Vorlesungsverzeichnis

M.Sc. Computer Science for Digital Media

Winter 2021/22

Stand 23.05.2022

M.Sc. Computer Science for Digital Media

Faculty Welcome for Master's Students Computer Science for Digital Media
Monday, 11th October 2021, 11 a.m., room 15, Bauhausstr. 11
Project fair
Monday, 11th October 2021, 5 p.m. via Moodle. Open from 11th October 2021.

4256402	Oberseminar Rendering, Visualisierung und Virtual Reality

B. Fröhlich   Veranst. SWS: 2
Seminar
Do, wöch., 10:30 - 12:00, Online bzw. nach Vereinbarung, ab 14.10.2021

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.

	Theses-Seminar HCI

E. Hornecker
Seminar
Do, Einzel, 10:00 - 16:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), 24.03.2022 - 24.03.2022

Beschreibung

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

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Modeling

4446631	Online Computation

R. Adejoh, A. Jakoby   Veranst. SWS: 4
Vorlesung
Di, wöch., 11:00 - 12:30, Bauhausstraße 11 - Seminarraum 015, Lecture, ab 12.10.2021
Di, wöch., 17:00 - 18:30, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), lab class, ab 12.10.2021

Beschreibung

Online Berechnungen

Online-Berechnung beschreibt ein Modell für Algorithmen und Probleme, die Entscheidung unter Unsicherheit erfordern. In einem Online-Problem hat der Algorithmus nicht den Zugriff auf die gesamte Eingangs von Anfang an: die Eingabe erfolgt in einer Folge von Schritten. Ein Online-Algorithmus kann seine Berechnungen nur auf die beobachtete Vergangenheit beziehen, ohne dass gesichertes Wissen über die bevorstehende Folge in der Zukunft vorhanden ist. Die Auswirkungen einer Entscheidung können nicht rückgängig gemacht werden.
Online Problemen und Algorithmen finden ihre Anwendung in vielen Bereichen, wie zum Beispiel:

- Datenstrukturen,

- Optimierungsprobleme,

- Geometrische Algorithmen,

- Parallele und verteilte Systeme,

- Planungsprobleme.

In der Vorlesung Online Berechnung, werden wir einige Online-Probleme und Algorithmen vorstellen und analysieren. Ferner werden einige grundlegende Methoden aus einigen aus den obigen Bereichen vorgestellt.

engl. Beschreibung/ Kurzkommentar

Online Computation

Online computation is a model for algorithms and problems which require decision under uncertainty. In an online problem the algorithm does not know the entire input from the beginning: the input is revealed in a sequence of steps. An online algorithm should make its computation based only on the observed past and without any secure knowledge about the forthcoming sequence in the future. The e#ects of a decision taken cannot be undone.

We find online problems and online algorithms within many areas, such as

- data structures,

- optimization problems,

- geometric algorithms,

- parallel and distributed systems,

- scheduling problems.

In the lecture Online Computation, we will present and analyze online problems and algorithms as well as some basic methods from some of these areas.

Voraussetzungen

BSc in a relevant study field

Leistungsnachweis

oral or written examination (depending on the number of students)

Distributed and Secure Systems

4332010   Secure Channels

S. Lucks, J. Boßert   Veranst. SWS: 4

Vorlesung
Di, wöch., 13:30 - 15:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), Lecture, ab 12.10.2021
Fr, wöch., 13:30 - 15:00, Lab class -online Moodle Link:, ab 22.10.2021

Beschreibung

Sicherheitsprotokolle in der Kryptographie

Ein Sicherheitsprotokoll dient der sicheren Kommunikation zwischen zwei oder mehr Teilnehmern. Einfache Sicherheitsprotokolle stellen die Grundfunktionen für andere Sicherheitsprotokolle dar, z.B. die authentische und vertrauliche Übermittlung von Datenpaketen.
In der Vorlesung werden die Anforderungen für Sicherheitsprotokolle vermittelt, und es werden die Stärken und Schwächen Sicherheitsprotokollen diskutiert. Zu den Schwächen gehören auch mögliche Implementationsfehler, die dazu führen, dass ein "an sich sicheres" Protokoll doch angreifbar ist.
Teilnehmerinnen und Teilnehmer der Vorlesung am Ende der Veranstaltung wissen,
  - wie man die Sicherheit von Protokollen definiert,
  - wie man Sicherheitsprotokolle analysiert und ggf.
  - nachweist, dass ein konkretes Protokoll seine Anforderungen erfüllt und
  - wie man Sicherheitsprotokolle korrekt implementiert.

engl. Beschreibung/ Kurzkommentar

Secure Channels

A secure channel, between two or more participants, provides privacy and integrity of the transmitted data. The goal of this course is to understand the principles of designing and analyzing secure channels. The students will learn to distinguish between a secure and an insecure design, by conceiving the basic ideas of secure channels:
  - Formalizing the security requirements
  - Analyzing existing protocol and channel designs
  - How to prove the security of a given design
  - Sound implementation of secure channels

Bemerkung

Die Veranstaltung ersetzt "Einfache Sicherheitsprotokolle" und kann daher nicht gemeinsam mit dieser Veranstaltung angerechnet werden.

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

Voraussetzungen

Cryptography introductory course

Leistungsnachweis

Mündliche Prüfung / oral exam
Beleg als Voraussetzung zur Prüfungszulassung. / Approval for examination is given on the basis of assignments.

Intelligent Information Systems

4439110   Introduction to Machine Learning

B. Stein, J. Bevendorff, M. Völske   Veranst. SWS: 4

Vorlesung

Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A, Lecture , ab 21.10.2021
Do, wöch., 11:00 - 13:00, Marienstraße 13 C - Hörsaal A, Lab class dates: 28. Oktober 2021   11. November 2021   25. November 2021   9. Dezember 2021   6. Januar 2022   20. Januar 2022   3. Februar 2022, ab 28.10.2021
Mo, Einzel, 09:00 - 11:00, Marienstraße 13 C - Hörsaal B, written exam, 21.02.2022 - 21.02.2022

Beschreibung

Students will learn to understand machine learning as a guided search in a space of possible hypotheses. The mathematical means to formulate a particular hypothesis class determines the learning paradigm, the discriminative power of a hypothesis, and the complexity of the learning process. Aside from foundations of supervised learning also an introduction to unsupervised learning is given. The lecture introduces concepts, algorithms, and theoretical backgrounds. The accompanying lab treats both theoretical and applied tasks to deepen the understanding of the field. Team work (2-3 students) is appreciated.

Leistungsnachweis

Klausur

Graphical and Interactive Systems

4345590   HCI Theory and Research Methods

E. Hornecker, B. Schulte   Veranst. SWS: 3

Vorlesung

Di, wöch., 09:15 - 10:45, online ->Lecture: provided as recorded video via Moodle , ab 12.10.2021

Beschreibung

The course provides an overview of the different perspectives within HCI and of its interdisciplinary nature. It will introduce students to the different types of research methods commonly used within HCI research, ranging from quantitative experimental studies to qualitative research methods and mixed method strategies, and present case studies as examples illustrating the use of these methods. Students will gain practical experience in utilizing a selection of these methods through practical assignments and mini-projects, and work with the research literature.

