Foundations of Artificial Intelligence

0. Organizational Matters

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University of Basel

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0.1 Organizational Matters

People: Lecturer

Lecturer
Prof. Dr. Malte Helmert
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People: Assistant

Assistant
Dr. Thomas Keller
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People: Tutors

Tutors
Jendrik Seipp
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- office: room 04.001, Spiegelgasse 5

Dr. Silvan Sievers
- email: `silvan.sievers@unibas.ch`
- office: room 04.001, Spiegelgasse 5

Time & Place

Lectures
- time: Mon 16:15–18:00, Wed 14:15–16:00
- place: room 05.002, Spiegelgasse 5

Exercise Sessions
group 1 (Silvan Sievers):
- time: Tue 16:15–18:00
- place: room 00.003, Spiegelgasse 1

group 2 (Jendrik Seipp):
- time: Wed 16:15–18:00
- place: room U1.001, Spiegelgasse 1

first exercise session: March 13/14

AI Course on the Web

Course Homepage
`http://www.cs.unibas.ch/fs2018/lecture-foundations-of-artificial-intelligence/`
- course information
- slides
- exercise sheets and materials
- bonus materials (not relevant for the exam)

enrolment:
- `https://services.unibas.ch/`

Course Material

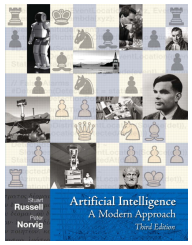
course material:

- slides (online + printed handouts)
- textbook
- additional material on request

Textbook

Artificial Intelligence: A Modern Approach
by Stuart Russell and Peter Norvig
(3rd edition)

- available at Karger Libri
- covers large parts of the course, but not everything



Target Audience

target audience:

- Bachelor Computer Science, ∼3rd year
- Bachelor Computational Sciences, ∼3rd year
- other students welcome

prerequisites:

- algorithms and data structures
- basic mathematical concepts
  (formal proofs; sets, functions, relations, graphs)
- complexity theory
- programming skills (mainly for exercises)

Exam

- written exam on Wed, June 13
  - 14:00-16:00 (120 minutes)
  - Spiegelgasse 1, room 00.003
- 8 ECTS credits
- admission to exam: 50% of the exercise marks
- no repeat exam

Exercises

exercise sheets (homework assignments):

- mostly theoretical exercises
- occasional programming exercises

exercise sessions:

- discussion of exercise sheets
- questions about the course
- participation voluntary but highly recommended

Theoretical Exercises

theoretical exercises:

- exercises on course homepage every Wednesday
- solved in groups of at most two ($2 = 2$)
- due Wednesday of following week (23:59) via Courses

Programming Exercises

programming exercises (project):

- project with 3–4 parts over the duration of the semester
- solved in groups of at most two ($2 < 3$)
- programming languages? operating systems?
- solutions that obviously do not work: 0 marks

Plagiarism

Plagiarism (Wikipedia)

Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work.

consequences:

- 0 marks for the exercise sheet (first time)
- exclusion from exam (second time)

if in doubt: check with us what is (and isn't) OK before submitting

exercises too difficult? we are happy to help!

0.2 About this Course

AI in Basel

- research group Artificial Intelligence (AI) at the DMI exists since June 2011
- researchers:
  - Prof. Dr. Malte Helmert
  - Dr. Guillem Francès Medina
  - Dr. Thomas Keller
  - Dr. Florian Pommerening
  - Dr. Gabriele Röger
  - Dr. Silvan Sievers
  - Salomé Eriksson
  - Patrick Ferber
  - Cedric Geissmann
  - Manuel Heusner
  - Jendrik Seipp
- http://ai.cs.unibas.ch/

Research Groups of the Computer Science Section

research area "Distributed Systems":

- High Performance Computing (F. Ciorba)
- Databases and Information Systems (H. Schuldt)
- Computer Networks (C. Tschudin)
- Adaptive Systems & Medical Data Science (J. Vogt)

research area "Machine Intelligence":

- Artificial Intelligence (M. Helmert)
- Biomedical Data Analysis (V. Roth)
- Graphics and Vision (T. Vetter)
- Adaptive Systems & Medical Data Science (J. Vogt)

Classical AI Curriculum

"Classical" AI Curriculum

1. introduction
2. rational agents
3. uninformed search
4. informed search
5. constraint satisfaction
6. board games
7. propositional logic: foundations
8. propositional logic: satisfiability
9. predicate logic
10. modeling with logic
11. machine learning
12. classical planning
13. probabilistic reasoning
14. reasoning under uncertainty
15. decisions under uncertainty
16. acting under uncertainty

$\rightsquigarrow$ wide coverage, but somewhat superficial

Our AI Curriculum

Our AI Curriculum

1. introduction
2. rational agents
3. uninformed search
4. informed search
5. constraint satisfaction
6. board games
7. propositional logic: foundations
8. propositional logic: satisfiability
9. ~~predicate logic~~
10. ~~modeling with logic~~
11. ~~machine learning~~
12. classical planning
13. ~~probabilistic reasoning~~
14. ~~reasoning under uncertainty~~
15. ~~decisions under uncertainty~~
16. acting under uncertainty

Topic Selection

guidelines for topic selection:

- fewer topics, more depth
- more emphasis on programming projects
- connections between topics
- avoiding overlap with other courses
  - Pattern Recognition (T. Vetter, B.Sc.)
  - Machine Learning (V. Roth, M.Sc.)
- focus on algorithmic core of modern AI

Under Construction...

- A course is never "done".
- We are always happy about feedback, corrections and suggestions!

0.3 This Week

Special Events This Week

- There are two special talks on topics in AI this week at our department to which you are cordially invited.
- To avoid overloading your brains with AI this week, there will be no lecture this Wednesday (February 28).

Tuesday: CS Colloquium Nathan Sturtevant

CS Colloquium Talk: Nathan Sturtevant

The Pathfinding Engine of Dragon Age: Origins

- Who: Nathan Sturtevant, University of Denver (USA)
- What: Computer Science Colloquium Presentation
- When: Tuesday, February 27, 12:15–13:15
- Where: Spiegelgasse 5, SR 05.002 (this room)

Wednesday: PhD Defense Jendrik Seipp

PhD Defense: Jendrik Seipp

Counterexample-Guided Cartesian Abstraction Refinement and Saturated Cost Partitioning for Optimal Classical Planning

- Who: Jendrik Seipp, University of Basel
- What: PhD Defense
- When: Wednesday, February 28, 12:00–13:00
- Where: Spiegelgasse 5, SR 05.002 (this room)