesel, G. Rendle, P. Riehmann Veranst. SWS: 3
Vorlesung

Do, wöch., 13:30 - 15:00, Lecture / Lab class , ab 13.04.2023
Do, wöch., 13:30 - 15:00, Schwanseestraße 143 - Seminarraum 2.16, 1st Lecture: in person, ab 13.04.2023
Mo, wöch., 17:00 - 18:30, Schwanseestraße 143 - Lintpool 2.17, Lab class, ab 17.04.2023
Di, wöch., 09:15 - 10:45, Schwanseestraße 143 - Lintpool 2.17, Lab class, ab 18.04.2023

Beschreibung

Im ersten Teil der Veranstaltung werden die wichtigsten Verfahren und Techniken aus dem Bereich der Informationsvisualisierung für folgende Datentypen vorgestellt: multi-dimensionale und hierarchische Daten, Graphen, Zeitreihen und mengenbasierte Daten. Der zweite Teil beschäftigt sich mit verschiedenen Ansätzen und Algorithmen zur Visualisierung volumetrischer und vektorieller Simulations- und Messdaten. Die Veranstaltung wird englischsprachig angeboten.

In den Übungen werden eine Auswahl der in den Vorlesungen vorgestellten Visualisierungsansätze umgesetzt, getestet und evaluiert. Ein separates Abschlussprojekt wird angeboten und mit zusätzlich 1,5 ETCS angerechnet.

Bemerkung

Bitte beachten:
um die vollen 6 ECTS zu erhalten, muss auch Abschlussprojekt bestanden werden: "Visualization – Final Project"

Voraussetzungen

Programmierkenntnisse sowie gute Kenntnisse von Algorithmen und Datenstrukturen sind erforderlich, z.B. nachgewiesen durch den erfolgreichen Abschluss der entsprechenden Lehrveranstaltungen des Bachelor-Studiengangs Medieninformatik.

In den Laborveranstaltungen werden JavaScript- und grundlegende GLSL-Programmierung eingesetzt. Grundkenntnisse der Computergrafik sind hilfreich, z.B. erworben durch die Vorlesung Computergrafik im Bachelor-Studiengang Medieninformatik.

Leistungsnachweis

Vorlesungsbegleitende Übungen, mündliche oder schriftliche Prüfung.

Ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1.5 ECTS.

420160006 Visualization - Final Project

B. Fröhlich, N.N., J. Reibert, G. Rendle Veranst. SWS: 1
Independent Study

Beschreibung

Im Abschlussprojekt der Vorlesung „Visualisierung” sollen die Teilnehmer die erlangten theoretischen und praktischen Fertigkeiten auf den Entwurf, die Implementierung und die Präsentation eines eigenständigen kleinen Forschungsprojektes anwenden. Dazu soll ein Problem ausgewählt, eine Lösung entwickelt, eine effiziente Implementierung realisiert und die Ergebnisse abschließend in einem Vortrag präsentiert werden.

Dies ist eine wertvolle Gelegenheit, an einem selbst gewählten Thema im Bereich der Visualisierung zu arbeiten.

Voraussetzungen

Erfolgreiche Teilnahme an der Vorlesung „Visualization”

Leistungsnachweis

Dokumentation, Abschlusspräsentation

Elective Modules

4555262 Visualisierung

B. Fröhlich, D. Kiesel, G. Rendle, P. Riehmann Veranst. SWS: 3
Vorlesung
Do, wöch., 13:30 - 15:00, Lecture / Lab class , ab 13.04.2023
Do, wöch., 13:30 - 15:00, Schwanseestraße 143 - Seminarraum 2.16, 1st Lecture: in person, ab 13.04.2023
Mo, wöch., 17:00 - 18:30, Schwanseestraße 143 - Lintpool 2.17, Lab class, ab 17.04.2023
Di, wöch., 09:15 - 10:45, Schwanseestraße 143 - Lintpool 2.17, Lab class, ab 18.04.2023

Beschreibung

Im ersten Teil der Veranstaltung werden die wichtigsten Verfahren und Techniken aus dem Bereich der Informationsvisualisierung für folgende Datentypen vorgestellt: multi-dimensionale und hierarchische Daten, Graphen, Zeitreihen und mengenbasierte Daten. Der zweite Teil beschäftigt sich mit verschiedenen Ansätzen und Algorithmen zur Visualisierung volumetrischer und vektorieller Simulations- und Messdaten. Die Veranstaltung wird englischsprachig angeboten.