The course will furthermore provide an overview of how the role of theory in HCI has expanded from the early days of human factors and mathematical modelling of behaviour to include explanatory and generative theories, which reflect influences from fields such as design, sociology, and ethnography.

Successful students should be able to

-    appreciate the diversity of research methods and relate them to research paradigms and theory

-    select research methods appropriate to the domain and research question, based on an understanding of the characteristics, strengths and weaknesses, and practical demands of methods

-    reflect on ethical aspects of study design

-    utilize a range of HCI research methods and approaches to investigate a research question

-    design, plan, and organize user studies and interpret the data

- report and present user studies and findings properly

- relate the role of theory in HCI to the expanding range of methodical approaches utilized for HCI research

engl. Beschreibung/ Kurzkommentar

The course will introduce students to the different types of research methods commonly used within HCI research in order to study and understand people, from quantitative experimental studies to qualitative research methods and mixed method strategies, and will present example case studies illustrating the use of these methods. The focus of this course lies on qualitative methods (e.g. interviews and observation) and qualitative data analysis (that is, approaches which do not rely on statistical analysis). You will gain practical experience in utilizing a selection of these methods through practical assignments and mini-projects, and will work with the research literature.
The course will furthermore provide an overview of how the role of theory in HCI has expanded from the early days of human factors and mathematical modelling of behaviour to include explanatory and generative theories, which reflect influences from fields such as design, sociology, and ethnography.
Successful students should be able to
-   appreciate the diversity of research methods and relate them to research paradigms and theory
-   select research methods appropriate to the domain and research question, based on an understanding of the characteristics, strengths and
    weaknesses, and practical demands of methods
-   utilize a range of HCI research methods and approaches to investigate a research question
-   report and present user studies and findings properly
-   relate the role of theory in HCI to the expanding range of methodical approaches utilized for HCI research
Due to the current situation, the course will be taught online, with a Moodle page as main entry point where you find all further details and access to contents and sessions. Please prepare for a mix of synchronous teaching (where you need to be online at specific times) and asynchronous delivery.
We will start with recorded lectures, but might switch to live-lectures (if this proves to work out). We plan to run the practical sessions in real-time via University online platforms. We also plan a half-hour real-time check-in session per week for discussion and questions. Provided in-person teaching may be allowed again, we may do a few in-presence sessions later in the semester, if this does not leave out any of the participants.
Students need to organize themselves into small groups for assignments and should thus be able to communicate, at least remotely, with each other.

Leistungsnachweis

For 4,5 ECTS: practical assignments in group work and an individual mini-project with report (at end of semester).

To achieve 6 ECTS, students need to do some additional (smaller) individual tasks over the course of the semester.

4556227	Usability Engineering & Testing

J. Ehlers   Veranst. SWS: 4
Vorlesung
Mo, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal A, Lecture Moodle-Link: https://moodle.uni-weimar.de/course/view.php?id=35809, ab 18.10.2021
Do, wöch., 13:30 - 15:00, Lab class (online) , ab 21.10.2021
Do, Einzel, 13:00 - 15:00, Marienstraße 13 C - Hörsaal B, written exam, 17.02.2022 - 17.02.2022

engl. Beschreibung/ Kurzkommentar

  Usability indicates the "absence of frustration". But what makes a product or a service really usable? The course will introduce to the basic concepts, theories and methods of usability engineering and testing. We will discuss quality attributes that constitute good usability and will identify design flaws and product defects. Special emphasis will be put on quantitative measures to determine the ease-of-use of a system in various stages of development. Students will learn how to set up and run an empirical user study, including (but not limited to) test setting (field vs. lab), random sampling, designing and hypothesising. We will also discuss procedures for quantitative data analysis

and adequate forms of documentation. To deepen the knowledge, the lecture is accompanied by practical training courses that link theoretical findings to systems and applications in the field of human-computer interaction.

Leistungsnachweis

Empirical exercises (tutorial) and written exam

4556228   Virtual Reality

B. Fröhlich, C. Bimberg, A. Kunert, S. Mühlhaus, E. Schott, T. Veranst. SWS: 3
Weißker
Vorlesung
Di, wöch., 15:15 - 16:45, Lecture, online (recorded), Moodle Link: https://moodle.uni-weimar.de/course/view.php?id=35223, ab 12.10.2021
Fr, wöch., 09:15 - 10:45, Übung Gruppe A, Starttermin wird noch bekannt gegeben (online), ab 15.10.2021
Fr, wöch., 11:00 - 12:30, Übung Gruppe B - Starttermin wird noch bekannt gegeben (online), ab 15.10.2021

Beschreibung

Virtual Reality (VR) erfreut sich seit mehreren Jahren großer Beliebtheit in Forschung, Unterhaltung und Bildung. VR-Systeme ermöglichen die Interaktion einer oder mehrerer Benutzerinnen mit einer computersimulierten Umgebung, welche dreidimensional auf einem stereoskopischen Display dargestellt wird. In diesem Kurs lernen Sie die theoretischen, technischen und angewandten Grundlagen moderner Virtual Reality-Systeme genauer kennen.

Die Vorlesung beginnt mit den Grundlagen der Computergrafik und des stereoskopischen Sehens, welche zur Realisierung von VR-Anwendungen erforderlich sind. Danach werden Sie verschiedene 3D-Eingabegeräte und 3D-Interaktionstechniken wie Selektion, Manipulation und Navigation in virtuellen Umgebungen kennenlernen. Der letzte Teil des Kurses baut auf dem bereits erworbenen Wissen auf und konzentriert sich auf kollaborative VR-Systeme für mehrere am gleichen oder an verschiedenen Orten befindliche Benutzerinnen.

Die Vorlesung wird von Laborveranstaltungen begleitet, welche neueste Virtual Reality-Technologien wie Multi-Viewer-3D-Projektionssysteme und hochauflösende Head-Mounted Displays einsetzen. Im Rahmen der Übungsaufgaben werden Sie verschiedene 3D-Interaktionstechniken mit diesen immersiven Displays sowie räumlichen Trackingsystemen und 3D-Eingabegeräten implementieren und auswerten. Je nach Situation können Sie auch von zu Hause aus an den Übungen arbeiten. Wir versuchen ausreichend Hardware dafür zur Verfügung zu stellen.

Bemerkung

Digital Engineering or MediaArchitecture students may also attend this lecture if they have already acquired the necessary programming skills through successful completion of appropriate courses and are able to demonstrate their skills at the beginning of the lab course. If you are interested in attending this course, please contact Prof. Fröhlich or one of his staff members named above.

Voraussetzungen

Basic knowledge of computer graphics is recommended. Fundamental programming skills are required.

Leistungsnachweis

Vorlesungsbegleitende, bewertete Übungen, mündliche Prüfung. Ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1.5 ECTS.

