Vorlesungsverzeichnis

M.Sc. Human-Computer Interaction

Sommer 2022

Stand 30.11.2022

M.Sc. Human-Computer Interaction

Faculty Welcome for Master's Students Human-Computer Interaction

Monday, 4th April 2022, 9.30 a.m., room 2.16, Schwanseestraße 143

Project fair

Monday, 4th April 2022, 5 p.m. via Moodle.

Theses-Seminar HCI

E. Hornecker
Seminar
Mo, Einzel, 09:00 - 18:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), 18.07.2022 - 18.07.2022

Beschreibung

Vorträge zu aktuellen Dissertationen und Veröffentlichungen sowie laufenden Master- und Bachelorarbeiten werden im Rahmen des Seminars präsentiert und diskutiert.

Bemerkung

Für diese Veranstaltung werden keine ECTS-Punkte vergeben.

Advanced HCI

Electives

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 05.04.2022
Do, wöch., 11:00 - 12:30, Coudraystraße 9 A - Hörsaal 6, Lab class, ab 14.04.2022
Di, Einzel, 10:00 - 12:00, Marienstraße 13 C - Hörsaal A, Klausur / written exam, 02.08.2022 - 02.08.2022
Di, Einzel, 10:00 - 12:00, Marienstraße 13 C - Hörsaal B, Klausur / written exam, 02.08.2022 - 02.08.2022

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)

420160004 Image Analysis and Object Recognition – Final Project

V. Rodehorst, C. Benz
Independent Study

Veranst. SWS: 1

Beschreibung

Im Abschlussprojekt der Vorlesung „Image Analysis and Object Recognition" sollen die Kenntnisse der Vorlesung an einer größeren praktischen Aufgabe vertieft werden.

Voraussetzungen

Erfolgreiche Teilnahme an der Vorlesung „Image Analysis and Object Recognition"

Leistungsnachweis

Dokumentation, Abschlusspräsentation

4555262   Visualisierung

B. Fröhlich, N.N., G. Rendle, P. Riehmann
Vorlesung

Veranst. SWS: 3

Do, wöch., 09:15 - 10:45, Lecture / Lab class - taught online (live&recorded)- Moodle: https://moodle.uni-weimar.de/course/view.php?id=38582   , ab 07.04.2022
Fr, Einzel, 09:15 - 11:15, Marienstraße 13 C - Hörsaal A, Klausur / written exam, 30.09.2022 - 30.09.2022

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 Sie:
um 6ECTS Punkte zu erhalten, ist zusätzlich der Kurs "Visualization - Final Project" verpflichtend zu belegen.

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

301013   Advanced modelling - calculation/CAE (L + E)

B. Rüffer, A. Legatiuk   Veranst. SWS: 4
Vorlesung
Di, wöch., 09:15 - 12:30, Coudraystraße 13 A - Hörsaal 2

Beschreibung

Scientifically orientated education in mathematical modelling and computer science in view of a complex interdisciplinary and networked field of work and research, modelling and simulation.

Students will have experience in Computer Aided Engineering (CAE) by establishing a problem specific model on the basis of a mathematical formulation, an applicable solution technique, design of efficient data structures and software implementation.

Numerical and analytical solution of partial differential equations, series expansions, integral representations, finite difference methods, description of heat flow, diffusion, wave propagation and elastostatic problems.

The topics are discussed theoretically and then implemented.

Convergence, stability and error analysis of finite difference methods (FDM). Modelling of steady and unsteady heat conduction problems, wave propagation and vibrations and problems from linear thermo-elasticity in 2D and 3D.

After considering the mathematical basis, the students will work on individual projects passing all levels of work (engineering model, mathematical model, numerical model, computer model, simulation, evaluation).

The solution methods will be implemented by help of MAPLE or MATLAB.

Bemerkung

This lecture replaces "Advanced Analysis". It is therefore not possible to receive credits for both courses.

Die Veranstaltung ersetzt "Advanced Analysis" und kann daher nicht gemeinsam mit dieser Veranstaltung angerechnet werden.

