

Vorlesungsverzeichnis

M.Sc. Human-Computer Interaction (ab PV19)

Sommer 2021

Stand 16.09.2021

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M.Sc. Human-Computer Interaction (ab PV19)

Faculty Welcome for Master's Students Human-Computer Interaction

Tuesday, 6th April 2021, 10.00 a.m., room 015, Bauhausstraße 11 and additionally via BigBlueButton:

<https://meeting.uni-weimar.de/b/chr-che-lqi-0xq>

Project fair

Tuesday, 6th April 2021, 5 p.m. via Moodle:

<https://moodle.uni-weimar.de/course/view.php?id=26486>

421150040 User Centered Design in a Nutshell

E. Hornecker, L. Guth

Veranst. SWS: 1.5

Kurs

Do, Einzel, 11:00 - 12:30, Start meeting: online (attendance mandatory), 08.04.2021 - 08.04.2021

Fr, Einzel, 15:15 - 18:00, Block 1 (attendance mandatory), 16.04.2021 - 16.04.2021

Fr, Einzel, 15:15 - 18:00, Block 2 (attendance mandatory), 30.04.2021 - 30.04.2021

Fr, Einzel, 15:15 - 18:00, Block 3 (attendance mandatory), 14.05.2021 - 14.05.2021

Fr, Einzel, 15:15 - 18:00, Bauhausstraße 11 - Seminarraum 014, Block 4 (attendance mandatory), 28.05.2021 - 28.05.2021

Beschreibung

This is a concentrated 'crash course' on User-Centered Design (UCD) for those Master students who need to do the HCI bachelor-level course (as requirement for admission) and have not had the chance to attend it yet.

User Centered Design is an iterative approach to developing useful and usable products, and a core component of HCI. In this course,

we focus on the UCD process, in particular on methods and approaches used in Requirements Analysis over Prototyping to Evaluation. We will also discuss basics of Usability and User Experience.

The course consists of video lectures on the UCD process and core concepts of HCI, several practical session meetings around shorter hands-on exercises done in pairs over the course of April + May, and an individual (graded) mini-project, which is documented in a report due several weeks after the teaching phase finishes (ca. 1 week effort).

Video lectures will be provided on Moodle. Practical sessions will run as real-time meetings (online or in-person if permitted).

Note: for everyone to participate, we might need to make use of evening slots, weekends or possibly a public holiday. (details to be announced)

Voraussetzungen

This course is only open for Master students in HCI or CS4DM who have the 'Auflage' / stipulation to do the bachelor level HCI course and have not done this course yet. It can be used to fulfill the stipulation.

Please register by sending email to lisa.guth@uni-weimar.de by Tuesday 6th 7pm. Note your name, study program, and why you need to participate.

New master students who have the HCI course as requirement have priority for this. In case there are empty places, it may be possible for students from prior semesters to also use this as replacement for the HCI bachelor course.

Leistungsnachweis

practical problem-based work in pairs and individual project-based report.

4256402 Oberseminar Rendering, Visualisierung und Virtual Reality

B. Fröhlich

Veranst. SWS: 2

Seminar

Do, wöch., 10:30 - 12:00, Online bzw. nach Vereinbarung, ab 08.04.2021

Beschreibung

Vorträge zu aktuellen Dissertationen und Veröffentlichungen sowie laufenden Master- und Bachelorarbeiten zu den Themen Rendering, Visualisierung und Interaktion werden im Rahmen des Seminars präsentiert und diskutiert.

Bemerkung

Für diese Veranstaltung werden keine ECTS-Punkte vergeben.

Introduction to Machine Learning (repeat exam)

B. Stein, M. Völske

Prüfung

Do, Einzel, 16:00 - 19:00, Bauhausstraße 11 - Seminarraum 015, written exam, 29.07.2021 - 29.07.2021

Introduction to Python Programming

A. Jakoby

Tutorium

Block, Course Instructor: Rosemary Adejoh, 13.09.2021 - 24.09.2021

HCI Fundamentals

Concepts & Methods

4556216 Ubiquitous Computing

E. Hornecker, B. Schulte

Veranst. SWS: 4

Vorlesung

Mi, wöch., 11:00 - 12:30, Lab / first lecture (April 7th, 2021) - online - , ab 07.04.2021

Mo, wöch., 13:30 - 15:00, Lecture (online) <https://moodle.uni-weimar.de/course/view.php?id=30663>, ab 12.04.2021

Beschreibung

The course explores advanced topics in HCI, presenting and reflecting on the concerns, perspectives and interdisciplinary nature of this area. We will look at new and emerging technologies and the issues they entail. These technologies move beyond 'traditional' computing concerns, in particular by going from the desktop into the world [ubiquitous computing], moving from the workplace to the home and other settings [e.g., domestic, public spaces], from purely functional to ludic concerns [e.g. home entertainment, pervasive games], and from digital to digital-physical systems [tangible computing, IoT].

The course covers technical aspects as well as user-centered design, concept prototyping and evaluation methods relevant for Ubiquitous Computing, and a discussion of broader societal and value-related concerns (e.g. privacy, security, user agency versus ambient intelligence).

Successful students should be able to

- discuss the diverse and emergent areas within UbiComp technologies and the issues they entail
- develop concepts for UbiComp applications that are appropriate for a given use context and illustrate these (sketching, video prototyping, Wizard of Oz) as well as determine their technical feasibility
- be able to reflect on practical experiences engaging with some of these technologies from a user-centred perspective
- understand the technical functioning of example UbiComp technologies
- choose and give a rationale for appropriate user-centered design methods for example application problems
- critically assess societal implications and discuss design trade-offs of UbiComp applications.
- understand complex issues from the HCI and UbiComp research literature, in particular, to summarize literature and to discuss it

Note: This course is offered biannually (and used to be called: Advanced HCI: UbiComp)

Introductory Literature:

- Ubiquitous Computing Fundamentals. Ed. John Krumm. ISBN: 1420093606. Chapman & Hall/CRC 2009.
- Harper, Rodden, Rogers, Sellen (eds.). Being Human: Human-Computer Interaction in the Year 2020. Microsoft Research Ltd 2008

Rowland et al. Modern User Interfaces for UbiComp Systems. O'Reilly 2015 V14h1.6I0,5.7

Bemerkung

Takes place bi-annual / every 2 years

Leistungsnachweis

practical assignments, individual and in group work

Psychology

HCI Specialisation

Specialisation HCI

Specialisation Tech

HCI Technologies

Computer Vision

4336010 Image Analysis and Object Recognition

V. Rodehorst, M. Kaisheva

Veranst. SWS: 3

Vorlesung

Di, wöch., 09:15 - 10:45, Lecture (online, recorded sessions) Moodle: <https://moodle.uni-weimar.de/course/view.php?id=30890>
(Registration will be open from March 29, 2021 onwards.), ab 06.04.2021