Electives

4256303	Photogrammetric Computer Vision

V. Rodehorst, M. Kaisheva   Veranst. SWS: 3

Vorlesung

Mo, wöch., 11:00 - 12:30, Lecture - online (recorded) Moodle-Link: https://moodle.uni-weimar.de/course/view.php?id=35823
Registration for this online course starts Oct, 08th 2021, ab 11.10.2021
Mo, wöch., 13:30 - 15:00, Übung - online (interaktiv) , ab 18.10.2021
Mo, Einzel, 10:00 - 12:00, Steubenstraße 6, Haus F - Hörsaal K20, written exam, 07.02.2022 - 07.02.2022

Beschreibung

Die Vorlesung gibt eine Einführung in die Grundlagen der Sensor-Orientierung und 3D-Rekonstruktion. Das Ziel ist ein Verständnis der Prinzipien, Methoden und Anwendungen der bildbasierten Vermessung. Behandelt werden unter anderem die algebraische projektive Geometrie, Abbildungsgeometrie, Kalibrierung, Orientierungsverfahren, Stereo-Bildzuordnung und weitere Verfahren zur Oberflächenrekonstruktion.

Bemerkung

Voraussetzungen

Einführung in die Informatik, Grundlagen Programmiersprachen

Leistungsnachweis

Erfolgreiche Bearbeitung der Übungen und Klausur; 4,5 ECTS, ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1.5 ECTS (6 ECTS)

4556228	Virtual Reality

B. Fröhlich, C. Bimberg, A. Kunert, S. Mühlhaus, E. Schott, T. Veranst. SWS: 3
Weißker

Vorlesung

Di, wöch., 15:15 - 16:45, Lecture, online (recorded), Moodle Link: https://moodle.uni-weimar.de/course/view.php?id=35223, ab 12.10.2021
Fr, wöch., 09:15 - 10:45, Übung Gruppe A, Starttermin wird noch bekannt gegeben (online), ab 15.10.2021
Fr, wöch., 11:00 - 12:30, Übung Gruppe B - Starttermin wird noch bekannt gegeben (online), ab 15.10.2021

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Voraussetzungen

Basic knowledge of computer graphics is recommended. Fundamental programming skills are required.

Leistungsnachweis

Vorlesungsbegleitende, bewertete Übungen, mündliche Prüfung. Ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1.5 ECTS.

417230000 Virtual Reality – Final Project

B. Fröhlich, C. Bimberg, A. Kunert, S. Mühlhaus, N.N., E. Schott, T. Weißker
Independent Study

Veranst. SWS: 1

Beschreibung

Im Abschlussprojekt der Vorlesung „Virtual Reality" sollen die Teilnehmer die erlangten theoretischen und praktischen Fertigkeiten auf den Entwurf, die Implementierung und die Präsentation eines eigenständigen kleinen Forschungsprojektes anwenden. Dazu soll zunächst ein Projektkonzept entwickelt werden, welches dann mit einer 3D-Engine zu implementieren und abschließend in einem Vortrag zu präsentieren ist. Dies ist eine wertvolle Gelegenheit, mit der modernen VR-Hardware in unserem Lab (Head-Mounted Displays, Multi-User-Projektionssystemen oder Multi-Touch-Tabletops) an einer spannenden Fragestellung Ihrer Wahl zu arbeiten. Je nach Situation können Sie auch von zu Hause aus an dem Projekt arbeiten.

Voraussetzungen

Erfolgreiche Teilnahme an der Veranstaltung „Virtual Reality"

Leistungsnachweis

Abschlusspräsentation

904003 / 4439100   Raumbezogene Informationssysteme/ Spatial information systems (GIS)

T. Gebhardt, V. Rodehorst   Veranst. SWS: 3
Integrierte Vorlesung
Do, gerade Wo, 15:15 - 16:45, Übung online (interactive) , ab 21.10.2021
Mi, wöch., 09:15 - 16:45, Vorlesung online (recorded)

Beschreibung

Die Vorlesung vermittelt vertiefte Grundlagen raumbezogener Informationssysteme, wie z.B. die Aufnahme, Organisation, Analyse und Präsentation raumbezogener Daten. Die Themen umfassen geographische Daten und frei verfügbare Ressourcen, Referenzsysteme und Kartennetzentwürfe, Geo-Datenbanken und effiziente Datenstrukturen, geometrische und topologische Datenanalyse, kartographische Generalisierung und Visualisierung sowie GIS im Planungskontext.

Bemerkung

Für die Selbsteinschreibung in den zugehörigen MOODLE-Lernraum (Hyperlink siehe oben!) lautet das Passwort: **spatial21**

Leistungsnachweis

Erfolgreiche Bearbeitung der Übungen mit abschließender Klausur (4,5 credits)

Ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1,5 credits

421250016   Data Physicalization of Hidden Data

E. Hornecker, R. Koningsbruggen   Veranst. SWS: 4
Seminar
Mo, wöch., 09:15 - 10:45, online, ab 18.10.2021
Mo, wöch., 11:00 - 12:30, online, ab 18.10.2021

Beschreibung

Computers and sensors are becoming more and more integrated and ubiquitous in users' daily environments and routines. Thus, the amount and types of information that is collected is constantly growing. In communication between users, such information can be crucial, but is sometimes difficult to convey due to the lack of language. For example, it is easy to report on a successful training session by referring to miles run or time spent in the gym, but other areas lack such quantifiable metrics or even understandable language at all. We call such information "hidden data" that is typically not directly accessible to users, such as hormone levels, emotional status, or memories and dreams.

The goal of this seminar-project style course is to explore the possibilities for data physicalization of such "hidden data", allowing users to learn a physical language that they can use as a medium for implicit or explicit communication in a collocated situation. Through a designerly approach, we will explore hidden data in our lives, how we can represent this data, and the potential consequences. This course is perfect for students who would like to be challenged to find problems, who enjoy multi-disciplinary group-work, and to come up with their own concepts.

The course is conducted in collaboration between LMU Munich, Bauhaus-Universität Weimar, and University of Augsburg and aims to explore and prototype physical artifacts. Students will focus on research topics such as "interactive/intelligent materials", "flexible/deformable interface materials", "shape-changing interfaces", and "ambient/peripheral interfaces". We encourage students to participate that have a high interest in prototyping with

hardware (e.g., Arduino), working with unconventional materials (e.g., silicone), or using traditional fabrication techniques (e.g., origami-folding).

The course will have a mix of lectures, seminar-style reading, practical exercises as well as a final project. As up to 10 students from each of the three Universities involved can participate, the course will be delivered via online teaching.

This course is co-taught by Dr. Ceenu George (Univ. Augsburg) and Beat Rossmy (MSc), Luke Harrington, M.A.Sc. (LMU).

Bemerkung

max. participants: 10 (of which would be 7 places dedicated for HCI students)

Voraussetzungen

All participants should enjoy working in an interdisciplinary group, want to be creative, build prototypes, and be able to converse in English.

Please send your application until October 12th to eva.hornecker@uni-weimar.de **and** rosa.donna.van.koningsbruggen@uni-weimar.de **(please include a description/portfolio of your prior experience in relevant areas and explain your interest in the project). We will inform accepted students by the 15th.**

Leistungsnachweis

Active participation and interim presentations, practical problem-based work in multidisciplinary groups, and a project-based report.