Leistungsnachweis

1 Project report + Presentation

"Advanced Modelling – Calculation/CAE" (100%) / **SuSe**

418260001 Physiological Computing

J. Ehlers   Veranst. SWS: 4
Vorlesung
Do, wöch., 13:30 - 15:00, Schwanseestraße 143 - Seminarraum 2.16, Lecture (in person), ab 14.04.2022
Di, wöch., 11:00 - 12:30, Schwanseestraße 143 - Seminarraum 2.16, Excercise (online until further notice), ab 26.04.2022
Do, Einzel, 11:00 - 13:00, Marienstraße 13 C - Hörsaal B, written exam, 21.07.2022 - 21.07.2022

Beschreibung

Physiological computing applies physiological data (like brain waves, skin conductance changes, pupil dynamics or heart rate variability) to generate user-state representations and enable computer systems to dynamically adapt to changes in cognitive and/or affective processing. By connecting the brain/body to a machine, the boundaries of the nervous system are extended which enables us to communicate with machines directly via processes that underlie our thoughts and emotions.

The course will provide basic knowledge on the human nervous system and introduce to the concepts, theories and methods of physiological computing. We will discuss selected examples from the current research by putting special emphasis on eye-tracking and pupillometry but also on recent developments in the field of brain-computer interfaces. Given the opportunity to work in the lab, students will form small groups and learn how to collect and analyse data on gaze behaviour, pupil size changes and skin conductance.

Leistungsnachweis

Empirische Übungen und schriftliche Prüfung

422150030 Big Data and Language Technologies

B. Stein, J. Bevendorff, M. Völske   Veranst. SWS: 4
Seminar
Mo, wöch., 13:30 - 15:00, Schwanseestraße 143 - Seminarraum 3.09, Seminar, ab 11.04.2022
Mo, wöch., 15:15 - 16:45, Schwanseestraße 143 - Seminarraum 3.09, Übung, ab 11.04.2022

Beschreibung

Information on the web is growing at an exponential pace, courtesy of social media platforms, blogs, and news.

Such large scale data sources call for high-end, scalable, distributed architectures for cognitive analysis, which shape the business decisions of many industries. In addition, deep learning has been propelled into mainstream and is now accessible to researchers and companies alike, thanks to tools such as TensorFlow, PyTorch. The

Webis research group operates large-scale high-performance compute infrastructure (totaling more than 3000 CPU cores, 10+ Petabytes of storage, and 24 high-end GPUs), which will be put to use in the course of this seminar. Students will receive application-oriented training in Big data and deep learning frameworks, solve tasks, and explore interesting research questions.

Voraussetzungen

This seminar requires good skills in both programming and algorithms.

Leistungsnachweis

geforderte Prüfungsleistung: Präsentation, Ausarbeitung mit Bericht

422150031 Generative Software Engineering

J. Ringert   Veranst. SWS: 4
Vorlesung
Di, wöch., 13:30 - 15:00, Marienstraße 13 C - Hörsaal A, Lecture, ab 05.04.2022
Fr, wöch., 13:30 - 15:00, Coudraystraße 9 A - Hörsaal 6, Lab class, ab 08.04.2022
Mo, Einzel, 09:00 - 11:00, Coudraystraße 13 B - Hörsaal 3, written exam, 08.08.2022 - 08.08.2022

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

422160000 Applied Cryptography

S. Lucks   Veranst. SWS: 2
Seminar

Bemerkung

Block seminiar during the lecture-free period

Voraussetzungen

Introduction to Modern Cryptography, or equivalent

Leistungsnachweis

Mündliche Präsentation zu einem Thema, Teilnahme an Diskussion zu den präsentierten Themen, schriftliche Zusammenfassung der Kernaussagen aus der eigenen mündlichen Präsentation

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422160001 Aspekte der Netzwerksicherheit

A. Jakoby, R. Adejoh   Veranst. SWS: 2
Seminar
Di, wöch., 17:00 - 18:30, Coudraystraße 13 B - Seminarraum 208, ab 05.04.2022

Bemerkung

First session: Tuesday . April 5th, 2022, SR 208, C 13 B.