Do, unger. Wo, 11:00 - 12:30, Lab (online), ab 15.04.2021

Di, Einzel, 09:00 - 11:00, written exam Location: Falkenburg, 27.07.2021 - 27.07.2021

Mo, Einzel, 09:00 - 12:00, Bauhausstraße 11 - Seminarraum 015, repeat exam (written exam), 06.09.2021 - 06.09.2021

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/ Kurzkomentar

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)

Visual Interfaces

4555262 Visualisierung

B. Fröhlich, N.N., J. Reibert, G. Rendle

Veranst. SWS: 3

Vorlesung

Do, wöch., 13:30 - 15:00, Vorlesung/Lecture - taught online (live&recorded)- Moodle: <https://moodle.uni-weimar.de/course/view.php?id=31089> , ab 08.04.2021

Mo, wöch., 17:00 - 18:30, Übung /Lab class (Master) - taught online (live sessions) - , ab 12.04.2021

Di, wöch., 11:00 - 12:30, Übung (Bachelor) - taught online (live sessions)- , ab 13.04.2021

Mo, Einzel, 10:00 - 12:00, Marienstraße 13 C - Hörsaal A, schriftl. Prüfung / written exam, 27.09.2021 - 27.09.2021

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
Independent Study

Veranst. SWS: 1

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

Design Theory**321140000 Digital Culture 2: An Introduction to the Design Professions**

J. Willmann, M. Braun, Projektbörse Fak. KuG

Veranst. SWS: 2

Vorlesung

Mo, wöch., 11:00 - 12:30, ab 12.04.2021

Beschreibung

The recent shift in digital technology has substantially affected the design professions and has led to entirely new concepts, tools and processes that were still inconceivable just a few years ago. These new possibilities have not only fostered novel material (and immaterial) practices in design and related fields (such as, for example, art, media and architecture), but have also transformed almost every aspect of our lives. While the Winter Semester was navigating through the history of the digital, the Summer Semester will focus on the theory of the digital, and, as such, bringing forward recent digital discourses, methods and practices of digital culture. Topics include user-experience, digital craft, authorship, programmable matter, human-machine interaction, robotics and automation, digital sustainability, internet of things, etc. As such, the lecture takes a cross-disciplinary – being designed for a student audience that is particularly concerned with and interested in digital technology.

Bemerkung

Art der Online-Teilnahmen: Moodle, Big Blue Button

Zeit: montags, 11 - 12:30 Uhr (Übungen)

Leistungsnachweis

Schriftliche Hausarbeit oder schriftliche Prüfung

Research Project 1**421110000 Applied Deep Learning for Computer Vision****V. Rodehorst, J. Eick, D. Tschirschwitz**

Projekt

Beschreibung

During this practice-oriented Deep Learning project, we will implement current state-of-the-art models for solving difficult tasks in the field of computer vision. During the course of the project the participants will learn how to implement and adapt models for image classification, segmentation, etc to varying problem domains. The landscape of data driven approaches is rapidly changing and researchers need a good understanding of the required tools, publicly available datasets and methods. The students will learn the design and evaluation of existing models, and how to leverage these skills to adapt and implement own models.

Bemerkung

Mandatory technology stack (no other framework allowed):

- Python
- PyTorch

Voraussetzungen

Successful completion of the course "Image Analysis and Object Recognition"

Good programming skills in Python

Leistungsnachweis

Active participation, presentations and project documentation (e.g. commented repositories)

421110001 Critical Games Lab

C. Wüthrich, W. Kissel, G. Pandolfo
Projekt

Veranst. SWS: 10

Beschreibung

"Critical Games 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.

Bemerkung

Ort und Zeit werden zur Projektbörse bekanntgegeben.

Voraussetzungen

Studierende der Medieninformatik sollten Programmierkenntnisse mitbringen. Studierende der Fakultät K&G hingegen Erfahrungen im Bereich Sounddesign, Illustration, Animation, 3D-Modelling oder Storytelling.

Leistungsnachweis

Abschlusspräsentation, fertiges Spiel

421110002 DESIGNING OUT OF THE BOX

M. Honauer, E. Hornecker, Projektbörse Fak. KuG
Projekt

Veranst. SWS: 10

Di, wöch., 13:30 - 16:45, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), 01.06.2021 - 20.07.2021

Di, Einzel, 10:00 - 15:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), Projekttreffen, 27.07.2021 - 27.07.2021

Beschreibung

Research through Design (RtD) is an approach to employ design practices and generate new knowledge. The design inquiries carried out by RtD result in a critical reflection of the state of the art. RtD provides a base for reflective practice by reinterpreting and reframing existing problems through creating and revising artifacts. These artifacts act as proposed solutions to the raised issues, investigating how we can change or improve the world.

Traditional HCI research typically investigates existing products and systems. It builds upon theories of users' needs and catalogs of technical requirements to create new interactive designs, rather than exploring a complex topic more broadly and critically questioning existing standards. More recent paths in HCI integrate RtD as an approach to construct intentional designs that inform the dialogue between the currently existing and what could be.

In this course, students will explore RtD as an approach to create their own project in the scope of the given semester topic, *Sustainability*. It is open to every student to find and explore their specific area of interest in that field. It could be anything as long as it is critically approached from a sustainability perspective – for example, cryptocurrencies (a creative concept for making Bitcoins' energy consumption transparent), the fashion industry (a crafted line of clothing from recycled electronic materials), anti-authoritarian education (fiction on the non-future of conservative values), or DIY communities (a series of fantasy tutorials for homemade, 3D-printed repairs). After familiarizing ourselves with the chosen topics, every student will create and evaluate an interactive artifact throughout the course. Students will document their process and iteratively develop their individual projects through critical reflection alone and in the class.

Bemerkung

time and place: t.b.a.

participants:

HCI/CSM4D/Mi : 4

PD/MA: 2

Total: 6

Language: English (if there's at least one Non-Native-German-Speaker)

Voraussetzungen

High motivation to explore a multidisciplinary topic,

ability to work self-organized & in teams,

fluent conversation in English,

(prior experiences in creative coding or physical computing are supportive but not a requirement for enrollment)

Students of Product-Design and Media Architecture: Please send a short informal application email to michaela.honauer@uni-weimar.de until Tuesday April 6th! In this email, please explain 1) why you want to join us in this course (what seems most interesting to you), 2) what are your prior experiences in the relevant field (no worries if you have none, then just make this transparent), and 3) show us up to three of your prior design/art projects (in or outside of the University).

Leistungsnachweis

Regular presentations & discussions, documentation of the process, commitment to shared goals & deadlines,

submission of assignments, video presentation & exhibition at summaery, final report

421110003 FL BaSe – Formal-Language Based Security

S. Lucks, J. Boßert, N. Lang

Veranst. SWS: 10

Projekt

Beschreibung

Wenn binäre Daten als Byte-Strom verschickt werden, braucht man eine „Datenserialisierungssprache“ (DSL). Im Unterschied zu menschenlesbaren Sprachen gibt es viele DSLs, die Daten variabler Länge als Längenpräfix-Sprachen implementieren. Das Ziel des Projektes besteht darin, eine Erweiterung der EBNF (der „extended Backus-Naur Form“) einzuführen, und einen Prototyp für einen Parser- Generator für derartige Sprachen zu implementieren.

