



Artificial Intelligence

About this Course

Prof. Dr. Jörg Hoffmann

Prof. Dr. habil. Jana Koehler

Summer 2020

A Podcast is available with these slides:
Login to the CMS, go to Information >
Materials > Lecture Podcasts

Artificial Intelligence Lecture at UdS in 2020

- Introduction into important subfields of AI, concepts and algorithms for various degree programs such as informatics, embedded systems, computer linguistics, media informatics ...
 - Prerequisite knowledge is different, the lecture is self-contained and some basics may be known to some of you, but not everybody
- 2 lectures per week
- Approx. weekly theoretical and bi-weekly practical exercise sheets
 - Discussed in tutorial sessions
 - No programming required, but modeling!

The Team

Lecturer



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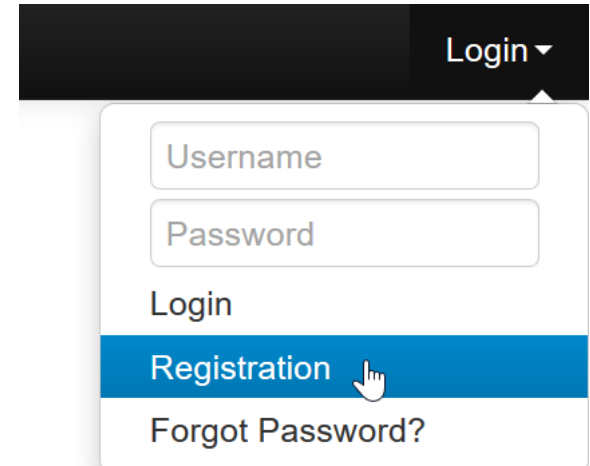
do@osmelak.de

Times & Locations (Tentative, Subject to Change)

- Lecture
 - Mondays 16:15 to 17:45 HS I in E2.5 or via Zoom
 - Tuesdays 14:15 to 15:45 HS I in E2.5 or via Zoom
- Tutorial Groups
 - Mondays 10-12 Thorsten Klößner
 - Tuesdays
 - 8-10 Doreen Osmelak
 - 12-14 Tobias Bleymehl
 - 16-18 Christian Eisenhut
 - 16-18 Katharina Christian
 - Thursdays 14-16 Tanja Bäumel
 - Fridays 10-12 Tim Arendes
- **Changes will be published as News and Calendar updates in the CMS!**

Course Web Page and Resources

- https://cms.sic.saarland/ai_20
- All slides and exercise sheets
- Additional material (audios, ...)
- Calendar with up-to-date information
- Announcements, tutorial groups
- Discussion forum for technical questions, . . .
- **YOU MUST REGISTER in the CMS!**
 - Use your UdS account
 - If you do not have one yet or have difficulties with registration, write email to Daniel Höller
 - hoeller@cs.uni-saarland.de



The screenshot shows a dark header bar with a 'Login' button and a dropdown arrow. Below the header, there is a white box containing a 'Username' input field, a 'Password' input field, a 'Login' button, a 'Registration' button (highlighted in blue with a mouse cursor icon), and a 'Forgot Password?' link.

A Note on Copyright Law

- All material made available on the CMS is for your personal use and subject to copyright protection
 - Copy and distribution of the material to external sites constitutes a copyright infringement
- Recording of streamed lectures or tutorials is not permitted unless you obtained the prior written consent of all involved participants

Organization of Tutorials and Student Groups

- Define your preferences in the CMS until **Thursday, 7th of May midnight**
- You will be assigned to the group that best fits your preferences modulo available seats until Friday, 8th of May (visible in CMS)
- Participation not mandatory, but highly recommended
 - However, you must submit enough sheets to qualify for the exam
- You can work in groups of up to 3 students
- Groups must remain stable for the entire semester
- All group members are registered for the same tutorial group

Theoretical Exercise Sheets

- In electronic form, points to earn can vary
- Submit via CMS as PDF file
- 1-week intervals for hand-out/submission
 - Hand-out: week n , submission: week $n+1$, tutorial week $n+2$
 - Detailed information on submission deadline and format is available on each sheet (and may vary)
- Understand concepts and algorithms from the course
- Apply concepts and algorithms to examples
- Do simple proofs

Practical Exercise Sheets

- In electronic form, points to earn can vary
- Submit via CMS in format as described on sheet
- 2-week intervals for hand-out/submission:
 - Handout: week n , submission week $n+2$, feedback by email
 - Detailed information on submission deadline and format is available on each sheet (and may vary)
- Experience with AI modeling languages and tools
 - Model given problems in AI formalisms, solve with of-the-shelf tools
 - Models checked by the tutors, graded based on correctness and completeness

Duplicate Solutions Policy on Practical Exercises

- We will check for identical solutions across student groups
- All teams involved (provider and copier of solution) will get no points!
- This can lead to exclusion from the exam
- Do not copy/paste models!!!