4345600   Computer Graphics II: Computer Animation

C. Wüthrich, G. Pandolfo   Veranst. SWS: 3
Vorlesung
Fr, wöch., 15:15 - 16:45, Coudraystraße 9 A - Hörsaal 6, Lab class, ab 08.04.2022
Mo, wöch., 17:00 - 18:30, Lecture, ab 11.04.2022
Do, Einzel, 09:00 - 11:00, Marienstraße 13 C - Hörsaal B, written exam, 28.07.2022 - 28.07.2022

Beschreibung

Das Ziel der Veranstaltungen ist die interdisziplinäre Vermittlung ästhetischer und technischer Aspekte der Computergrafik und -Animation von der Theorie bis in die Praxis.

Die Veranstaltung besteht aus einer eigens für Medienkünstler / Gestalter entwickelten Vorlesung und einer Übung, in der Künstler und Informatiker interdisziplinär zusammen arbeiten können.
In der Vorlesung werden die Studenten mit den nötigen technischen Details versorgt.
Die Übung wird von M.F.A Gianluca Pandolfo geleitet und deckt sowohl technische als auch ästhetische Grundlagen ab (Modellieren, Rendern, Animieren). Gearbeitet wird mit Blender 3D. Ziel der Übung ist die Fertigstellung eines einminütigen 3D-Animationsfilms als finale Abgabe.

engl. Beschreibung/ Kurzkommentar

Computer Animation

Three-dimensional Computer Graphics and Computer Animation are now widespreadly used in the Arts and in Design. Aim of this is to allow students to understand the modelling and rendering techniques used in common high level animation programs.
Successful students in this course should be able to conceive and produce a 3D animation and should be able to cooperate with Computer Scientists on a common 3D animation project, which might at times involve the specification of requirements for programming plugins for the animation system. At the end of the course they should master the steps required for the conception, design and rendering of a 3D animation software.

Leistungsnachweis

Beleg, Klausur

4445203   Randomized Algorithms

A. Jakoby   Veranst. SWS: 4
Vorlesung
Do, wöch., 15:15 - 16:45, Schwanseestraße 143 - Seminarraum 2.16, Lecture, ab 07.04.2022
Do, wöch., 17:00 - 18:30, Schwanseestraße 143 - Seminarraum 2.16, lab class, ab 07.04.2022

Beschreibung

Randomisierte Algorithmen

Für viele Probleme stellen randomisierte Algorithmen die einzigen bekannten effizienten Lösungsverfahren dar. Für manches andere Problem erhalten wir mit einem solchen Verfahren Algorithmen, die um vieles einfacher und verständlicher sind als alle bekannten deterministischen Verfahren. Es ist daher nicht verwunderlich, dass wir randomisierte Algorithmen in viele Anwendungsgebieten finden, wie z.B. in

-     Datenstrukturen,

-     Graphenalgorithmen,

-     parallelen und verteilen Systemen,

-     Online-Algorithmen,

-     Zahlentheorie und

-     geometrische Algorithmen.

In der Vorlesung *Randomisierte Algorithmen* werden wir Verfahren aus einigen dieser Gebiete und grundlegende Techniken für randomisierte Algorithmen vorstellen und analysieren.

Darüber hinaus werden grundlegende probabilistische Methoden zur Analyse von Algorithmen vorgestellt.

engl. Beschreibung/ Kurzkommentar

Randomized Algorithms

For many problems randomized algorithms are the only known efficient solution method. For some other problem we can find randomized algorithms that are much simpler and more understandable than any known deterministic method. It is therefore not surprising that we find randomized algorithms in many areas, such as in

-     data structures,

-     graph algorithms,

-     parallel and distributed systems,

-     on-line algorithms,

-     number theory, and

-     geometric algorithms.

In the lecture Randomized Algorithms, we will present and analyze randomized algorithms and basic methods from some of these areas. Furthermore, basic probabilistic methods for the analysis of algorithms are presented.