Bemerkung

time and place: t.b.a.

Voraussetzungen

Discrete Mathematics

Formal Languages

Solid programming skills

Leistungsnachweis

Zwischenpräsentation, Abschlusspräsentation, Abschlussbericht

421110004 Gamifizierung von Lerninhalten

C. Wüthrich, G. Pandolfo
Projekt

Veranst. SWS: 10

Bemerkung

time and place: t.b.a.

421110005 Hot Topics in Computer Vision SoSe21

V. Rodehorst, C. Benz, P. Debus, 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)

Leistungsnachweis

Aktive Mitarbeit, Einführungsvortrag, Abschlusspräsentation, Dokumentation

421110006 Human echolocation in video games for the blind

J. Ehlers
Projekt

Veranst. SWS: 10

Bemerkung

time and place: t.b.a.

421110007 Large-Scale Concept Mining in Scientific Publications

B. Stein, J. Bevendorff, T. Gollub, N. Kolyada, M. Wolska
Projekt

Veranst. SWS: 10

Beschreibung

Scientific publications can be regarded as contributions to a complex asynchronous and multi-threaded conversation about specific research questions. Scientists develop and describe their

own ideas and relate them to and compare them with previous related ideas and concepts in the field. In this project, you will learn how to apply neural natural language processing technologies and parallel computing to make conceptual relationships explicit in a datastructure called a concept graph. In a concept graph, two concepts are connected by a directed edge if one relates to the other. It can further be developed into a concept prerequisite graph with directed edges if the concepts build upon another. During the project, we would like to create and publish a concept graph as a resource for CORON-19, an open dataset of currently 280K scholarly articles about the coronavirus.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421110010 Projekt (VR) Creative

B. Fröhlich, A. Kulik, A. Kunert, E. Schott, S. Stickert
Projekt

Veranst. SWS: 10

Beschreibung

Die Erstellung digitaler 3D-Inhalte bewegt sich langsam von Desktop-Arbeitsplätzen zu immersiveren Umgebungen, in denen Benutzer ihre erlebte Welt, einschließlich interaktiver Verhaltensweisen, verändern können. Eine zunehmende Anzahl von Modellierungsanwendungen baut auf den Potenzialen der virtuellen Realität (VR) auf, aber Standards müssen sich erst noch herausbilden. Die 3D-Eingabegeräte sind zwar ausdrucksstärker, aber die Benutzer müssen im Vergleich zu Desktop-Oberflächen an Präzision und vielleicht sogar an Komfort einbüßen. Dies erfordert andere Ansätze bei der Erstellung und Verwaltung von Inhalten, z. B. intelligente Korrekturen der ungefähren Platzierung von Inhalten oder die Anwendung verschiedener Stile auf in Bezug stehende geometrische Strukturen.

Die Schnelligkeit der Interaktion kann in vielen Anwendungen sogar der Schlüssel sein, um z.B. den Flow in spielerischen, sozialen Umgebungen aufrechtzuerhalten. Im Kontext von sozialen Zusammenkünften sollte der ausdrucksstarke, kommunikative Wert von 3D-Skizzen gegenüber präziser 3D-Modellierung im Vordergrund stehen.

In diesem Projekt werden wir verfügbare Anwendungen und vorgeschlagene 3D-Interaktionstechniken für die kollaborative Erstellung interaktiver virtueller Umgebungen untersuchen. Wir werden die Vor- und Nachteile der verschiedenen Ansätze bewerten und eine Reihe von vielversprechenden Techniken in einem sozialen VR-Raum mit Unity und der portablen Oculus Quest implementieren

Bemerkung

time and place: t.b.a.

Voraussetzungen

Programming skills as well as Unity skills are useful prerequisites.

Leistungsnachweis

Active and regular participation in the project work, intermediate oral presentations, final report

421110011 Real-Time Avatars for 3D Telepresence in Unity

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

Veranst. SWS: 10

Beschreibung

3D telepresence enables participants at different locations to meet and collaborate in a shared virtual environment using realistic representations of themselves. We presented the first [immersive group-to-group telepresence system in 2013](#). Since then, many fundamental technologies have been continuously improved; in particular, real-time 3D capturing and reconstruction of user representations. Such avatar representations are referred to as 3D video avatars or volumetric avatars in the literature.

Our server infrastructure for creating such volumetric avatars from colour and depth image streams implements state-of-the-art 3D reconstruction techniques and supports the latest generation of Kinect colour and depth sensors for 3D capturing. In early 2020 we decided to use Unity as our virtual reality (VR) framework, to move closer to widespread adoption of our vision of social VR and 3D telepresence. In order to create VR applications in Unity, the capability to stream compact avatar representations from remote locations to Unity clients for rendering is, of course, fundamental.

In this project, we will focus on the design and implementation of a C++ plugin for Unity that receives volumetric avatar streams from our existing capture server and subsequently renders avatars' geometry and texture natively in Vulkan. Since the transfer of such rich 3D data over the internet still remains a bottleneck, we will also investigate how to efficiently compress the avatar streams using existing libraries and different data reduction approaches, such as level-of-detail reconstruction, as well as geometry and image compression.

At the beginning of this project, we will study related research and learn to use our existing infrastructure and technologies. On this basis, we will define our requirements, before designing and structuring our tasks to achieve our goal with an efficient implementation.

In case students are not equipped with recent hardware, we are able to provide workstations, head-mounted displays (HMDs), and pre-recorded Kinect streams for students to work with during the project. Meetings, presentations, and general communication will be held online. You will learn about and work on the following topics in your project team:

- Real-time rendering of avatar streams using state-of-the-art features of established graphics APIs with a focus on Vulkan & shader languages (Vulkan GLSL / GLSL)
- Native Render-Plugin Development in Unity
- Distributed multi-user virtual reality applications
- Design and implementation of a low-level rendering plugin for Unity clients that receives avatar streams over the internet from remote 3D reconstruction servers
- Design and implementation of one-to-many communication channels based on an existing network library (ZMQ)
- Compression techniques for geometry and texture streams, e.g. dimensionality reduction through principal component analysis
- Last, but certainly not least: Being a reliable team member in a complex software project

Bemerkung

time and place: t.b.a.

Voraussetzungen

As well as willingness to work in a team, and enthusiasm for learning about and developing rendering and compression techniques on cutting edge hardware, you should have the following competencies:

- Solid C++ skills, both conceptual and practical
- Basic analysis and linear algebra skills
- Previous experiences in computer graphics helpful
 - e.g. having worked with Vulkan, OpenGL or DirectX

If you are in doubt as to whether you fulfil the requirements, or if you have any further questions regarding the project, we are happy to have a discussion with you during the project fair on 6th of April. You can find us in our BigBlueButton room at the fair for the entire time between 5pm and 7pm.