In den Übungen werden eine Auswahl der in den Vorlesungen vorgestellten Visualisierungsansätze umgesetzt, getestet und evaluiert. Ein separates Abschlussprojekt wird angeboten und mit zusätzlich 1,5 ETCS angerechnet.

Bemerkung

Bitte beachten:
um die vollen 6 ECTS zu erhalten, muss auch Abschlussprojekt bestanden werden: ”Visualization – Final Project”

Voraussetzungen

Programmierkenntnisse sowie gute Kenntnisse von Algorithmen und Datenstrukturen sind erforderlich, z.B. nachgewiesen durch den erfolgreichen Abschluss der entsprechenden Lehrveranstaltungen des Bachelor-Studiengangs Medieninformatik.

In den Laborveranstaltungen werden JavaScript- und grundlegende GLSL-Programmierung eingesetzt. Grundkenntnisse der Computergrafik sind hilfreich, z.B. erworben durch die Vorlesung Computergrafik im Bachelor-Studiengang Medieninformatik.

Leistungsnachweis

Vorlesungsbegleitende Übungen, mündliche oder schriftliche Prüfung.

Ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1.5 ECTS.

420160006 Visualization - Final Project

B. Fröhlich, N.N., J. Reibert, G. Rendle Veranst. SWS: 1
Independent Study

Beschreibung

Im Abschlussprojekt der Vorlesung „Visualisierung" sollen die Teilnehmer die erlangten theoretischen und praktischen Fertigkeiten auf den Entwurf, die Implementierung und die Präsentation eines eigenständigen kleinen Forschungsprojektes anwenden. Dazu soll ein Problem ausgewählt, eine Lösung entwickelt, eine effiziente Implementierung realisiert und die Ergebnisse abschließend in einem Vortrag präsentiert werden.

Dies ist eine wertvolle Gelegenheit, an einem selbst gewählten Thema im Bereich der Visualisierung zu arbeiten.

Voraussetzungen

Erfolgreiche Teilnahme an der Vorlesung „Visualization"

Leistungsnachweis

Dokumentation, Abschlusspräsentation

205007 Modelling of steel structures and numerical simulation (L + E)

M. Kraus, S. Ibañez Sánchez, S. Mämpel Veranst. SWS: 4
Vorlesung

1-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 301, Exercise
1-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise
2-Gruppe Mo, wöch., 11:00 - 12:30, Marienstraße 7 B - Projektraum 302, Exercise
2-Gruppe Mi, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 302, Exercise
Mo, wöch., 11:00 - 12:30, Marienstraße 13 C - Hörsaal D, Exercise
Mi, wöch., 07:30 - 09:00, Marienstraße 13 C - Hörsaal D, Exercise

Beschreibung

The students will be familiar with skills and expertise in the field of nonlinear structural analyses. Extensive knowledge of theoretical basics and modern modelling methods including numerical representations are the aim of the course. The students will acquire skills in handling advanced tools for the analysis and the design of structures.

Design of steel structures using finite element methods; basics of the design; modelling of structures and loads; nonlinear material behaviour, numerical analyses of steel-members and structures regarding geometric and physical nonlinearities; stability behaviour of members including flexural and lateral torsional buckling

Leistungsnachweis

1 Project report

"Modelling of steel structures and numerical simulation" (0%) / **SuSe**

1 written exam

"Modelling of steel structures and numerical simulation"/ 120 min (100%) / **SuSe** + WiSe