421250017 Robust and Leakage-Resilient Modes of Operation for Block Ciphers

S. Lucks, J. Boßert, N. Lang
Seminar

Veranst. SWS: 2

Beschreibung

Once you have a block cipher, you need a "mode of operation" to employ the block cipher for anything "useful", such as 1
• modes for encryption, e.g., the counter mode,
• modes for authentication, e.g., variants of the CBC-MAC,
• and authenticated encryption modes, e.g., the Galois-Counter Mode (GCM) or the offset-code-book (OCB) mode.
Most of the modes have been proven secure -- and yet,
there are attacks against these modes. The proofs are always based on a certain set of assumptions, such as a "nonce" never being used a second time,
or the decryption of an invalid ciphertext never been compromised. Thus, "non-standard attacks" or "misuse scenarios", where the adversary may exploit a seemingly
innocent but actually flawed implementation of the mode, allow the adversary to bypass the proven security claims. Moreover, typical proofs consider adversaries to learn
inputs and outputs of the mode (except for the secret key), but not any internal data. Another way to bypass proven security claims and to attack a mode is to gather
"side-channel" information about internal data, e.g., by measuring the response time in a cryptographic protocol, or by measuring the power consumption of a device running
the operation. The seminar is about
• nonstandard attacks,
• side-channel attacks,

• "robust" modes to withstand nonstandard attacks,
• and "leakage-resilient" modes for resistance to side-channel attacks.

engl. Beschreibung/ Kurzkommentar

Das Seminar beschäftigt sich mit Betriebsarten für Blockchiffren, und der Sicherheit dieser Betriebsarten gegen nicht-standard und Seitenkanal Angriffe.

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

4332010	Secure Channels

S. Lucks, J. Boßert
Vorlesung   Veranst. SWS: 4
Di, wöch., 13:30 - 15:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), Lecture, ab 12.10.2021
Fr, wöch., 13:30 - 15:00, Lab class -online Moodle Link:, ab 22.10.2021

Beschreibung

Sicherheitsprotokolle in der Kryptographie

Ein Sicherheitsprotokoll dient der sicheren Kommunikation zwischen zwei oder mehr Teilnehmern. Einfache Sicherheitsprotokolle stellen die Grundfunktionen für andere Sicherheitsprotokolle dar, z.B. die authentische und vertrauliche Übermittlung von Datenpaketen.
In der Vorlesung werden die Anforderungen für Sicherheitsprotokolle vermittelt, und es werden die Stärken und Schwächen Sicherheitsprotokollen diskutiert. Zu den Schwächen gehören auch mögliche Implementationsfehler, die dazu führen, dass ein "an sich sicheres" Protokoll doch angreifbar ist.
Teilnehmerinnen und Teilnehmer der Vorlesung am Ende der Veranstaltung wissen,
   - wie man die Sicherheit von Protokollen definiert,
   - wie man Sicherheitsprotokolle analysiert und ggf.
   - nachweist, dass ein konkretes Protokoll seine Anforderungen erfüllt und
   - wie man Sicherheitsprotokolle korrekt implementiert.

engl. Beschreibung/ Kurzkommentar

Secure Channels

A secure channel, between two or more participants, provides privacy and integrity of the transmitted data. The goal of this course is to understand the principles of designing and analyzing secure channels. The students will learn to distinguish between a secure and an insecure design, by conceiving the basic ideas of secure channels:
   - Formalizing the security requirements
   - Analyzing existing protocol and channel designs
   - How to prove the security of a given design
   - Sound implementation of secure channels

Bemerkung

Die Veranstaltung ersetzt "Einfache Sicherheitsprotokolle" und kann daher nicht gemeinsam mit dieser Veranstaltung angerechnet werden.

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

Voraussetzungen

Cryptography introductory course

Leistungsnachweis

Mündliche Prüfung / oral exam
Beleg als Voraussetzung zur Prüfungszulassung. / Approval for examination is given on the basis of assignments.

4345590	HCI Theory and Research Methods

E. Hornecker, B. Schulte   Veranst. SWS: 3
Vorlesung
Di, wöch., 09:15 - 10:45, online ->Lecture: provided as recorded video via Moodle , ab 12.10.2021

Beschreibung

The course provides an overview of the different perspectives within HCI and of its interdisciplinary nature. It will introduce students to the different types of research methods commonly used within HCI research, ranging from quantitative experimental studies to qualitative research methods and mixed method strategies, and present case studies as examples illustrating the use of these methods. Students will gain practical experience in utilizing a selection of these methods through practical assignments and mini-projects, and work with the research literature.

The course will furthermore provide an overview of how the role of theory in HCI has expanded from the early days of human factors and mathematical modelling of behaviour to include explanatory and generative theories, which reflect influences from fields such as design, sociology, and ethnography.

Successful students should be able to

- appreciate the diversity of research methods and relate them to research paradigms and theory

- select research methods appropriate to the domain and research question, based on an understanding of the characteristics, strengths and weaknesses, and practical demands of methods

- reflect on ethical aspects of study design

- utilize a range of HCI research methods and approaches to investigate a research question

- design, plan, and organize user studies and interpret the data

- report and present user studies and findings properly

- relate the role of theory in HCI to the expanding range of methodical approaches utilized for HCI research

engl. Beschreibung/ Kurzkommentar

The course will introduce students to the different types of research methods commonly used within HCI research in order to study and understand people, from quantitative experimental studies to qualitative research methods and mixed method strategies, and will present example case studies illustrating the use of these methods. The focus of this course lies on qualitative methods (e.g. interviews and observation) and qualitative data analysis (that is,

approaches which do not rely on statistical analysis). You will gain practical experience in utilizing a selection of these methods through practical assignments and mini-projects, and will work with the research literature.

The course will furthermore provide an overview of how the role of theory in HCI has expanded from the early days of human factors and mathematical modelling of behaviour to include explanatory and generative theories, which reflect influences from fields such as design, sociology, and ethnography.

Successful students should be able to

- appreciate the diversity of research methods and relate them to research paradigms and theory
- select research methods appropriate to the domain and research question, based on an understanding of the characteristics, strengths and

  weaknesses, and practical demands of methods
- utilize a range of HCI research methods and approaches to investigate a research question
- report and present user studies and findings properly
- relate the role of theory in HCI to the expanding range of methodical approaches utilized for HCI research

Due to the current situation, the course will be taught online, with a Moodle page as main entry point where you find all further details and access to contents and sessions. Please prepare for a mix of synchronous teaching (where you need to be online at specific times) and asynchronous delivery.

We will start with recorded lectures, but might switch to live-lectures (if this proves to work out). We plan to run the practical sessions in real-time via University online platforms. We also plan a half-hour real-time check-in session per week for discussion and questions. Provided in-person teaching may be allowed again, we may do a few in-presence sessions later in the semester, if this does not leave out any of the participants.

Students need to organize themselves into small groups for assignments and should thus be able to communicate, at least remotely, with each other.

Leistungsnachweis

For 4,5 ECTS: practical assignments in group work and an individual mini-project with report (at end of semester).