Leistungsnachweis

The final assessment of your work will be conducted based on the project contributions of every team member, including:

- Active participation in the project during and in between weekly meetings
- Design, implementation and evaluation of a C++ Unity plugin for rendering avatars streamed from 3D reconstruction servers
- Intermediate talks
- Intermediate and final project presentations
- Documentation in form of a short paper

421110013 Robots in the Wild – Interacting with Robots in Public

E. Hornecker, B. Schulte, N.N.

Veranst. SWS: 10

Projekt

Mo, Einzel, 15:00 - 17:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), 21.06.2021 - 21.06.2021

Beschreibung

Automation is said to be on its way and we increasingly see news about robots taking over service in restaurants & hotels, deliver food or take on security on university campuses. Robots like this move in the public space and have to both interact with the people involved in their main tasks as well as bystanders, curious passers-by and others. But these instances are relatively rare and we are not yet used to these types of interventions.

In this project we will explore how people respond when they interact with robots "in the wild", i.e. outside, in shops, parks and other environments. The focus is not on the development of robots, but on creative exploration of the design space. Methods could include:

- Speculative Design: Building artefacts that are not necessarily functional, but tell a story through which we can ask questions about emerging technologies before they even exist. How could speculation be useful in the field of robotics beyond the (mostly dystopian or utopian) examples of sci-fi movies, but rather in an embodied, everyday situation?
- Technology Probes: What might it be like to engage with a robot in the wild? What better way to find out than to deploy one (functional, partly functional or completely Wizard of Oz). Probes are design artefacts that live with people for a while, to explore how they might affect people's life and how they are conceptualized. Using this approach, you could consider various form factors or means of interacting and focus on means to build and test those.

The project is highly open and exploratory but it is expected that it will lead to a (conceptual) prototype in addition to the study results. In this project, you will get hands-on insights into creative research and ideation methods, working in an exciting fast-moving technology field. You will further engage critically with existing technologies and future visions by considering their mundane consequences as well as their wider societal consequences.

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, Raspberry Pi, or basic robotic kits 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.

421110015 Understanding Social Investing Hype

B. Stein, N. Kolyada, M. Völske, M. Wiegmann
Projekt

Veranst. SWS: 10

Beschreibung

The last few years have seen an unprecedented boom in retail investment, driven largely by decentralized coordination in active online communities and a new breed of easy-to-use, extremely low-barrier-to-entry investment apps. This new level of public participation both liberated the investment business and opened new markets but also created several new, large-scale economic phenomena. In this project we will analyze social media datasets with an eye to large-scale economic phenomena, and tackle research questions related to social media analysis, author profiling, computational ethics, and the interplay between social media and market sentiment. We will employ big data tools, machine learning, and natural language processing.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421110017 What's that about? Knowledge and Argument Graphs in Voice Search

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

Veranst. SWS: 10

Beschreibung

Teaching a computer to reason has been a dream and challenge to computer science ever since. Knowledge graphs like Wikidata---that contains the information from Wikipedia---are a major milestone in this endeavor. The automatic transformation of everyday language questions into formal query languages is yet another one. In this project we will focus on combining these methods for the domain of argument search, specifically for our argument search engine args.me and it's Alexa-powered voice interface.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421110019 NAIS – Network Attached Insecurities**S. Lucks, J. Boßert, N. Lang**
Projekt

Veranst. SWS: 10

Beschreibung

Das Internet of Things (IoT) wächst beständig und täglich kommen neue Produkte heraus. Diese bringen verschiedenste Sensoren und Kontrollmechanismen in das Haus der Kunden, welche deren Leben vereinfachen sollen. Jedoch sind diese Geräte oftmals nicht ausreichend vor dem Zugriff von Außenstehenden geschützt. In diesem Projekt sollen verschiedene IoT Produkte in dieser Hinsicht untersucht werden.

Bemerkung

time and place: t.b.a.

Voraussetzungen

Solid programming skills

And at least one of the following:

- Introduction to Modern Cryptography
- Experience with microcontrollers

Leistungsnachweis

Zwischenpräsentation, Abschlusspräsentation, Abschlussbericht

Research Project 2**421110000 Applied Deep Learning for Computer Vision****V. Rodehorst, J. Eick, D. Tschirschwitz**
Projekt**Beschreibung**

During this practice-oriented Deep Learning project, we will implement current state-of-the-art models for solving difficult tasks in the field of computer vision. During the course of the project the participants will learn how to implement and adapt models for image classification, segmentation, etc to varying problem domains. The landscape of data driven approaches is rapidly changing and researchers need a good understanding of the required tools, publicly available datasets and methods. The students will learn the design and evaluation of existing models, and how to leverage these skills to adapt and implement own models.

Bemerkung

Mandatory technology stack (no other framework allowed):

- Python
- PyTorch

Voraussetzungen

Successful completion of the course "Image Analysis and Object Recognition"

Good programming skills in Python

Leistungsnachweis

Active participation, presentations and project documentation (e.g. commented repositories)

421110001 Critical Games Lab

C. Wüthrich, W. Kissel, G. Pandolfo
Projekt

Veranst. SWS: 10

Beschreibung

"Critical Games 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.

Bemerkung

Ort und Zeit werden zur Projektbörse bekanntgegeben.

Voraussetzungen

Studierende der Medieninformatik sollten Programmierkenntnisse mitbringen. Studierende der Fakultät K&G hingegen Erfahrungen im Bereich Sounddesign, Illustration, Animation, 3D-Modelling oder Storytelling.

Leistungsnachweis

Abschlusspräsentation, fertiges Spiel

421110002 DESIGNING OUT OF THE BOX

M. Honauer, E. Hornecker, Projektbörse Fak. KuG
Projekt

Veranst. SWS: 10

Di, wöch., 13:30 - 16:45, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), 01.06.2021 - 20.07.2021

Di, Einzel, 10:00 - 15:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), Projekttreffen, 27.07.2021 - 27.07.2021

Beschreibung

Research through Design (RtD) is an approach to employ design practices and generate new knowledge. The design inquiries carried out by RtD result in a critical reflection of the state of the art. RtD provides a base for reflective practice by reinterpreting and reframing existing problems through creating and revising artifacts. These artifacts act as proposed solutions to the raised issues, investigating how we can change or improve the world.

Traditional HCI research typically investigates existing products and systems. It builds upon theories of users' needs and catalogs of technical requirements to create new interactive designs, rather than exploring a complex topic more broadly and critically questioning existing standards. More recent paths in HCI integrate RtD as an approach to construct intentional designs that inform the dialogue between the currently existing and what could be.