301005 Statistics

N. Gorban, B. Rüffer Veranst. SWS: 4

Integrierte Vorlesung

Mo, wöch., 13:30 - 15:00, Schwanseestraße 143 - Seminarraum 3.09
Di, wöch., 17:00 - 18:30, Coudraystraße 11 C - Seminarraum (geologische Sammlung) 202

engl. Beschreibung/ Kurzkommentar

Statistics

Contents:
- Probability (Events, classical probability, axiomatic approach, conditional probability)
- Random variables (Discrete random variables, continuous random variables, limit theorems)
- Descriptive statistics (Graphical representation and frequency distributions, location and scattering parameters, bivariate and multivariate analysis: dependence and correlation, regression analysis)
- Inductive statistics
- Point and interval estimation
- Parameter testing
- Goodness-of-fit-tests
- Nonparametric tests
- Tests for independence and correlation

Voraussetzungen

B.Sc. in a related study field, Basic knowledge on random variables and the most important distributions

Leistungsnachweis

Written exam

301016 Complex dynamics

B. Rüffer Veranst. SWS: 4

Vorlesung

Di, wöch., 07:30 - 10:45, Coudraystraße 13 A - Hörsaal 2

Beschreibung

After the course the students will be able to analyse mathematical models that describe dynamic behaviour, as they occur in engineering (e.g. mechanical coupling of building structures), in biology and in physics, but also in multi-agent systems in computer science, or as opinion dynamics in psychology. Based on examples from different disciplines, students learn to build simplified models that allow to answer questions on their long-term behaviour. Students will be able to apply methods of feedback design that help shape the dynamics of a given system, along with the relevant stability concepts. As several topics lend themselves for computer simulation, students of this course will develop a proficiency to both implement and analyse mathematical models using computational tools and software.

Bemerkung

Examples of complex dynamics. Models for dynamical systems in continuous and discrete time. Computer simulation. Control and Feedback. Stability, stabilization, and Lyapunov functions. Coupled systems: Disturbance or Cooperation? Networks of systems. Consensus. Synchronization.

The topics will be presented in a lecture, deepened by exercises. Some of the exercise include computer programming and simulation.

Voraussetzungen

B.Sc., knowledge in Matlab or Python

Leistungsnachweis

1 written exam

”Complex dynamics”

120 min (100%) / **SuSe** + WiSe

301017 Mathematics for data science

B. Rüffer, M. Schönlein Veranst. SWS: 4

Vorlesung

Mi, Einzel, 13:30 - 16:45, Coudraystraße 13 B - Hörsaal 3, 05.04.2023 - 05.04.2023
Mo, wöch., 09:15 - 12:30, Coudraystraße 13 A - Hörsaal 2

Beschreibung

After the course the students will be familiar with the fundamental concepts of data science. The participants can analyse given data sets with respect to dimensionality reduction and clustering. They also know the basic structure of neural networks and support vector machines to solve classification tasks. The participants know relevant methods from linear algebra and optimization and can apply these techniques. This embraces the design of appropriate algorithms and the implementation of different numerical methods to solve the corresponding problems.

Bemerkung

Examples of complex dynamics. Models for dynamical systems in continuous and discrete time. Computer simulation. Control and Feedback. Stability, stabilization, and Lyapunov functions. Coupled systems: Disturbance or Cooperation? Networks of systems. Consensus. Synchronization.

The topics will be presented in a lecture, deepened by exercises. Some of the exercise include computer programming and simulation.

Voraussetzungen

B. Sc.; Analysis and Linear Algebra at Bachelor level, knowledge of Matlab or Python

Leistungsnachweis

1 written exam

”Complex dynamics”

120 min (100%) / **SuSe** + WiSe

303001 Advanced Building Information Modelling

C. Koch, M. Alabassy, J. Krischler Veranst. SWS: 4

Vorlesung

Mi, wöch., 11:00 - 12:30, Marienstraße 7 B - Student Design Studio – SDS 303, Exercise
Mi, wöch., 11:00 - 12:30, Coudraystraße 13 B - Pool Fak. B 007, Exercise
Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A, Lecture

engl. Beschreibung/ Kurzkommentar

Advanced Building Information Modelling

Content: Advanced geometric and parametric modelling, Interoperability and collaboration concepts (IFC, IDM, BEP), Advanced use cases (e.g. clash detection, as-built model-ing), BIM programming (incl. visual programming)

Target qualifications: This module introduces advanced concepts of Building Information Modelling (BIM) to provide students with advanced knowledge in order to understand, analyze and discuss scientific research approaches related to BIM. Within the frame of the mod-ule project (coursework) the students will choose a topic from a pre-defined list or come up with their own topic. Based on that they will do detailed research, imple-ment a representative concept in a software prototype and discuss findings and limi-tations. Also the students acquire skills of scientific working and presentation.