Voraussetzungen

Bsc in a relevant study field

Leistungsnachweis

oral examination

4526501   Academic English Part One

G. Atkinson   Veranst. SWS: 2
Kurs
Di, wöch., 17:00 - 18:30, Online (Moodle) , ab 26.04.2022

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.

This writing course will basically run as an online correspondence course using the university's Moodle platform. In addition, occasional consultations for groups of up to 10 students are offered in order to discuss written work. These will take place on pre-arranged Tuesdays at 17.00 and may take place either face-to-face
or using Big Blue Button.

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., 17:00 - 18:30, Online (Moodle) , ab 27.04.2022

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.

This writing course will basically run as an online correspondence course using the university's Moodle platform. In addition, occasional consultations for groups of up to 10 students are offered in order to discuss written work. These will take place on pre-arranged Wednesdays at 17.00 and may take place either face-toface or using Big Blue Button.

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

4556105	Advanced Numerical Mathematics

B. Rüffer   Veranst. SWS: 4
Vorlesung
Mo, wöch., 09:15 - 10:45, Coudraystraße 13 A - Hörsaal 2, Lecture , ab 11.04.2022
Mo, wöch., 11:00 - 12:30, Coudraystraße 13 A - Hörsaal 2, Exercise, ab 11.04.2022
Mi, Einzel, 09:00 - 11:00, Coudraystraße 13 B - Seminarraum 210, Klausur / written exam, 03.08.2022 - 03.08.2022

Beschreibung

Höhere Numerik

Effiziente Lösung linearer und nichtlinearer Gleichungssysteme;
• Diskretisierungsmethoden für verschiedene Typen partieller Differentialgleichungen
• Projektionsverfahren, Stabilität, Konvergenz und Konditionszahl
• Direkte Löser für schwach besetzte Systemmatrizen
• Fixpunktsatz, iterative Löser, Gesamtschrittverfahren, Einzelschrittverfahren, Gradientenverfahren, Relaxationsverfahren, Multiskalenmethoden und Überblick über andere Zugänge
• Eigenwertprobleme, iterative Löser
• Gebietszerlegungsverfahren

engl. Beschreibung/ Kurzkommentar

Advanced Numerical Mathematics

Efficient solution of linear and non-linear systems of algebraic equations;
• Discretization methods for different types of partial differential equations
• Projection methods, stability and convergence, condition number

• Direct solvers for sparse systems
• Fixed-point theorem, iterative solvers: Total step method, single step method, gradient methods, relaxation methods, multiscale methods and a survey on other approaches
• Eigenvalue problems, iterative solvers
• Domain decomposition methods

Voraussetzungen

Courses in Linear Algebra, Analysis

Leistungsnachweis

Project

Information Proc. & Pres.

418260001 Physiological Computing

J. Ehlers   Veranst. SWS: 4
Vorlesung
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Di, wöch., 11:00 - 12:30, Schwanseestraße 143 - Seminarraum 2.16, Excercise (online until further notice), ab 26.04.2022
Do, Einzel, 11:00 - 13:00, Marienstraße 13 C - Hörsaal B, written exam, 21.07.2022 - 21.07.2022

Beschreibung

Physiological computing applies physiological data (like brain waves, skin conductance changes, pupil dynamics or heart rate variability) to generate user-state representations and enable computer systems to dynamically adapt to changes in cognitive and/or affective processing. By connecting the brain/body to a machine, the boundaries of the nervous system are extended which enables us to communicate with machines directly via processes that underlie our thoughts and emotions.

The course will provide basic knowledge on the human nervous system and introduce to the concepts, theories and methods of physiological computing. We will discuss selected examples from the current research by putting special emphasis on eye-tracking and pupillometry but also on recent developments in the field of brain-computer interfaces. Given the opportunity to work in the lab, students will form small groups and learn how to collect and analyse data on gaze behaviour, pupil size changes and skin conductance.