In this course, students will explore RtD as an approach to create their own project in the scope of the given semester topic, *Sustainability*. It is open to every student to find and explore their specific area of interest in that field. It could be anything as long as it is critically approached from a sustainability perspective – for example, cryptocurrencies (a creative concept for making Bitcoins' energy consumption transparent), the fashion industry (a crafted line of clothing from recycled electronic materials), anti-authoritarian education (fiction on the non-future of conservative values), or DIY communities (a series of fantasy tutorials for homemade, 3D-printed repairs). After familiarizing ourselves with the chosen topics, every student will create and evaluate an interactive artifact

throughout the course. Students will document their process and iteratively develop their individual projects through critical reflection alone and in the class.

Bemerkung

time and place: t.b.a.

participants:

HCI/CSM4D/Mi : 4

PD/MA: 2

Total: 6

Language: English (if there's at least one Non-Native-German-Speaker)

Voraussetzungen

High motivation to explore a multidisciplinary topic,

ability to work self-organized & in teams,

fluent conversation in English,

(prior experiences in creative coding or physical computing are supportive but not a requirement for enrollment)

Students of Product-Design and Media Architecture: Please send a short informal application email to michaela.honauer@uni-weimar.de until Tuesday April 6th! In this email, please explain 1) why you want to join us in this course (what seems most interesting to you), 2) what are your prior experiences in the relevant field (no worries if you have none, then just make this transparent), and 3) show us up to three of your prior design/art projects (in or outside of the University).

Leistungsnachweis

Regular presentations & discussions, documentation of the process, commitment to shared goals & deadlines,

submission of assignments, video presentation & exhibition at summaery, final report

421110003 FL BaSe – Formal-Language Based Security

S. Lucks, J. Boßert, N. Lang

Projekt

Veranst. SWS:

10

Beschreibung

Wenn binäre Daten als Byte-Strom verschickt werden, braucht man eine „Datenserialisierungssprache“ (DSL). Im Unterschied zu menschenlesbaren Sprachen gibt es viele DSLs, die Daten variabler Länge als Längenpräfix-Sprachen implementieren. Das Ziel des Projektes besteht darin, eine Erweiterung der EBNF (der „extended Backus-Naur Form“) einzuführen, und einen Prototyp für einen Parser- Generator für derartige Sprachen zu implementieren.

Bemerkung

time and place: t.b.a.

Voraussetzungen

Discrete Mathematics

Formal Languages

Solid programming skills

Leistungsnachweis

Zwischenpräsentation, Abschlusspräsentation, Abschlussbericht

421110004 Gamifizierung von Lerninhalten

C. Wüthrich, G. Pandolfo
Projekt

Veranst. SWS: 10

Bemerkung

time and place: t.b.a.

421110005 Hot Topics in Computer Vision SoSe21

V. Rodehorst, C. Benz, P. Debus, 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)

Leistungsnachweis

Aktive Mitarbeit, Einführungsvortrag, Abschlusspräsentation, Dokumentation

421110006 Human echolocation in video games for the blind

J. Ehlers
Projekt

Veranst. SWS: 10

Bemerkung

time and place: t.b.a.

421110007 Large-Scale Concept Mining in Scientific Publications

B. Stein, J. Bevendorff, T. Gollub, N. Kolyada, M. Wolska
Projekt

Veranst. SWS: 10

Beschreibung

Scientific publications can be regarded as contributions to a complex asynchronous and multi-threaded conversation about specific research questions. Scientists develop and describe their own ideas and relate them to and compare them with previous related ideas and concepts in the field. In this project, you will learn how to apply neural natural language processing technologies and parallel computing to make conceptual relationships explicit in a datastructure called a concept graph. In a concept graph, two concepts are connected by a directed edge if one relates to the other. It can further be developed into a concept prerequisite graph with directed edges if the concepts build upon another. During the project, we would like to create and publish a concept graph as a resource for CORON-19, an open dataset of currently 280K scholarly articles about the coronavirus.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421110010 Projekt (VR) Creative

B. Fröhlich, A. Kulik, A. Kunert, E. Schott, S. Stickert

Veranst. SWS: 10

Projekt

Beschreibung

Die Erstellung digitaler 3D-Inhalte bewegt sich langsam von Desktop-Arbeitsplätzen zu immersiveren Umgebungen, in denen Benutzer ihre erlebte Welt, einschließlich interaktiver Verhaltensweisen, verändern können. Eine zunehmende Anzahl von Modellierungsanwendungen baut auf den Potenzialen der virtuellen Realität (VR) auf, aber Standards müssen sich erst noch herausbilden. Die 3D-Eingabegeräte sind zwar ausdrucksstärker, aber die Benutzer müssen im Vergleich zu Desktop-Oberflächen an Präzision und vielleicht sogar an Komfort einbüßen. Dies erfordert andere Ansätze bei der Erstellung und Verwaltung von Inhalten, z. B. intelligente Korrekturen der ungefähren Platzierung von Inhalten oder die Anwendung verschiedener Stile auf in Bezug stehende geometrische Strukturen.

Die Schnelligkeit der Interaktion kann in vielen Anwendungen sogar der Schlüssel sein, um z.B. den Flow in spielerischen, sozialen Umgebungen aufrechtzuerhalten. Im Kontext von sozialen Zusammenkünften sollte der ausdrucksstarke, kommunikative Wert von 3D-Skizzen gegenüber präziser 3D-Modellierung im Vordergrund stehen.

In diesem Projekt werden wir verfügbare Anwendungen und vorgeschlagene 3D-Interaktionstechniken für die kollaborative Erstellung interaktiver virtueller Umgebungen untersuchen. Wir werden die Vor- und Nachteile der verschiedenen Ansätze bewerten und eine Reihe von vielversprechenden Techniken in einem sozialen VR-Raum mit Unity und der portablen Oculus Quest implementieren

Bemerkung

time and place: t.b.a.

Voraussetzungen

Programming skills as well as Unity skills are useful prerequisites.

Leistungsnachweis

Active and regular participation in the project work, intermediate oral presentations, final report

421110011 Real-Time Avatars for 3D Telepresence in Unity

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

Veranst. SWS: 10

Beschreibung

3D telepresence enables participants at different locations to meet and collaborate in a shared virtual environment using realistic representations of themselves. We presented the first [immersive group-to-group telepresence system in 2013](#). Since then, many fundamental technologies have been continuously improved; in particular, real-time 3D capturing and reconstruction of user representations. Such avatar representations are referred to as 3D video avatars or volumetric avatars in the literature.

Our server infrastructure for creating such volumetric avatars from colour and depth image streams implements state-of-the-art 3D reconstruction techniques and supports the latest generation of Kinect colour and depth sensors for 3D capturing. In early 2020 we decided to use Unity as our virtual reality (VR) framework, to move closer to widespread adoption of our vision of social VR and 3D telepresence. In order to create VR applications in Unity, the capability to stream compact avatar representations from remote locations to Unity clients for rendering is, of course, fundamental.

In this project, we will focus on the design and implementation of a C++ plugin for Unity that receives volumetric avatar streams from our existing capture server and subsequently renders avatars' geometry and texture natively in Vulkan. Since the transfer of such rich 3D data over the internet still remains a bottleneck, we will also investigate how to efficiently compress the avatar streams using existing libraries and different data reduction approaches, such as level-of-detail reconstruction, as well as geometry and image compression.