Bemerkung

NHRE: Possible as Elective Compulsory as from Intake 2022

Voraussetzungen

Recommended require-ments for participation: Basic knowledge of Computer-Aided Design, BIM concepts, and object-oriented programming

Leistungsnachweis

written report, presentation

303002 Simulation Methods in Engineering

C. Koch, M. Artus Veranst. SWS: 4

Vorlesung

Fr, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A
Fr, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 301, Exercise
Fr, wöch., 13:30 - 15:00, Marienstraße 7 B - Projektraum 302

engl. Beschreibung/ Kurzkommentar

Simulation Methods in Engineering

Content:

- System analysis and modelling
- System dynamics
- Discrete event simulation
- Multi-agent simulation
- Input data and stochastic simulation
- Simulation based optimization
- Introduction to the software AnyLogic

Target qualifications:

This module provides students with comprehensive knowledge about computer based simulation concepts to address practical challenges in engineering. Modern simulation and optimization software is introduced within tutorials. The module project (coursework) offers an opportunity to students to work in groups on current problems in the context of civil and environmental engineering (e.g. production logistics, pedestrian simulation, pollutant dispersion). Using object-oriented simula-tion software the students will analyze, model and simulate different engineering systems. The programming is carried out using Java. Also the students acquire team working and presentation skills.

Voraussetzungen

Recommended require-ments for participation: Basic knowledge of programming

Leistungsnachweis

Short group report, group presentation, written exam

420160000 Introduction to Natural Language Processing

B. Stein, M. Wolska, N. Kolyada, N. Mirzakhmedova, M. Wiegmann Veranst. SWS: 4

Vorlesung

Mo, wöch., 15:15 - 16:45, Schwanseestraße 143 - Seminarraum 2.16, Lab class, ab 24.04.2023
Do, wöch., 15:15 - 16:45, Lecture

Beschreibung

This course gives an overview of basic techniques of working with language data. We will introduce basic linguistic notions, issues involved in building and working with language corpora, current standard techniques for preparing text for analysis, and methods of computational processing of a subset of language phenomena. By the end of the course students will

(1) have an understanding of key word-level, syntactic, semantic, and discourse phenomena,

(2) be aware of issues involved in building text corpora,

(3) be familiar with typical language processing tasks addressed in the NLP community and methods of addressing them, and

(4) will be able to perform tasks that are part of a standard NLP pipeline.

Leistungsnachweis

Klausur

422150031 Generative Software Engineering

J. Ringert Veranst. SWS: 4

Vorlesung

Mi, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A, Lecture
Fr, wöch., 13:30 - 15:00, Coudraystraße 9 A - Hörsaal 6, Lab class

Beschreibung

We introduce main approaches and techniques to generative software development.

- Model Driven Engineering
- Software Modeling languages for structure and behavior
  - Class Diagrams, Object Diagrams, OCL
  - Sequence Diagrams and State Machines
- Software model consistency and semantics
- Code Generation from class diagrams
- Code generation from State Machines
- Reactive Synthesis from temporal specifications
- Software Product Lines
- Domain Specific Languages
- Model Transformations

After completion students will be able to

- Contrast different modelling languages and chose based on purpose

- Analyze model consistency
- Evaluate and apply code generators
- integrate generated code in software projects
- create and analyze temporal specifications
- synthesize software from temporal specifications
- understand domain specific languages and model transformations

Bemerkung

Lecturer: Prof. Ringert

422150032 Complexity Theory

A. Jakoby Veranst. SWS: 4
Vorlesung
Di, wöch., 11:00 - 12:30, Lecture SR 3.31, Schwanseestraße 143, ab 04.04.2023
Do, wöch., 09:15 - 10:45, Lab class Lecture Hall 2 , Coudraystr. 13A, ab 06.04.2023

Beschreibung

The aim this course is to impart basic knowledge on concepts of complexity theory. The course present knowledge on the limits of information processing.