Leistungsnachweis

Empirische Übungen und schriftliche Prüfung

4555262   Visualisierung

B. Fröhlich, N.N., G. Rendle, P. Riehmann   Veranst. SWS: 3
Vorlesung
Do, wöch., 09:15 - 10:45, Lecture / Lab class - taught online (live&recorded)- Moodle: https://moodle.uni-weimar.de/course/view.php?id=38582   , ab 07.04.2022
Fr, Einzel, 09:15 - 11:15, Marienstraße 13 C - Hörsaal A, Klausur / written exam, 30.09.2022 - 30.09.2022

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 Sie:
um 6ECTS Punkte zu erhalten, ist zusätzlich der Kurs "Visualization - Final Project" verpflichtend zu belegen.

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.

Mobile HCI

Projects

421210004	Hot Topics in Computer Vision - Generated 3D Interior Design for Point Cloud 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

421210004	Hot Topics in Computer Vision SoSe22

V. Rodehorst, C. Benz, P. Debus, J. Eick, M. Kaisheva
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

422110003 Adventures into the Digital Humanities

B. Stein, T. Gollub, N. Kolyada, M. Völske Projekt	Veranst. SWS: 10

Beschreibung

The Digital Humanities strive for answering humanities research questions with the aid of technology. In the project, the goal is to develop answers by applying natural language processing technology to corpora. The project participants will work together as a development team on different research questions in two-week sprints. A special focus will be on mining arguments that support or attack a specific stance. In the course of the project, each participant will take the role of a product owner for at least one of the questions. Research questions and corpora will be provided by the supervisors, but can also be developed by the participants themselves.

Bemerkung

Time and place will be announced at the project fair.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

422110004 Affiliate Spam Detection

B. Stein, J. Bevendorff, M. Wiegmann Projekt	Veranst. SWS: 10

Beschreibung

Some websites on the Internet have just one purpose: to make you click on an affiliate link to a sales page, which, in turn, earns the affiliated partner a share of the sale. We call such websites Affiliate Spam. Since it is purely accidental if these websites fulfill any information need, they rely on SEO and abuse recommendation engines to attract visitors. We believe that affiliate spam should be put in its place, which is much lower in the ranking of a search engine.

In this project, we will start with detecting offending websites, hence Affiliate Spam Detection. Goals: Find affiliate spam in the CommonCrawl.

Find affiliate Spam on Google. Then. find features to detect them, like links to Amazon, affiliate signatures on links, SEO compliance, main content features.

Bemerkung

Time and place will be announced at the project fair.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

422110006 Identifying triggering content

B. Stein, M. Wolska
Projekt

Veranst. SWS: 10

Beschreibung

A trigger is a stimulus that elicits negative emotions or feelings of distress; these may be evoked by acts/events of whatever type, for instance, violence, trauma, death, eating disorders, or obscenity. In order to make it possible for sensitive audiences to prepare for the content, the use of so-called ``trigger warnings''---labels indicating the type of triggering content present---has become common in online communities and education. In this project we will investigate properties of (a subset of) triggering content using computational methods based on a corpus of fanfiction in which stories have been labelled with trigger warnings by the authors themselves. First, we will annotate segments of text which do contain distressing content. Annotations will be analyzed and a human judgement-based gold-standard dataset will be constructed. Then, we will build classifiers to identify the triggering segments automatically (machine learning). The specific type of triggers to address will be agreed upon with the students at the beginning of the course.

Bemerkung

Time and place will be announced at the project fair.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

422110007 In Dialog with the Virtual Museum 2

B. Stein, M. Gohsen, J. Kiesel
Projekt

Veranst. SWS: 10

Beschreibung

This project aims to create an interactive and immersive environment for learning about a specific topic. Users will be in a virtual replication of Walter Gropius' office, a historically significant room for the Bauhaus Movement, to experience its history.

Specifically, this project will continue to design and develop the voice interface that allows the users to ask their questions and inform themselves in an intuitive and natural way about the room's eventful history, pioneering design, and general significance for the Bauhaus style. With this setup, this project thus provides hands-on design and development experience for the "Metaverse" (as, for example, set as a goal by Facebook/Meta, Microsoft, or Nvidia). As per your interests, you will acquire skills in voice interaction design, conversational agents, knowledge representation, and language generation.