At the beginning of this project, we will study related research and learn to use our existing infrastructure and technologies. On this basis, we will define our requirements, before designing and structuring our tasks to achieve our goal with an efficient implementation.

In case students are not equipped with recent hardware, we are able to provide workstations, head-mounted displays (HMDs), and pre-recorded Kinect streams for students to work with during the project. Meetings, presentations, and general communication will be held online. You will learn about and work on the following topics in your project team:

- Real-time rendering of avatar streams using state-of-the-art features of established graphics APIs with a focus on Vulkan & shader languages (Vulkan GLSL / GLSL)
- Native Render-Plugin Development in Unity
- Distributed multi-user virtual reality applications
- Design and implementation of a low-level rendering plugin for Unity clients that receives avatar streams over the internet from remote 3D reconstruction servers
- Design and implementation of one-to-many communication channels based on an existing network library (ZMQ)
- Compression techniques for geometry and texture streams, e.g. dimensionality reduction through principal component analysis
- Last, but certainly not least: Being a reliable team member in a complex software project

Bemerkung

time and place: t.b.a.

Voraussetzungen

As well as willingness to work in a team, and enthusiasm for learning about and developing rendering and compression techniques on cutting edge hardware, you should have the following competencies:

- Solid C++ skills, both conceptual and practical
- Basic analysis and linear algebra skills
- Previous experiences in computer graphics helpful
 - e.g. having worked with Vulkan, OpenGL or DirectX

If you are in doubt as to whether you fulfil the requirements, or if you have any further questions regarding the project, we are happy to have a discussion with you during the project fair on 6th of April. You can find us in our BigBlueButton room at the fair for the entire time between 5pm and 7pm.

Leistungsnachweis

The final assessment of your work will be conducted based on the project contributions of every team member, including:

- Active participation in the project during and in between weekly meetings
- Design, implementation and evaluation of a C++ Unity plugin for rendering avatars streamed from 3D reconstruction servers
- Intermediate talks
- Intermediate and final project presentations
- Documentation in form of a short paper

421110013 Robots in the Wild – Interacting with Robots in Public

E. Hornecker, B. Schulte, N.N.

Veranst. SWS: 10

Projekt

Mo, Einzel, 15:00 - 17:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), 21.06.2021 - 21.06.2021

Beschreibung

Automation is said to be on its way and we increasingly see news about robots taking over service in restaurants & hotels, deliver food or take on security on university campuses. Robots like this move in the public space and have to both interact with the people involved in their main tasks as well as bystanders, curious passers-by and others. But these instances are relatively rare and we are not yet used to these types of interventions.

In this project we will explore how people respond when they interact with robots "in the wild", i.e. outside, in shops, parks and other environments. The focus is not on the development of robots, but on creative exploration of the design space. Methods could include:

- Speculative Design: Building artefacts that are not necessarily functional, but tell a story through which we can ask questions about emerging technologies before they even exist. How could speculation be useful in the field of robotics beyond the (mostly dystopian or utopian) examples of sci-fi movies, but rather in an embodied, everyday situation?
- Technology Probes: What might it be like to engage with a robot in the wild? What better way to find out than to deploy one (functional, partly functional or completely Wizard of Oz). Probes are design artefacts that live with people for a while, to explore how they might affect people's life and how they are conceptualized. Using this approach, you could consider various form factors or means of interacting and focus on means to build and test those.

The project is highly open and exploratory but it is expected that it will lead to a (conceptual) prototype in addition to the study results. In this project, you will get hands-on insights into creative research and ideation methods, working in an exciting fast-moving technology field. You will further engage critically with existing technologies and future visions by considering their mundane consequences as well as their wider societal consequences.

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, Raspberry Pi, or basic robotic kits 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.

421110015 Understanding Social Investing Hype

B. Stein, N. Kolyada, M. Völske, M. Wiegmann
Projekt

Veranst. SWS: 10

Beschreibung

The last few years have seen an unprecedented boom in retail investment, driven largely by decentralized coordination in active online communities and a new breed of easy-to-use, extremely low-barrier-to-entry investment apps. This new level of public participation both liberated the investment business and opened new markets but also created several new, large-scale economic phenomena. In this project we will analyze social media datasets with an eye to large-scale economic phenomena, and tackle research questions related to social media analysis, author profiling, computational ethics, and the interplay between social media and market sentiment. We will employ big data tools, machine learning, and natural language processing.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421110017 What's that about? Knowledge and Argument Graphs in Voice Search

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

Veranst. SWS: 10

Beschreibung

Teaching a computer to reason has been a dream and challenge to computer science ever since. Knowledge graphs like Wikidata---that contains the information from Wikipedia---are a major milestone in this endeavor. The automatic transformation of everyday language questions into formal query languages is yet another one. In this project we will focus on combining these methods for the domain of

argument search, specifically for our argument search engine args.me and it's Alexa-powered voice interface.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421110019 NAIS – Network Attached Insecurities

S. Lucks, J. Boßert, N. Lang

Veranst. SWS: 10

Projekt

Beschreibung

Das Internet of Things (IoT) wächst beständig und täglich kommen neue Produkte heraus. Diese bringen verschiedenste Sensoren und Kontrollmechanismen in das Haus der Kunden, welche deren Leben vereinfachen sollen. Jedoch sind diese Geräte oftmals nicht ausreichend vor dem Zugriff von Außenstehenden geschützt. In diesem Projekt sollen verschiedene IoT Produkte in dieser Hinsicht untersucht werden.

Bemerkung

time and place: t.b.a.

Voraussetzungen

Solid programming skills

And at least one of the following:

- Introduction to Modern Cryptography
- Experience with microcontrollers

Leistungsnachweis

Zwischenpräsentation, Abschlusspräsentation, Abschlussbericht

Electives

4336010 Image Analysis and Object Recognition

V. Rodehorst, M. Kaisheva

Veranst. SWS: 3

Vorlesung

Di, wöch., 09:15 - 10:45, Lecture (online, recorded sessions) Moodle: <https://moodle.uni-weimar.de/course/view.php?id=30890>
(Registration will be open from March 29, 2021 onwards.), ab 06.04.2021

Do, unger. Wo, 11:00 - 12:30, Lab (online), ab 15.04.2021

Di, Einzel, 09:00 - 11:00, written exam Location: Falkenburg, 27.07.2021 - 27.07.2021

Mo, Einzel, 09:00 - 12:00, Bauhausstraße 11 - Seminarraum 015, repeat exam (written exam), 06.09.2021 - 06.09.2021

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/ Kurzkomentar

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, M. Kaisheva

Veranst. SWS: 1

Independent Study

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., J. Reibert, G. Rendle

Veranst. SWS: 3

Vorlesung

Do, wöch., 13:30 - 15:00, Vorlesung/Lecture - taught online (live&recorded)- Moodle: <https://moodle.uni-weimar.de/course/view.php?id=31089> , ab 08.04.2021