To achieve 6 ECTS, students need to do some additional (smaller) individual tasks over the course of the semester.

4439110   Introduction to Machine Learning

B. Stein, J. Bevendorff, M. Völske   Veranst. SWS: 4
Vorlesung
Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A, Lecture , ab 21.10.2021
Do, wöch., 11:00 - 13:00, Marienstraße 13 C - Hörsaal A, Lab class dates: 28. Oktober 2021   11. November 2021   25. November 2021   9. Dezember 2021   6. Januar 2022   20. Januar 2022   3. Februar 2022, ab 28.10.2021
Mo, Einzel, 09:00 - 11:00, Marienstraße 13 C - Hörsaal B, written exam, 21.02.2022 - 21.02.2022

Beschreibung

Students will learn to understand machine learning as a guided search in a space of possible hypotheses. The mathematical means to formulate a particular hypothesis class determines the learning paradigm, the discriminative power of a hypothesis, and the complexity of the learning process. Aside from foundations of supervised learning also an introduction to unsupervised learning is given. The lecture introduces concepts, algorithms, and theoretical backgrounds. The accompanying lab treats both theoretical and applied tasks to deepen the understanding of the field. Team work (2-3 students) is appreciated.

Leistungsnachweis

Klausur

4446631   Online Computation

R. Adejoh, A. Jakoby   Veranst. SWS: 4
Vorlesung

Di, wöch., 11:00 - 12:30, Bauhausstraße 11 - Seminarraum 015, Lecture, ab 12.10.2021
Di, wöch., 17:00 - 18:30, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), lab class, ab 12.10.2021

Beschreibung

Online Berechnungen

Online-Berechnung beschreibt ein Modell für Algorithmen und Probleme, die Entscheidung unter Unsicherheit erfordern. In einem Online-Problem hat der Algorithmus nicht den Zugriff auf die gesamte Eingangs von Anfang an: die Eingabe erfolgt in einer Folge von Schritten. Ein Online-Algorithmus kann seine Berechnungen nur auf die beobachtete Vergangenheit beziehen, ohne dass gesichertes Wissen über die bevorstehende Folge in der Zukunft vorhanden ist. Die Auswirkungen einer Entscheidung können nicht rückgängig gemacht werden.
Online Problemen und Algorithmen finden ihre Anwendung in vielen Bereichen, wie zum Beispiel:

- Datenstrukturen,

- Optimierungsprobleme,

- Geometrische Algorithmen,

- Parallele und verteilte Systeme,

- Planungsprobleme.

In der Vorlesung Online Berechnung, werden wir einige Online-Probleme und Algorithmen vorstellen und analysieren. Ferner werden einige grundlegende Methoden aus einigen aus den obigen Bereichen vorgestellt.

engl. Beschreibung/ Kurzkommentar

Online Computation

Online computation is a model for algorithms and problems which require decision under uncertainty. In an online problem the algorithm does not know the entire input from the beginning: the input is revealed in a sequence of steps. An online algorithm should make its computation based only on the observed past and without any secure knowledge about the forthcoming sequence in the future. The e#ects of a decision taken cannot be undone.

We find online problems and online algorithms within many areas, such as

- data structures,

- optimization problems,

- geometric algorithms,

- parallel and distributed systems,

- scheduling problems.

In the lecture Online Computation, we will present and analyze online problems and algorithms as well as some basic methods from some of these areas.

Voraussetzungen

BSc in a relevant study field

Leistungsnachweis

oral or written examination (depending on the number of students)

4526501   Academic English Part One

G. Atkinson   Veranst. SWS: 2
Kurs
Di, wöch., 17:00 - 18:30, Online (Moodle) , ab 02.11.2021

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.

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, ab 03.11.2021

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.

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

4556227	Usability Engineering & Testing

J. Ehlers
Vorlesung

Veranst. SWS: 4

Mo, wöch., 15:15 - 16:45, Marienstraße 13 C - Hörsaal A, Lecture Moodle-Link: https://moodle.uni-weimar.de/course/view.php?id=35809, ab 18.10.2021
Do, wöch., 13:30 - 15:00, Lab class (online) , ab 21.10.2021
Do, Einzel, 13:00 - 15:00, Marienstraße 13 C - Hörsaal B, written exam, 17.02.2022 - 17.02.2022

engl. Beschreibung/ Kurzkommentar

  Usability indicates the "absence of frustration". But what makes a product or a service really usable? The course will introduce to the basic concepts, theories and methods of usability engineering and testing. We will discuss quality attributes that constitute good usability and will identify design flaws and product defects. Special emphasis will be put on quantitative measures to determine the ease-of-use of a system in various stages of development. Students will learn how to set up and run an empirical user study, including (but not limited to) test setting (field vs. lab), random sampling, designing and hypothesising. We will also discuss procedures for quantitative data analysis and adequate forms of documentation. To deepen the knowledge, the lecture is accompanied by practical training courses that link theoretical findings to systems and applications in the field of human-computer interaction.

Leistungsnachweis

Empirical exercises (tutorial) and written exam

Project

321220029	How to? Prototyping: methods and technologies

E. Hornecker, Projektbörse Fak. KuG, H. Waldschütz

Veranst. SWS: 10

Projekt

Beschreibung

Concepts and Designs mostly start as Ideas and sketches. But in order to understand if, how and why they work, the creation of prototypes are often the next logical step.

In this project, you will be challenged to bring some concepts and ideas to real life with different methods of prototyping.

We will introduce, use and discuss several approaches of prototyping and production methods in the context of HCI. From rather design oriented methods like storyboarding, video prototyping or clay sculpting, to functional prototypes built with software, electronics and physical materials.

This project will start with weekly exercices which will eventually evolve to the creation of physical objects using different modalities such as visual, auditory, and haptic. Through a designerly approach, this project will explore the many variations how we can tackle the problem of dealing with materiality and functionality to make things work. Guided by literature we discuss the role of prototyping in the user centred design process.

This project is perfect for students who would like to be challenged to find problems and come up with their own concepts and like to work with different materials and techniques.

Bemerkung

time and place: t.b.a.

participants:

HCI/CSM4D/Mi : 6

PD/MA: 2

Total: 8

Voraussetzungen

Interest in understanding concepts, designing interactive systems and creative thinking, interest in working with literature. Ideally, you have some prior experience with Arduino and electronics. You should be interested in developing novel interactive devices and interaction. Moreover, all participants should enjoy working in an interdisciplinary team and be able to converse in English.

Students of Bachelor/Master Produktdesign, Master Mediaart, Master MediaArchitecture:

Please send your application until October 12th to hannes.waldschuetz@uni-weimar.de <mailto:hannes.waldschuetz@uni-weimar.de> and eva.hornecker@uni-weimar.de <mailto:eva.hornecker@uni-weimar.de> (please include a description/portfolio of your prior experience in relevant areas and explain your interest in the project). We will inform accepted students by the 15th.