Bemerkung

Time and place will be announced at the project fair.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

422110008 Non-Photorealistic Rendering for Virtual Reality Applications

B. Fröhlich, A. Kreskowski, S. Mühlhaus, G. Rendle
Projekt

Veranst. SWS: 10

Beschreibung

The term Non-Photorealistic Rendering (NPR) refers to a family of rendering techniques that produce stylized, simplified or abstract images based on 3D geometry. Unlike photorealistic rendering, their purpose is not the simulation of the real world in as much detail as possible, but the abstraction of objects within a specific context. Examples of this are visual simplification of architecture and highlighting of geometric features such as edges and corners, the creation of blueprints or exploded view diagrams for models of complex mechanical parts, and the transformation of 3D worlds into distinct works of art with a visually consistent style.

One of the main challenges in creating NPR effects is to design the algorithms such that the stylizations are consistent between different viewing perspectives to allow for stereoscopic perception and temporal plausibility, for example when models are animated.

In this project, we will review the NPR literature, with a focus on whether existing algorithms are suitable in the context of a variety of virtual reality applications. In order to support a wide range of operating systems, such as Windows, Linux and Android, as well as different display devices such as head-mounted displays and projection-based systems, the techniques will be implemented entirely with Unity, using hand-crafted shader pipelines and Unity's abstract graphics API. In this way, the same code base can be used to create NPR rendering assets that work on any device without major changes. Depending on the size of the project group, the results of the initial research phase, and your individual interests, we will explore illustrative rendering techniques in different scenarios using a combination of architectural models, volumetric datasets, realistic avatar representations, procedural geometry, and skeletal animated models.

Do you want to learn about and create compelling NPR effects for virtual reality applications? Do you want to dive into illustrative rendering and graphics programming within Unity? Do you have at least a coarse understanding of a rasterization-based rendering pipeline? If you answered "yes" to the questions above, we would look forward to welcoming you in our project!

Bemerkung

time and place: t.b.a.

Voraussetzungen

Solid programming skills in C# or C++, experience in the field of real-time computer graphics and shader programming are helpful

Leistungsnachweis

Active participation in project meetings, implementation and evaluation of small software modules, intermediate & final presentation

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422110009 The Sound of Distraction

J. Ehlers, N.N.
Projekt

Veranst. SWS: 10

Beschreibung

Recent research emphasizes that environmental noise causes stress, disturbs sleep and impairs cognitive performance. Empirical evidence from epidemiologic studies even suggests that ongoing noise pollution increases the risk of cardiovascular effects. The current project aims to differentiate the influence of selected sound variables on individual levels of stress, bodily arousal and cognitive performance. Eye-tracking measures are applied to determine psychological and physiological changes during task processing in situations of environmental noises. Project students are asked to work themselves into the wearable eye-tracking technology and to carry out experiments in real-world settings. In a second part of the project, results from the field study are contrasted against findings from lab sessions to evaluate possibilities and limitations of physiological computing in the field of noise research.

The project is carried out in close cooperation with the Federal Institute for Occupational Safety and Health (BAuA).

Bemerkung

Time and place will be announced at the project fair.

responsible lecturer:

Jun.-Prof. Dr. Jan Ehlers

Dr. Jan Grenzebach

Voraussetzungen

We assume you are interested in carrying out empirical eye-tracking studies to evaluate the influence of various sounds and volume differences on cognitive performance and bodily arousal. (Basic) Programming skills, especially in Python, are a precondition; knowledge of quantitative research and the experimental method is helpful.

Leistungsnachweis

Project members are asked to create and implement experimental scenarios (both lab and field studies) on basis of wearable and stationary eye-trackers in order to investigate the influence of environmental noise on cognitive performance. Results need to be statistically tested and documented in a lab report.