Admission to Exam and Re-Exam

- Exam qualification: $\geq 50\%$ points on each sheet for 75% of the published theoretical exercise sheets AND for 75% of the published practical exercise sheets (rounded to next integer)
 - This year: 7 out of 9 theoretical and 3 out of 4 practical sheets
- Double Registration Policy
 - Registration in HISPOS for the exam is mandatory until 2 weeks before the exam date!
 - YOU must also register for the exam in the CMS
- Non-computer-science students
 - Must register in the examination office of your study program and register in the CMS, but not HISPOS

Exam vs. Re-Exam

- Each exam is a separate attempt to pass this course
- Both exams taken ► better score counts
- ATTENTION! Once you pass the course, you CANNOT improve your grade in later years
- The re-exam within the same year is your only chance to improve your grade

Exam Open Book Policy

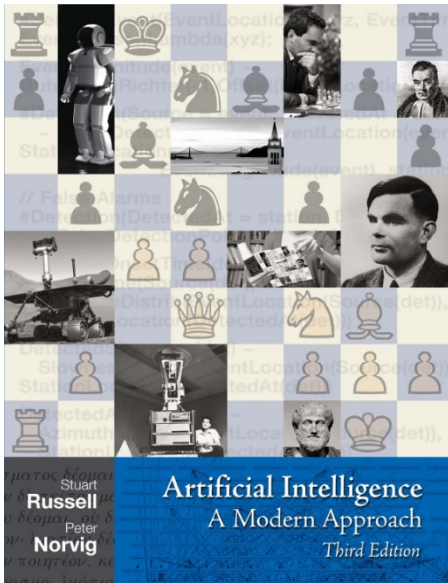
- Written Exam 120 Minutes
- Allowed to bring entire course material on paper
 - Highly not recommended
 - You will receive a negative list on what is NOT-exam-relevant, everything not on this list, is relevant
- Relevant slides in the lectures by Jana Koehler are marked with  (recommendation only, make your own choice)
- No laptops or mobile phones

Exam and Re-Exam Dates (Tentative)

- 2-4 pm
- 21.07.2020
 - GHH, HS I, HS II, HS III in E2 5,
 - HS 001, HS002 and HS 003 in E1 3
- 30.09.2020
 - GHH, HS I, HS II in E2 5, HS002 in E1 3
- Exam inspection:
 - 30.07.2020 between 2-5 pm (HS002 in E1.3)
 - 7.10.2020 between 2-4 pm (HS002 in E1.3)

Textbook – The Famous AIMA Book

- <http://aima.cs.berkeley.edu>



Stuart Russell

Peter Norvig

Artificial Intelligence – A Modern Approach

PRENTICE HALL SERIES IN ARTIFICIAL INTELLIGENCE

3rd Edition, 2016

All our chapter numbers and references for recommended reading in the slides are based on this edition! Note that editions differ in numbering!

If you cannot buy the book, you find pirate copies on the web, search for aima pdf download - however not recommended, buy an online copy

4th Edition is announced for Mid April - not relevant for this lecture (we continue to work with the 3rd edition this year)

Course Outline (Tentative)

Exact times see CMS!
**optional online material*

Week	Topic	Lecturer
April*	Introduction	Koehler
April*	Intelligent Agents	Koehler
May	Search Algorithms	Koehler
May	Propositional Logic	Koehler
May	Predicate Logic	Hoffmann
June	Adversarial Search	Hoffmann
June	Knowledge Representation and Reasoning	Koehler
June	Constraint Satisfaction	Hoffmann
June	Machine Learning Basics	Koehler
June/July	AI Planning	Hoffmann
July	Probabilistic Reasoning	Koehler
July	Examen Preparation	Chief Tutors

Learning Objectives

- Know
 - Basic ideas and assumptions underlying AI research
 - Various subfields of AI, their potential and limitations
 - Foundational algorithms and techniques

- Be able to
 - Discuss metaphors, assumptions, goals and methods of AI research
 - Position technology wrt. the AI fields, evaluate potential and limitations
 - Apply AI techniques to solve problems of interest
 - Further pursue the study of the field in courses or work

AIMA Book Topics Deepened by Other Lectures

- **AI Planning by Prof. J. Hoffmann**
- **Architectural Thinking for Intelligent Systems by Prof. J. Koehler**
- **Analysing and Understanding Images**
 - Image Processing and Computer Vision
 - High Level Computer Vision
- **Understanding Natural Language**
 - Statistical Natural Language Processing
 - Text-to-Speech Synthesis
 - Inferences in Artificial Intelligence and Computational Linguistics
- **Machine Learning**
 - Machine Learning / Machine Learning in Cybersecurity
 - Neural Networks: Theory & Implementation/Implementation & Application
- **Ethical Aspects of AI**
 - Ethics for Nerds
- Many more ... see LSF .. See also <https://saarland-informatics-campus.de/en/studium-studies/data-science-and-artificial-intelligence-master/>

Take Away Messages

- Register in CMS and actively use it
- Be flexible wrt. changes - this semester ist different ...
- Regularly attend lecture and tutorials
- Make use of online material provided
- Ask questions
- Read the text book
- Find a good team
- Do all exercises
- Passing the exam should be well possible

Enjoy the Lecture!