Mo, wöch., 17:00 - 18:30, Übung /Lab class (Master) - taught online (live sessions) - , ab 12.04.2021

Di, wöch., 11:00 - 12:30, Übung (Bachelor) - taught online (live sessions)- , ab 13.04.2021

Mo, Einzel, 10:00 - 12:00, Marienstraße 13 C - Hörsaal A, schriftl. Prüfung / written exam, 27.09.2021 - 27.09.2021

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
Independent Study

Veranst. SWS: 1

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)

K. Gürlebeck, D. Legatiuk
Vorlesung

Veranst. SWS: 4

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**

321140000 Digital Culture 2: An Introduction to the Design Professions

J. Willmann, M. Braun, Projektbörse Fak. KuG

Veranst. SWS: 2

Vorlesung

Mo, wöch., 11:00 - 12:30, ab 12.04.2021

Beschreibung

The recent shift in digital technology has substantially affected the design professions and has led to entirely new concepts, tools and processes that were still inconceivable just a few years ago. These new possibilities have not only fostered novel material (and immaterial) practices in design and related fields (such as, for example, art, media and architecture), but have also transformed almost every aspect of our lives. While the Winter Semester was navigating through the history of the digital, the Summer Semester will focus on the theory of the digital, and, as such, bringing forward recent digital discourses, methods and practices of digital culture. Topics include user-experience, digital craft, authorship, programmable matter, human-machine interaction, robotics and automation, digital sustainability, internet of things, etc. As such, the lecture takes a cross-disciplinary – being designed for a student audience that is particularly concerned with and interested in digital technology.

Bemerkung

Art der Online-Teilnahmen: Moodle, Big Blue Button

Zeit: montags, 11 - 12:30 Uhr (Übungen)

Leistungsnachweis

Schriftliche Hausarbeit oder schriftliche Prüfung

417130003 Discrete Optimization

A. Jakoby

Veranst. SWS: 4

Vorlesung

Do, wöch., 11:00 - 12:30, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), Lecture / lab class (until further notice: online, live), ab 08.04.2021

Di, wöch., 15:15 - 16:45, lecture (online, live) Moodle-Link: <https://moodle.uni-weimar.de/course/view.php?id=30962>

Beschreibung

Diskrete Optimierung

Die diskrete / kombinatorische Optimierung ist ein Gebiet an der Schnittstelle von Mathematik und Informatik. Anwendungen für derartige Optimierungsprobleme sind in den vielfältigsten Bereichen zu finden.

Betrachtet werden sowohl diskrete Optimierungsprobleme, die effizient lösbar sind (kürzeste Wege, Flußprobleme), als auch NP-schwierige Probleme. Für letztere werden sowohl exakte Verfahren (Greedy-Algorithmen über Matroiden, Branch-and-Bound-Verfahren), als auch Heuristiken und Metaheuristiken zur näherungsweise Lösung behandelt.

engl. Beschreibung/ Kurzkomentar

Discrete Optimization

Discrete / combinatorial optimization is an area at the borderline of mathematics and computer science. Applications for such optimization problems can be found in the most varied areas.

Consideration is given to discrete optimization problems, which are efficiently solvable (e.g. shortest paths, flow problems), as well as NP-hard problems. For the latter, both exact methods (greedy algorithms on matroids, branch-and-bound methods), as well as heuristics and metaheuristics, are introduced.

Voraussetzungen

Bsc in a relevant study field

Leistungsnachweis

oral examination (individual appointments via Moodle)

421150039 Workshop 3P - Musical Interfaces with PSLab, Python, and Processing

H. Waldschütz, N.N., Projektbörse Fak. KuG

Veranst. SWS: 1

Workshop

Beschreibung

In this 3-day hands-on workshop we will explore the design and basic implementation of musical interfaces and sound generation with PSLab, Processing 3 and Python.

The Pocket Science Lab [1] is an open hardware device, which can be used as oscilloscope, multimeter, wave generator, logic analyzer, power source, among others. In this class we will use the PSLab as an input and output device, to generate creative/procedural algorithmic music.

At least since Brian Eno's Generative Music 1 (1996), the idea of ever changing musical compositions created by a system has been popularized. By connecting sensors to the PSLab we have the foundation for creating our own physical/tangible musical interfaces.

For example ultrasonic sensors can be used similar to a theremin, capacitive sensing can trigger touch events, and a light dependend resistor (LDR) can be controlled via a flash light.

To do so we will shed some light on basic electronics and interfacing methods, sound synthesis and Programming in Processing 3 [2] (and some Python).

This Workshop consist of three sessions (~3-4h each):

1. Introduction and overview
2. Ideas and experiments
- 3 Presentation of your Projects.

After the first two sessions, you will have some days on your own to develop your own musical interface which will be then presented in the following third session.

All dates need to be found by the group at start of the semester!

engl. Beschreibung/ Kurzkomentar

3-day hands-on workshop to explore the design and implementation of musical interfaces and sound generation with PSLab, Processing 3 and Python.

Bemerkung

Time and place: Lecture hall, HK7, 2nd half of April 2021. All dates tba

Co-Referenten: Daniel Wessolek, PhD.

Voraussetzungen

Since there are only very limited places to attend this workshop, please apply until April 7 by email to hannes.waldschuetz@uni-weimar.de with some words about you and your motivation. We will get back to you until April 9.

There will be an initial online meeting on Monday, April 12 to find possible workshop-slots within the following 3-4 Weeks.

421150041 Crowdsourced Translation of Fan Fiction

M. Wolska

Seminar

Veranst. SWS:

2

Beschreibung

This course is about literary translation and crowdsourcing. Specifically, we would like to develop a methodology for exploiting crowdsourcing in service of translation; that is, employ the crowd (and, possibly, machine translation systems) to translate a literary piece and investigate whether this is a viable alternative to the traditional approach to literary translation in which expert translators are hired. The course will consist of two parts: In the first part, students and instructors as well as invited speakers (experts in translation and crowdsourcing) will give presentations various aspects of the two topics. In the second part, students will work on their own projects in groups and conduct crowdsourcing translation experiments. We will use a specific literary piece, Eliezer Yudkowsky's "Harry Potter and the Methods of Rationality", for all the projects. Credits will be given for the presentation and the project concluded with a report. The course is given jointly by Uni Leipzig and Uni Weimar.