Key topics include

- Complexity Classes
- Reductions
- Efficiency versus Intractability
- NP complete problems
- Approximability

engl. Beschreibung/ Kurzkommentar

Complexity Theory

The aim this course is to impart basic knowledge on concepts of complexity theory. The course present knowledge on the limits of information processing.

Key topics include

- Complexity Classes
- Reductions
- Efficiency versus Intractability
- NP complete problems

Voraussetzungen

Diskrete Mathematik

Leistungsnachweis

Klausur

423150020 Advanced Topics in Software Engineering

J. Ringert
Seminar

Fr, wöch., 15:15 - 16:45, Coudraystraße 13 B - Hörsaal 3

423150021 Deep Learning for Computer Vision

V. Rodehorst, J. Eick, D. Tschirschwitz Veranst. SWS: 4
Integrierte Vorlesung
Di, wöch., 09:15 - 10:45, ab 04.04.2023
Fr, wöch., 11:00 - 12:30, ab 14.04.2023

Beschreibung

In diesem Kurs für Fortgeschrittene werden die Prinzipien, Techniken und Anwendungen des tiefgehenden Lernens in Computer Vision behandelt. Die Teilnehmer lernen, wie man neuronale Netze für die Bildklassifizierung, Objekterkennung, semantische Segmentierung und andere Computer-Vision-Aufgaben entwickelt, trainiert und validiert. Es werden auch Techniken zur Verbesserung der Leistung von Deep-Learning-Modellen und Veranschaulichungen behandelt, um Anhaltspunkte für die weitere Modellentwicklung zu erhalten. Am Ende des Kurses werden die Studierenden in der Lage sein, Deep-Learning-Techniken anzuwenden, um reale Probleme in verschiedenen Bereichen zu lösen.

Bemerkung

Bitte melden Sie sich bis zum 11.04.2023 mit Ihrer Univeritäts-E-Mail über die Moodle-Plattform (https://moodle.uni-weimar.de/course/view.php?id=43615) an und füllen Sie den bereitgestellten Fragebogen aus. Bei Überschreitung der Teilnehmerzahl wird die Teilnahme an der Lehrveranstaltung "Introduction to Machine Learning and Data Mining" als Auswahlkriterium herangezogen.

Voraussetzungen

Bachelor: Software Engineering II (B.Sc.), Analysis (B.Sc.) and Linear Algebra (B.sc.) oder gleichwertig.

Master: Object Oriented Modeling and Programming (M.Sc.) and Software Engineering (M.Sc.) oder gleichwertig.

Leistungsnachweis

Erfolgreiche Teilnahme an den Laborübungen und dem Projekt mit abschließender Klausur.

Gewichtung: 50% Projekt und 50% Klausur

4336010 Image Analysis and Object Recognition

V. Rodehorst, C. Benz Veranst. SWS: 3
Vorlesung
Di, wöch., 15:15 - 16:45, Coudraystraße 9 A - Hörsaal 6, Lecture, ab 04.04.2023
Do, wöch., 11:00 - 12:30, Coudraystraße 9 A - Hörsaal 6, Lab class, ab 13.04.2023

Beschreibung

Bildanalyse und Objekterkennung

Die Vorlesung gibt eine Einführung in die Grundlagen der Mustererkennung und Bildanalyse. Behandelt werden unter anderem die Bildverbesserung, lokale und morphologische Operatoren, Kantenerkennung, Bilddarstellung im Frequenzraum, Fourier-Transformation, Hough-Transformation, Segmentierung, Skelettierung, Objektklassifizierung und maschinelles Lernen zur visuellen Objekterkennung.

engl. Beschreibung/ Kurzkommentar

Image analysis and object recognition

The lecture gives an introduction to the basic concepts of pattern recognition and image analysis. It covers topics as image enhancement, local and morphological operators, edge detection, image representation in frequency domain, Fourier transform, Hough transform, segmentation, thinning, object categorization and machine learning for visual object recognition.