Leistungsnachweis

Active participation and interim presentations, reading of literature, autonomous and self-initiated work mode, technical or design work, potentially also small user study, documentation as written (scientific) report

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421210000 4D-SPACE: 4D Scene and Performance Analysis in Collaborative virtual Environments

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

Veranst. SWS: 10

Beschreibung

4D-SPACE: 4D Scene and Performance Analysis in Collaborative virtual Environments

Collaborative virtual reality systems, such as our immersive group-to-group telepresence system [1], allow multiple users to interact in a shared virtual environment. Collaboration between distributed parties and in particular gestural communication can be facilitated by including realistic user representations (volumetric avatars). Such systems can be leveraged to analyse human actions and interactions. For example, researchers may want to study social interaction in realistic situations, but desire a strict control over the situation that a real-life setting may not afford [2]. An experiment that takes place in virtual reality can provide that control, while maintaining the plausibility of the situation. In creative fields, the possibility to create realistic virtual user representations gives physical performers like actors and dancers the opportunity to evaluate their movements with richer information than that provided by a simple video stream.

To support retrospective analysis of action and interaction, it is essential that user sessions in virtual environments can be recorded and subsequently replayed for exploration, annotation, and coding. In this project, we aim to develop a tool for 4D scene and performance analysis in collaborative environments. The software will be able to capture and replay multi-modal interaction between users in a virtual environment, as well as dynamic performances recorded in our lab space. Continuous information about users' position and orientation should be recorded, as well as audio streams for speech and conversation analysis. When realistic user representations, such as volumetric avatars are required, these should also be encoded in a manner that allows reconstruction at the original quality level.

The main challenges in this project are recording and synchronizing a plethora of different data streams, and storing them in a compact format that preserves the quality of the live reconstruction and allows the performance to be replayed on-demand for analysis and annotation purposes.

 You have an affinity for real-time systems and in particular Unity, feel confident in C++ programming and are interested in asynchronous and concurrent programming? Great! You want to learn about standard compression libraries or even want to explore state-of-the-art compression papers to tackle the challenge of real-time compression of large data streams? Perfect! If at least one of the two sentences describes you, we would look forward to welcoming you in our project!

Bemerkung

time and place: t.b.a.

Voraussetzungen

Solide C++-Kenntnisse (STL, C++14 oder höhere Standards) , Erfahrung im Bereich der Echtzeit-Computergrafik

421210001 Bringing Structure to Social Media Discussions

B. Stein, J. Kiesel, N.N., M. Wolska
Projekt

Veranst. SWS: 10

Beschreibung

The Web manifests various resources for obtaining arguments. Debate portals such as idebate.org and kialo.com provide an organized overview of arguments. Still, creating discussions there requires substantial effort, and hence, considering recent controversial topics might be postponed for some time. Social media discussions on controversial topics, such as those in Reddit and Facebook, expose arguments in a less-organised way (thread style), but they consider an up-to-date overview of arguments. The goal of this project is to utilize the advantages of the two resources, by transforming up-to-date arguments in social media discussions to a debate platform organized style.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421210002   Extraction of main content and metadata from web crawls

B. Stein, J. Bevendorff, E. Körner, M. Wolska   Veranst. SWS: 10
Projekt

Beschreibung

Extraktion von Main-Content und Metadaten aus Web-Crawls

In this project, we will extract author and meta information from websites on a web-scale (Big Data). We will use approaches from natural language processing to extract and analyze content from social media sources (e.g. novelupdates) to create benchmarking datasets for authorship analytics (e.g., profiling and verification).

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421210003   FL BaSe - Formal-Language Based Security WiSe21/22

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

421210004   Hot Topics in Computer Vision WiSe21/22

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)

Leistungsnachweis

Aktive Mitarbeit, Einführungsvortrag, Abschlusspräsentation, Dokumentation

421210005   (Hypo)Vigilance and Behaviour

J. Ehlers
Projekt

Veranst. SWS: 10

Beschreibung

Drowsiness due to long driving times impairs the ability to react quickly in case of sudden events. Tallying with this, the Yerkes-Dodson Law states that behavioural output can be depicted as an inverted U-shaped curve with low (fatigue) and high arousal (stress) involving decrements in performance. To depict physiological changes as well as behavioural consequences in tiring situations, the project aims to create virtual scenarios (e.g. driving tasks, monitoring activities) that systematically lower or increase bodily arousal. We plan to collect EEG (brainwaves) and pupillary data to determine individual activation states and apply reactions times/accuracy rates to index changes in behavioural performance.

Bemerkung

time and place: t.b.a.

Voraussetzungen

We assume you are interested in carrying out empirical studies to evaluate physiological and behavioural measures for the determination of vigilance. (Basic) Programming skills are a precondition; experience with Unity as well as knowledge of quantitative research and the experimental method is helpful.

Leistungsnachweis

Project members are asked to create and implement virtual scenarios that enable to vary the level of bodily arousal. Empirical studies are to be carried out to uncover the relationship between physiological changes and behavioural performance. Results need to be statistically tested and documented in a lab report.

421210006   In Dialog with the Virtual Museum

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

Veranst. SWS: 10

Beschreibung

Though current "smart" assistants like Alexa, Siri, or Google Assistant are very limited in their capabilities, they foreshadow a time in which we can talk to "the Web" like we do to a human. One of the current challenges for such assistants is, after they identified the relevant bits of information, to formulate answers as a human would. This project will focus on tackling this challenge for a specific situation, namely while visiting a virtual museum. In this project, which is part of a largeer collaboration to make this museum "reality," the participants will research on and learn to apply methods of information representation, natural language generation, and voice interaction.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421210007 Indiegame Development Lab

C. Wüthrich, W. Kissel, G. Pandolfo
Projekt
Mi, wöch., 13:30 - 16:30, Bauhausstraße 11 - Seminarraum 015, ab 20.10.2021

Veranst. SWS: 10

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

421210008 Music Performances in Virtual Reality

B. Fröhlich, S. Mühlhaus
Projekt

Veranst. SWS: 10

Beschreibung

Music Performances in Virtual Reality

Music performances offer a vast design space that has historically evolved according to interactive multimedia systems. Artists and consumers alike appreciate a live music performance not only for auditory stimuli but for the sum of all aspects that can be found at a venue. Desktop systems, tablets and smartphones can only address

this demand to a limited extent. That is why an increasing number of applications target VR technology to deliver compelling immersive experiences for both artists and audiences.

Our vision for a VR live concert experience includes an artistic representation for the performance, channels for communication of artist to crowd, crowd to artist and crowd to crowd as well as a suitable degree of agency for all participants. Tools and systems supporting such a concert experience require suitable integrations into the creative workflows of artists.

In this project, we will take first steps towards the aforementioned vision. Our investigations will begin by reviewing available applications and related work for VR performances and music-based creation of dynamic virtual environments. We will then evaluate the benefits and drawbacks of the various approaches. Finally, we will implement a set of promising techniques towards a system that enables music performances in VR.

Hardware

Due to the covid-19 pandemic, working from our lab may only be possible to a limited extent. Nevertheless, we want to supply you with state-of-the-art hardware and boost your journey into immersive virtual worlds.