Bemerkung

Termin: Nach Vereinbarung

Ort: BBB

Leistungsnachweis

Präsentation, Ausarbeitung mit Bericht

4447556 Digital Watermarking and Steganography

A. Jakoby

Veranst. SWS: 4

Vorlesung

Do, wöch., 15:15 - 16:45, Lecture (online) Moodle-Link: <https://moodle.uni-weimar.de/course/view.php?id=30969>, ab 08.04.2021
 Di, wöch., 17:00 - 18:30, Marienstraße 13 C - Hörsaal B, Lab class Bis auf Weiteres/until further notice: online, ab 13.04.2021

Beschreibung

Digitale Wasserzeichen und Steganography

Digitale Wasserzeichen dienen dazu Nachrichten zu einer Bild-, Audio- oder Videodatei innerhalb dieser Datei selber abzulegen. Ein zentrales Ziel der hierzu verwendeten Verfahren ist es, sicherzustellen, dass die eingebetteten Informationen nicht wieder entfernt werden können. Solche Nachricht können dazu herangezogen werden, um zusätzliche Informationen über den Inhalt der Medien selbst zu liefern, so zum Beispiel bestehende Urheberrechte. Digitale Wasserzeichen sollen daher lesbarer oder zumindest nachweisbar sein. Jedoch sollen sie nur mit erheblichen Aufwand wieder zu entfernen sein.

In der Steganographie untersuchen wir Systeme, in denen die eingebetteten Informationen vollständig für Unbefugte versteckt werden soll. Selbst die Tatsache, dass eine Mediendatei eine versteckte Botschaft enthält, soll für Unbefugte nicht zu beobachten sein. Somit ist es durch Verwendung eines solchen Systems möglich, dass zwei Personen Informationen austauschen, ohne dass eine dritte Person die Kommunikation detektieren kann.

In dieser Vorlesung werden wir grundlegende Konzepte, Methoden und Anwendungen der digitalen Wasserzeichen und Steganographie vorstellen und analysieren.

engl. Beschreibung/ Kurzkomentar

Digital Watermarking and Steganography

Digital watermarking is the practice of hiding a message about an image, audio clip, video clip, or other work of media within that work itself. One goal of the used methods is to ensure that the message cannot be removed after it is embedded in the media. Thus, systems can use such a message to provide additional information of the content of the media itself, e.g. copyrights. Digital watermarks have to be readable or detectable, but they should be hard to remove from the content.

In steganography we investigate systems where the embedded information is completely hidden for unauthorized parties. Even the fact that a media file contains a hidden message should be hidden. Thus, by using such a system two parties can communicate in such a way that a third party cannot detect the communication.

In this lecture we will introduce some basic concepts, methods and applications of digital watermarking and steganography.

Voraussetzungen

BSc in a relevant study field

Leistungsnachweis

oral examination (individual appointments via Moodle)

4526501 Academic English Part One**G. Atkinson**

Veranst. SWS: 2

Kurs

Di, wöch., 17:00 - 18:30, Online (Moodle) , ab 20.04.2021

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.

The course will be conducted basically in an online correspondence format with occasional video consultations and/or face-to-face teaching sessions if and as required. The time allocated for these is Tues 17.00-18.30. The individual dates, if required, will be determined as the course progresses

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 participants 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 21.04.2021

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.

The course will be conducted basically in an online correspondence format with occasional video consultations and/or face-to-face teaching sessions if and as required. The time allocated for these is Weds 17.00-18.30. The individual dates, if required, will be determined as the course progresses.

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 participants 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

K. Gürlebeck, D. Legatiuk

Veranst. SWS: 4

Vorlesung

Mo, wöch., 09:15 - 10:45, Coudraystraße 13 A - Hörsaal 2, Lecture (hybrid), ab 12.04.2021

Mo, wöch., 15:15 - 16:45, Coudraystraße 13 A - Hörsaal 2, Exercise (hybrid), ab 12.04.2021

Mo, Einzel, 09:00 - 11:00, Coudraystraße 13 B - Seminarraum 210, written exam, 09.08.2021 - 09.08.2021

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/ Kurzkomentar

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

4556216 Ubiquitous Computing

E. Hornecker, B. Schulte

Veranst. SWS: 4

Vorlesung

Mi, wöch., 11:00 - 12:30, Lab / first lecture (April 7th, 2021) - online - , ab 07.04.2021

Mo, wöch., 13:30 - 15:00, Lecture (online) <https://moodle.uni-weimar.de/course/view.php?id=30663>, ab 12.04.2021

Beschreibung

The course explores advanced topics in HCI, presenting and reflecting on the concerns, perspectives and interdisciplinary nature of this area. We will look at new and emerging technologies and the issues they entail. These technologies move beyond 'traditional' computing concerns, in particular by going from the desktop into the world [ubiquitous computing], moving from the workplace to the home and other settings [e.g., domestic, public spaces], from purely functional to ludic concerns [e.g. home entertainment, pervasive games], and from digital to digital-physical systems [tangible computing, IoT].

The course covers technical aspects as well as user-centered design, concept prototyping and evaluation methods relevant for Ubiquitous Computing, and a discussion of broader societal and value-related concerns (e.g. privacy, security, user agency versus ambient intelligence).

Successful students should be able to

- discuss the diverse and emergent areas within UbiComp technologies and the issues they entail
- develop concepts for UbiComp applications that are appropriate for a given use context and illustrate these (sketching, video prototyping, Wizard of Oz) as well as determine their technical feasibility
- be able to reflect on practical experiences engaging with some of these technologies from a user-centred perspective
- understand the technical functioning of example UbiComp technologies
- choose and give a rationale for appropriate user-centered design methods for example application problems
- critically assess societal implications and discuss design trade-offs of UbiComp applications.
- understand complex issues from the HCI and UbiComp research literature, in particular, to summarize literature and to discuss it

Note: This course is offered biannually (and used to be called: Advanced HCI: UbiComp)

Introductory Literature:

- Ubiquitous Computing Fundamentals. Ed. John Krumm. ISBN: 1420093606. Chapman & Hall/CRC 2009.
- Harper, Rodden, Rogers, Sellen (eds.). Being Human: Human-Computer Interaction in the Year 2020. Microsoft Research Ltd 2008

Rowland et al. Modern User Interfaces for Ubicomp Systems. O'Reilly 2015 V14h1.6I0,5.7

Bemerkung

Takes place bi-annual / every 2 years

Leistungsnachweis

practical assignments, individual and in group work

C. Wüthrich

Veranst. SWS: 4

Vorlesung

Fr, wöch., 11:00 - 12:30, Übung (online), ab 05.03.2021

Di, wöch., 13:30 - 15:00, Vorlesung(online) Moodle- Link: <https://moodle.uni-weimar.de/course/view.php?id=31374>, ab 16.03.2021**Beschreibung**

Algorithmen und Datenstrukturen

engl. Beschreibung/ Kurzkomentar

Computer Graphics II: Fundamentals of Imaging

In Computer Graphics, and also in Image processing and in Design, professionals are used to speak about "better" or "worse" quality for pictures. Contrary to popular belief, however, there is no general method for analyzing the quality of picture. The course will start with a wide introduction to light transport and reflection theory, continue with a trip through digital and analogue image capture and reproduction and a survey of image compression methods. In its last part the course will focus on methods for evaluating the quality of pictures and of animated sequences, revealing advantages and disadvantages of different display and printing techniques and of the different compression methods.

Leistungsnachweis

Beleg, Klausur

oral exam, individual appointments via Moodle