Leistungsnachweis

Erfolgreiche Bearbeitung der Übungen und Klausur (sowie des Final Projects für das Erreichen der 6 ECTS)

451002 Introduction to Optimization (L+E)

T. Lahmer Veranst. SWS: 3
Integrierte Vorlesung
Mo, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal D, Lecture
Do, wöch., 07:30 - 09:00, Marienstraße 7 B - Projektraum 301, Exercise Dates by arrangement

Beschreibung

In engineering science, we are often faced with problems having potential for optimization. We learn how to formulate this in mathematical terms, and we will study techniques how to improve the situations, generally by involving numerical models. We will discuss classical optimization problems in the field of linear and nonlinear optimization, e.g. optimization of the use of resources, routing problems, calibration problems and structural optimization. In particular in structural optimization we learn techniques like dimensioning, shape and topology optimization. Optimized structures are discussed also in the context of additive manufacturing techniques.

Bemerkung

Introduction to Optimization (summer semester):

Definitions, Classification of Optimization Problems,

Linear Problems, Simplex Method, Nonlinear Problems: Constrained and unconstrained continuous problems, descent methods and variants. (Robust) Structural Optimization (including Shape and Topology Optimization)

Voraussetzungen

B.Sc.

Leistungsnachweis

1 written or oral exam (depending on the number of participants)

”Introduction to Optimization” (3 credits) / **SuSe** + WiSe

451006 Optimization in Applications (P)

T. Lahmer Veranst. SWS: 3
Projektmodul/Projekt

Beschreibung

In engineering science, we are often faced with problems having potential for optimization. We learn how to formulate this in mathematical terms, and we will study techniques how to improve the situations, generally by involving numerical models. We will discuss classical optimization problems in the field of linear and nonlinear

optimization, e.g. optimization of the use of resources, routing problems, calibration problems and structural optimization. In particular in structural optimization we learn techniques like dimensioning, shape and topology optimization. Optimized structures are discussed also in the context of additive manufacturing techniques.

Bemerkung

Optimization in Applications (summer semester):

Optimization in Applications is generally a project assigned to the students including own programming and modelling. E.g. innovative optimization strategies are to be implemented in Matlab, Python or similar. Alternatively, engineering models could be subjected to optimization software.

Leistungsnachweis

1 project ”Optimization in Applications” (3 credits) / **SuSe** + WiSe

4526501 Academic English Part One

G. Atkinson Veranst. SWS: 2

Kurs

Mi, wöch., 15:30 - 16:45, Consultations, R.218, S143 (indiv.appointments), ab 26.04.2023
Mi, wöch., 17:00 - 18:30, Schwanseestraße 143 - Seminarraum 3.09, Academic English Part I+II (alternating), ab 26.04.2023

Beschreibung

This is the first part of a two-part course which aims to improve your ability to express yourself clearly in written English and to develop a suitably coherent academic writing style. Part One concentrates mainly on structure in writing academic articles, essays and reports. We begin by examining the structure of individual paragraphs and move on to extended texts of various types (e.g. process essays, cause/effect, comparison/contrast, etc.). Particular attention is paid to connectives, i.e. transitional phrases and constructions which help you link ideas and paragraphs in a logical, systematic way.

Bemerkung

You are advised to take Part One first, although it is possible to take both parts in reverse order or concurrently (i.e. in the same semester). You may only do the latter on the authority of the course leader (Atkinson).

Voraussetzungen

Registration (compulsory)

All students must register. First time particpants are required to present a B2 English Level certificate along with their email registration. All students, **including those who have already taken Academic English Part Two and those who need to repeat Academic English Part One,** must register by contacting Howard Atkinson at: howard.atkinson@uni-weimar.de**.**

You will be informed by email when registration opens and when the deadline is. Please do not attempt to register until you have received this Email. Registration Emails should be given the subject heading: AE I Registration.

Leistungsnachweis

continuous assessment

4526502 Academic English Part Two

G. Atkinson Veranst. SWS: 2

Kurs

Mi, wöch., 15:30 - 16:45, Consultations, R.2.18, S143 (indiv.appointments), ab 26.04.2023
Mi, wöch., 17:00 - 18:30, Schwanseestraße 143 - Seminarraum 3.09, Academic English Part I+II alternating, ab 26.04.2023

Beschreibung

Part Two of the Academic English course concentrates on improving and refining aspects of academic writing style. It includes sections on clause and sentence structure, punctuation rules and how to incorporate quotations, statistics and footnotes into academic texts.