For the duration of the project, each participant will be supplied with an Oculus Quest 2 HMD. We will also hand out desktop workstations to meet any additional hardware requirements, which your own machine cannot handle.

Depending on the scope of your contribution, we will consider acquiring a multi-channel audio interface to integrate your own instruments or vocals.

Apart from deploying your applications using this hardware, we strongly encourage you to explore related VR applications in the wild!

Bemerkung

time and place: will be arranged with the students after project assignment

Voraussetzungen

- strong interest in creative workflows and music performances

- solid programming / scripting skills (C#, C++, Python or similar)

Advantages are experience in:

- Unity3D development

- digital signal processing

- social VR development

421210009 NoRa - No Ransom

S. Lucks, J. Boßert, N. Lang
Projekt

Veranst. SWS: 10

Beschreibung

In a previous project, students developed a prototype of a fileserver that hinders various kinds of ransomware attacks.

This semester, we would like to extend the prototype to a version that can be used in practice.

This includes programming in C++ and Python, as well as finding solutions to edgecases that have not been dealt with yet.

Bemerkung

time and place: t.b.a.

421210010 Rearranging Pixels VII

C. Wüthrich, F. Andreussi
Projekt

Veranst. SWS: 10

Beschreibung

Since the introduction of digital cameras, computer raster monitors and printing devices, the world of pixels has been ordered on a square based raster, limiting optimal signal sampling to two main directions, and creating collateral problems where the grid density causes undersampling of the light signal. This project will tackle the problem, exploring new and unconventional ways of sampling light signals. The focus will be set on the development of new robust methods and on their evaluation, and compare traditional square sampling to the new methods. The conception and development of new devices will be a major focus of the project.

Bemerkung

Time and place will be announced at the project fair.

421210011 Ten Tweaks to Icicles Plots: A cool visualization for discussion quality in comments

B. Fröhlich, N.N., J. Reibert
Projekt

Veranst. SWS: 10

Beschreibung

Etwa 300 Nachrichtenartikel werden laut The GDELT Project (https://www.gdeltproject.org/) jede Minute online veröffentlicht. Viele Plattformen bieten NutzerInnen die Möglichkeit, Artikel mit anderen in Form von Kommentaren zu diskutieren. Die Qualität dieser Diskussionen beeinflusst dabei maßgeblich die Meinungen, die sich sowohl aktiv beteiligte als auch konsumierende NutzerInnen zu dem Thema bilden. Daher ist es das Anliegen vieler Sozialforscher, so auch des Lehrstuhls für Kommunikationswissenschaft mit dem Schwerpunkt Empirische Methoden um Prof. Dr. Ines Engelmann, herauszufinden, welche Faktoren sowohl auf Ebene des Artikels und der Nachrichtenplattform als auch der Kommentare selbst die Qualität der Diskussionen nachhaltig beeinflussen. Dazu hat der Lehrstuhl 14.6k Kommentare zu 175 Artikeln von 8 Newsplattformen gesammelt und manuell mit Merkmalen der Plattform, des Artikels und des Kommentars versehen. Da die Kommentare durch sich aufeinander beziehende Antworten eine hierarchische Struktur aufweisen, bietet sich eine Darstellung der Daten durch einen Icicle plot (https://observablehq.com/@d3/icicle) an. Im Projekt sollen dessen Möglichkeiten exploriert werden, eine

interaktive Übersicht über die hierarchische Struktur und Eigenschaften der Kommentare zu geben. Herausfordernd hierbei sind verschiedene Aspekte, denn sowohl die Anzahl der Kommentare pro Artikel schwankt sehr stark, als auch die Tiefe der entstehenden Hierarchie. Um diese Herausforderungen zu berücksichtigen und darüber hinaus Qualitätsmerkmale der Kommentare in Bezug zu Eigenschaften der Artikel und Plattformen zu setzen, bedarf es kreativer Lösungswege, die wir in diesem Projekt explorieren und unter Nutzung webbasierter Technologien – allen voran Javascript und HTML5 – realisieren wollen.

Bemerkung

Ort und Zeit: nach Projektvergabe mit den Studierenden ausgemacht

Voraussetzungen

Kenntnisse im Bereich HTML5 und Javascript, im Idealfall auch mit d3.js

Leistungsnachweis

Aktive Mitarbeit, sowie Zwischen- und Endpräsentation

421210012 Watch Language Models _____ Low-context Word Prediction Tests

B. Stein, M. Völske, M. Wiegmann, M. Wolska
Projekt

Veranst. SWS: 10

Beschreibung

Correctly answering word prediction tests is a _____ task for many language models. It is used in various applications, like our own netspeak.org. This task gets particularly difficult if the context is limited: "is a _____ task". In this project, we want to investigate how several different language models answer word prediction tests under varying given contexts sizes, given genres of text, and phrase structure of the test. We target three milestones for this project: (1) Collect existing word prediction test datasets, (2) construct a new dataset of word prediction tests that covers all the parameters we want to vary, and (3) run different language models on the datasets and evaluate the results.

Bemerkung

time and place: t.b.a.

Leistungsnachweis

Abschlusspräsentation und Ausarbeitung

421210015 BlueP - The Truth behind Matrix: Virtual Machines and the Blue Pill Environment

R. Adejoh, A. Jakoby
Projekt

Veranst. SWS: 10

421210016 Reinventing the smartphone

E. Hornecker, M. Honauer, B. Schulte
Projekt
Di, wöch., 15:15 - 18:30, Karl-Haußknecht-Straße 7 - Seminarraum (IT-AP) 001

Beschreibung

The smartphone has become our constant companion but does it have to be that way? What is a smartphone? Why is it the way it is? Based on something we are all familiar with, we will explore different methods and positions: from UX to feminist theory and speculative design.

Through user studies, critical readings and design experiments, we will try to understand the phone on a functional and social level and engage in speculation about potential alternative designs. The project will touch on the following points, but is not limited to:

- usage/ habits/ common features
- history of the (smart)phone
- (dis)abled users
- present and future smartphone technologies

In the first phase, we will focus on the way we use the smartphone, introducing methods for user studies (e.g. diaries or auto-ethnography), before touching on technical requirements and limitations of phones. After a phase of shared exploration, we will split up into smaller groups for in-depth engagement with specialist topics (e.g. smartphones for non-humans, inconvenient smartphone designs, wearable smartphones, shape-changing smartphones, smartphones for special user groups, ...).

Through this project you will not only be introduced to user research methods, but also will engage with critical literature, such as feminist or queer voices as well as get insights into highly creative speculative design methods. In addition, we will engage with several small design experiments to approach the topic not just from a theoretical and thinking perspective, but to also explore why/how to reinvent the smartphone through prototyping and practical hands-on activities.