422110011   Aspekte der Nachhaltigkeit in der Informatik

J. Ehlers, A. Jakoby
Projekt

Veranst. SWS: 8

422110014   Beyond Pink – Gender, Identity & Smartphones

E. Hornecker, B. Schulte
Projekt
Mi, wöch., 15:15 - 18:30, Karl-Haußknecht-Straße 7 - Seminarraum (IT-AP) 001, ab 13.04.2022

Veranst. SWS: 10

Beschreibung

Crash test dummies have for a long time been modelled after young, able-bodied, cis-male bodies, which has put others, especially women and children at risk as crashes affected them differently (find this and other examples e.g. here [1]). Biases like these can make their way into technology design, even if these technologies have for a long time been considered neutral. But if we want to overcome these biases, how can we take the needs of more

diverse groups into account, without falling back onto stereotypes? While HCI has always prided itself on taking the perspective of (potential) users into account, increasingly methods and underlying assumptions are questioned and extended.

In this project we will draw on queer, feminist and intersectional theory to explore these tensions. Over the duration of the semester, we will do this through critical reading & discussion as well as hands-on activities such as design tasks and small studies. This will include 'traditional' HCI methods, as well as more speculative and creative tasks drawing on critical design and comparable approaches.

We will center the work around the smartphone – a device well-known, well-researched and essential to most our lives. In this project, we will explore what role gender might play when designing for/interacting with the smartphone; to what extent heteronormative assumptions have shaped the smartphone and how we can potentially redesign the phone and its applications to overcome some of its current limitations.

The project content will not cover the technical basics of how smartphones work and will not engage in the basics of app design or development. Instead, through this project you will get insights into the user-centered design process, as well as a deep understanding of current debates that push the boundaries of what HCI research is.

[1]   The deadly truth about a world built for men – from stab vests to car crashes | Women | The Guardian. Retrieved January 27, 2022 from https://www.theguardian.com/lifeandstyle/2019/feb/23/truth-world-built-for-men-car-crashes

Bemerkung

time and place will be announced at the project fair.

Voraussetzungen

Participants should have basic knowledge or experience of user-centered methods (user studies, interviewing etc.) and ideally some experience in prototyping techniques. Depending on the students' interests, working with micro-controllers such as Arduino or Raspberry Pi might be an option and support will be given if needed. In addition, all participants should enjoy working in an interdisciplinary team, want to be creative and be able to converse in English.

Leistungsnachweis

Active participation and interim presentations, autonomous and self-initiated working mode, project documentation.

422110016 Indiegame Development Lab II

C. Wüthrich, W. Kissel, G. Pandolfo   Veranst. SWS: 10
Projekt
Mi, wöch., 13:30 - 16:30, ab 13.04.2022

Beschreibung

"Indiegame Development Lab" ist ein interdisziplinäres Projekt zwischen Studierende der Fakultät K&G und der Medieninformatik, das sich in diesem Jahr mit der praktischen Entwicklung von Computerspielen befasst. Studierende der Medieninformatik sollten Programmierkenntnisse mitbringen. Studierende der Fakultät K&G hingegen Erfahrungen im Bereich Sounddesign, Illustration, Animation, 3D-Modelling oder Storytelling. Bemerkung: Ort und Zeit werden zur Projektbörse bekannt gegeben.

Bemerkung

Ort und Zeit werden zur Projektbörse bekanntgegeben.

Leistungsnachweis

Abschlusspräsentation, fertiges Spiel

422150038 Projekt SETAV-Software Engineering for Trusted Autonomous Systems

J. Ringert   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.

VR/AR

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 05.04.2022
Do, wöch., 11:00 - 12:30, Coudraystraße 9 A - Hörsaal 6, Lab class, ab 14.04.2022
Di, Einzel, 10:00 - 12:00, Marienstraße 13 C - Hörsaal A, Klausur / written exam, 02.08.2022 - 02.08.2022
Di, Einzel, 10:00 - 12:00, Marienstraße 13 C - Hörsaal B, Klausur / written exam, 02.08.2022 - 02.08.2022

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)