Bemerkung

You are advised to take Part One first, although it is possible to take both parts in reverse order or concurrently (i.e. in the same semester). You may only do the latter on the authority of the course leader (Atkinson).

Voraussetzungen

Registration (compulsory)

All students must register. First time particpants are required to present a B2 English Level certificate along with their email registration. All students, **including those who have already taken Academic English Part One and those who need to repeat Academic English Part Two,** must register by contacting Howard Atkinson at: howard.atkinson@uni-weimar.de**.**

You will be informed by email when registration opens and when the deadline is. Please do not attempt to register until you have received this Email. Registration Emails should be given the subject heading: AE II Registration.

Leistungsnachweis

continuous assessment

4555211 Algorithmen und Datenstrukturen

C. Wüthrich, F. Andreussi, Projektbörse Fak. KuG Veranst. SWS: 4
Vorlesung
Di, wöch., 13:30 - 15:00, Coudraystraße 9 A - Hörsaal 6, Vorlesung, ab 11.04.2023
Mi, wöch., 09:15 - 10:45, Coudraystraße 9 A - Hörsaal 6, Übung, ab 12.04.2023

Beschreibung

Das Lernziel dieser Veranstaltung soll zum einen der generelle Umgang und die selbstständige Entwicklung, Analyse, und Optimierung von Algorithmen und Datenstrukturen sein. Zum anderen soll ein Überblick über gängige problemspezifische Verfahren und deren Anwendung in der Praxis vermittelt werden.

engl. Beschreibung/ Kurzkommentar

Algorithms and Data Structures

The lecture deals with the principle and the implementation of basic algorithms and data structures. The course teaches among all, the Strings, geometric problems, graphs, mathematical algorithms and NP-complete problems.

Leistungsnachweis

Beleg, Klausur

Project

423110006 Content Warning Detection

B. Stein, M. Wolska, M. Wiegmann Veranst. SWS: 10
Projekt

Beschreibung

Content warnings are often assigned to online content to give vulnerable groups an opportunity to avoid potentially discomforting or distressing content. However, most online content requires the creator to add warning labels, which is often not done. We have previously created a large datasets (300k+) fanfiction stories with warning labels. In this project, we want to develop (one or more) machine learning models that add content warnings automatically. Depending on our success, we might submit the best model to a scientific competition on this dataset.

Bemerkung

Time and place will be announced at the project fair.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

423110007 Fifty shades of ChatGPT

B. Stein, M. Gohsen, K. Heinrich, J. Bevendorff Veranst. SWS: 10
Projekt

Beschreibung

Large language models such as ChatGPT or GPT-3 represent a significant advance in the field of artificial intelligence. These models are trained on massive amounts of text data, which enables them to understand and generate human-like text. This project aims to investigate large language models for their capabilities to solve the following problems: (1) generating conversational responses and matching the generated information with knowledge from a knowledge base, and (2) generating coherent and engaging stories. A common requirement for these tasks is a low-latency infrastructure for our own language model, which we will try to develop in this project.

Bemerkung

Time and place will be announced at the project fair.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

423110010 Kryptographie im Kopf -- Single-Page Crypto Challenge

S. Lucks, J. Leuther, N. Lang Veranst. SWS: 10
Projekt

Beschreibung

Does a cryptosystem need to be complex in order to be secure? No! We want to create a simple state-of-the-art cryptosystem whose source code can fit easily onto one single page in print, or even on two slides for a presentation -- without refering to a crypto library.

Simplicity does not mean that the computations will be trivial or that users have to make compromises about the security. Simplicity means that independent implementations ``from memory'' will be compatible with each other: when

a ``sender'' encrypts a message M under a key K and a ``receiver'' decrypts the ciphertext under the same key K, then the receiver will get M again, even when both sender and receiver are using their own implementation of the scheme they both memoized.