Bemerkung

participants

HCI: 5

CSM4D: 3

Total: 8

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)

Leistungsnachweis

Regular presentations & discussions, documentation of the process, commitment to shared goals & deadlines, submission of assignments, video presentation, final report

Specialization

4256303	Photogrammetric Computer Vision

V. Rodehorst, M. Kaisheva

Veranst. SWS: 3

Vorlesung
Mo, wöch., 11:00 - 12:30, Lecture - online (recorded) Moodle-Link: https://moodle.uni-weimar.de/course/view.php?id=35823
Registration for this online course starts Oct, 08th 2021, ab 11.10.2021
Mo, wöch., 13:30 - 15:00, Übung - online (interaktiv) , ab 18.10.2021
Mo, Einzel, 10:00 - 12:00, Steubenstraße 6, Haus F - Hörsaal K20, written exam, 07.02.2022 - 07.02.2022

Beschreibung

Die Vorlesung gibt eine Einführung in die Grundlagen der Sensor-Orientierung und 3D-Rekonstruktion. Das Ziel ist ein Verständnis der Prinzipien, Methoden und Anwendungen der bildbasierten Vermessung. Behandelt werden unter anderem die algebraische projektive Geometrie, Abbildungsgeometrie, Kalibrierung, Orientierungsverfahren, Stereo-Bildzuordnung und weitere Verfahren zur Oberflächenrekonstruktion.

Bemerkung

Voraussetzungen

Einführung in die Informatik, Grundlagen Programmiersprachen

Leistungsnachweis

Erfolgreiche Bearbeitung der Übungen und Klausur; 4,5 ECTS, ein abschließendes Projekt wird separat bewertet und erhält zusätzliche 1.5 ECTS (6 ECTS)

4332010	Secure Channels

S. Lucks, J. Boßert

Veranst. SWS: 4

Vorlesung
Di, wöch., 13:30 - 15:00, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), Lecture, ab 12.10.2021
Fr, wöch., 13:30 - 15:00, Lab class -online Moodle Link:, ab 22.10.2021

Beschreibung

Sicherheitsprotokolle in der Kryptographie

Ein Sicherheitsprotokoll dient der sicheren Kommunikation zwischen zwei oder mehr Teilnehmern. Einfache Sicherheitsprotokolle stellen die Grundfunktionen für andere Sicherheitsprotokolle dar, z.B. die authentische und vertrauliche Übermittlung von Datenpaketen.
In der Vorlesung werden die Anforderungen für Sicherheitsprotokolle vermittelt, und es werden die Stärken und Schwächen Sicherheitsprotokollen diskutiert. Zu den Schwächen gehören auch mögliche Implementationsfehler, die dazu führen, dass ein "an sich sicheres" Protokoll doch angreifbar ist.
Teilnehmerinnen und Teilnehmer der Vorlesung am Ende der Veranstaltung wissen,
  - wie man die Sicherheit von Protokollen definiert,
  - wie man Sicherheitsprotokolle analysiert und ggf.
  - nachweist, dass ein konkretes Protokoll seine Anforderungen erfüllt und
  - wie man Sicherheitsprotokolle korrekt implementiert.

engl. Beschreibung/ Kurzkommentar

Secure Channels

A secure channel, between two or more participants, provides privacy and integrity of the transmitted data. The goal of this course is to understand the principles of designing and analyzing secure channels. The students will learn to distinguish between a secure and an insecure design, by conceiving the basic ideas of secure channels:
- Formalizing the security requirements
- Analyzing existing protocol and channel designs
- How to prove the security of a given design
- Sound implementation of secure channels

Bemerkung

Die Veranstaltung ersetzt "Einfache Sicherheitsprotokolle" und kann daher nicht gemeinsam mit dieser Veranstaltung angerechnet werden.

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

Voraussetzungen

Cryptography introductory course

Leistungsnachweis

Mündliche Prüfung / oral exam
Beleg als Voraussetzung zur Prüfungszulassung. / Approval for examination is given on the basis of assignments.

4439110	Introduction to Machine Learning

B. Stein, J. Bevendorff, M. Völske   Veranst. SWS: 4
Vorlesung

Do, wöch., 09:15 - 10:45, Marienstraße 13 C - Hörsaal A, Lecture , ab 21.10.2021
Do, wöch., 11:00 - 13:00, Marienstraße 13 C - Hörsaal A, Lab class dates: 28. Oktober 2021   11. November 2021   25. November 2021   9. Dezember 2021   6. Januar 2022   20. Januar 2022   3. Februar 2022, ab 28.10.2021
Mo, Einzel, 09:00 - 11:00, Marienstraße 13 C - Hörsaal B, written exam, 21.02.2022 - 21.02.2022

Beschreibung

Students will learn to understand machine learning as a guided search in a space of possible hypotheses. The mathematical means to formulate a particular hypothesis class determines the learning paradigm, the discriminative power of a hypothesis, and the complexity of the learning process. Aside from foundations of supervised learning also an introduction to unsupervised learning is given. The lecture introduces concepts, algorithms, and theoretical backgrounds. The accompanying lab treats both theoretical and applied tasks to deepen the understanding of the field. Team work (2-3 students) is appreciated.

Leistungsnachweis

Klausur

4446631	Online Computation

R. Adejoh, A. Jakoby   Veranst. SWS: 4
Vorlesung

Di, wöch., 11:00 - 12:30, Bauhausstraße 11 - Seminarraum 015, Lecture, ab 12.10.2021
Di, wöch., 17:00 - 18:30, Karl-Haußknecht-Straße 7 - Hörsaal (IT-AP), lab class, ab 12.10.2021

Beschreibung

Online Berechnungen

Online-Berechnung beschreibt ein Modell für Algorithmen und Probleme, die Entscheidung unter Unsicherheit erfordern. In einem Online-Problem hat der Algorithmus nicht den Zugriff auf die gesamte Eingangs von Anfang an: die Eingabe erfolgt in einer Folge von Schritten. Ein Online-Algorithmus kann seine Berechnungen nur auf die beobachtete Vergangenheit beziehen, ohne dass gesichertes Wissen über die bevorstehende Folge in der Zukunft vorhanden ist. Die Auswirkungen einer Entscheidung können nicht rückgängig gemacht werden.
Online Problemen und Algorithmen finden ihre Anwendung in vielen Bereichen, wie zum Beispiel:

- Datenstrukturen,

- Optimierungsprobleme,

- Geometrische Algorithmen,

- Parallele und verteilte Systeme,

- Planungsprobleme.

In der Vorlesung Online Berechnung, werden wir einige Online-Probleme und Algorithmen vorstellen und analysieren. Ferner werden einige grundlegende Methoden aus einigen aus den obigen Bereichen vorgestellt.

engl. Beschreibung/ Kurzkommentar

Online Computation

Online computation is a model for algorithms and problems which require decision under uncertainty. In an online problem the algorithm does not know the entire input from the beginning: the input is revealed in a sequence of steps. An online algorithm should make its computation based only on the observed past and without any secure knowledge about the forthcoming sequence in the future. The e#ects of a decision taken cannot be undone.

We find online problems and online algorithms within many areas, such as

- data structures,

- optimization problems,

- geometric algorithms,

- parallel and distributed systems,

- scheduling problems.

In the lecture Online Computation, we will present and analyze online problems and algorithms as well as some basic methods from some of these areas.

Voraussetzungen

BSc in a relevant study field

Leistungsnachweis

oral or written examination (depending on the number of students)