Bemerkung

time and place to be announced at the project fair.

room:S143 Medsec/Webis-Lab

Leistungsnachweis

Abschlusspräsentation, Abschlussbericht

423110012 Mining Arguments from Podcasts

B. Stein, N. Mirzakhmedova, M. Wiegmann, J. Kiesel Veranst. SWS: 10
Projekt

Beschreibung

Computational argumentation tries to present a user with pro and/or contra arguments on a controversial topic. These arguments are usually mined (extracted) from long and well-structured debates from websites like debate.org. However, the debates on these websites often cover few and outdated topics. An alternative source for a broad variety of up-to-date topics are transcribed podcasts. This project will leverage cutting-edge argument mining technologies and apply them to podcast data, providing insights into the nature of arguments in this context and how they differ from traditional debates.

Bemerkung

Time and place will be announced at the project fair.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

423110013 Projekt MLOM II: Machine learning models on Arduino (Part II)

J. Ringert, B. Burse Veranst. SWS: 10
Projekt

Beschreibung

As part of the Software Engineering for Trusted Autonomous Systems we will develop a platform for an autonomous vehicle based on the Robot Operation System (ROS).

Bemerkung

Time and place will be announced at the project fair.

423110014 Projekt SETAV III-Software Engineering for Trusted Autonomous Systems (PartIII)

J. Ringert, .. Soaibuzzaman Veranst. SWS: 10
Projekt

Beschreibung

As part of the Software Engineering for Trusted Autonomous Systems we will develop a platform for an autonomous vehicle based on the Robot Operation System (ROS).

Bemerkung

Time and place will be announced at the project fair.

423110015 Quantum Crypto Rescue

S. Lucks, J. Leuther, N. Lang Veranst. SWS: 10
Projekt

Beschreibung

The future advent of quantum computers leads to a new analysis of current cryptographic schemes toward their post-quantum security. This does not only include asymmetric crypto schemes but also symmetric ones.
The goal of this project is to discuss and elaborate strategies of salvaging currently used schemes such that we will still be able to use them securely despite having quantum computers.

Bemerkung

time and place to be announced at the project fair.

Room: S143 Medsec/Webis-Lab

Voraussetzungen

At least one lecture passed in Cryptography (e.g. Introduction to Modern Cryptography) and one in the field of theoretical computer science

Leistungsnachweis

Abschlusspräsentation, Abschlussbericht

Hot Topics in Computer Vision: Cloudy with a chance of scene understanding

V. Rodehorst, C. Benz, P. Debus, J. Eick
Projekt

Beschreibung

Die Teilnehmer werden an ein aktuelles forschungs- oder industrierelevantes Thema herangeführt. Es ist nicht beabsichtigt einen festgelegten Bereich in voller Breite zu explorieren. Stattdessen werden die Teilnehmer mit der vollen Komplexität eines begrenzten Themas konfrontiert und die Eigeninitiative gefördert. Es ermöglicht einen Einblick in die Forschungs- und Entwicklungsprojekte des Fachgebiets.

Bemerkung

Ort und Zeit werden zur Projektbörse bekanntgegeben.

Voraussetzungen

Gute Programmierkenntnisse (z.B. C/C++, MATLAB, OpenCL/CUDA)

Leistungsnachweis

Aktive Mitarbeit, Einführungsvortrag, Abschlusspräsentation, Dokumentation

Multimodal Sequence Representations for Feed Data

B. Stein, T. Gollub, J. Kiesel Veranst. SWS: 10
Projekt

Beschreibung

Social media has become a significant part of our every day life, and continues to change the way we interact with each other on a global scale. In this project, we work on the development of computational tools and methods for the analysis of social media at large scale. A core task will be the development of a neural representation for social media feeds (i.e., sequences of posts that may be commented and liked) using pre-trained multimodal neural networks from Hugging Face (https://huggingface.co/). The envisioned representation is supposed to capture the topical preferences of a feed, including topic-specific stances. Along the work on representations, we will work on an analysis toolbox facilitating among others the clustering of feeds into user groups, the classification of feeds, e.g. with respect to specific stances, and even the generation of feed-related posts.

Bemerkung

Time and place will be announced at the project fair.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung