Fundamentals of Artificial Intelligence
Chapter 00: **Course Overview**

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M.S. Course "Artificial Intelligence Systems", academic year 2021-2022

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Outline

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Legal Notice

Important:

Please be aware that all classes may be video-recorded (including students' questions & speeches) and that the recordings may be made available online.

Target

- The course will be given in English.
- The course is intended for 1st year students of the M.S. program "Artificial Intelligence Systems" at DISI, University of Trento.
    - Students from other programs, however, are welcome.

Timetable

Timetable:

1st Semester, September 13th–December 21st

- CLASS: Monday 09.30-11.30, Room A102 (Povo 1)
- LAB: Wednesday 11.30-13.30, Room A102 (Povo 1)
- CLASS: Friday 09.30-12.30/13.30, Room A102 (Povo 1)$^{(*)}$

The course is given **in presence.**

$^{(*)}$ four hour-slot: may be used to catch up with some missed class

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Office Hours & Forum

Office hours:

- No weekly fixed-day
- Anytime in the week, upon appointment only
- In presence (only after class) or via zoom
- Appointments to be set in class or via email
- Office hours only during class period (see above)!

Forum

A forum for Q&A is available at the course page in the Moodle platform

Important: Email Communications

Important

Teaching this course is only part of our job, and we receive a huge amount of email. Thus:

- email to both me and the teaching assistant
- use as subject "[Fundamentals of AI]: subject"
- email only from your "official" UNITN email address "name.surname@studenti.unitn.it"
- email for relevant reasons only
- be polite and respectful, with both me and the T.A.
  (see e.g. "Bad Email Reply – What not to say to your professor")

PS: Notice that even professors use social media (example)

Outline

Motivations & Goals

- Artificial Intelligence (hereafter simply "AI") is an umbrella term, covering a large and heterogeneous amount of disciplines (e.g. problem solving, knowledge representation and reasoning, planning, reasoning under uncertain knowledge, learning, ...).
- This course aims at providing an overview of the foundations of AI and of (some of) its main disciplines in an organic way.
- Examples and exercises will be provided during the course.
- The course consists also in a series of lab sessions, where student will be required to run simple exercises consisting in modeling and solving simple problems by means of AI techniques and tools, and to solve simple exercises by hand.
  - Notice: "lab" here means "exercise session": no programming or use of tools.

Topics

Covered Topics

The main topics covered in the course are (not necessarily in order):

- Introduction to AI
- Intelligent Agents
- Problem Solving & Search
- Constraint Satisfaction
- Logic & Logical Agents
- Automated Inference & Reasoning
- Automated Planning
- Knowledge Representation
- Uncertain Knowledge and Reasoning

Topics (cont.)

Un-covered Topics

The following topics will *not* be covered in the course

- Machine Learning ($\implies$ ad-hoc course)
- Natural-Language & Speech ($\implies$ ad-hoc course)
- Image Recognition & Computer Vision ($\implies$ ad-hoc course)
- Robotics ($\implies$ ad-hoc course)
- AI & NeuroScience ($\implies$ ad-hoc course)
- Ethics in AI ($\implies$ ad-hoc course)
- AI & Philosophy
- AI & Psychology
- ...

References & Material

- Your notes from the lessons
- Slides (will be progressively available from the URL of the course)
- Other material (available from the URL of the course)
- The textbook:
  Stuart Russell & Peter Norwig.
  "Artificial Intelligence. A Modern Approach" (a.k.a. "AIMA")
  3rd Edition. Pearson. (The 4th Edition has been recently released)
  `http://aima.cs.berkeley.edu/`
- Supplementary material from the AIMA URL
- Feel free to buy the (very recent) fourth edition

About the AIMA Book

- Leading textbook in AI
- Adopted by over 1400 schools in over 120 countries.
- Lots of extra material & documentation
- Fundamental book in a AI professional's bookshelf
- Currently 3rd Edition,
  4th Edition has recently been published
- Electronic versions available
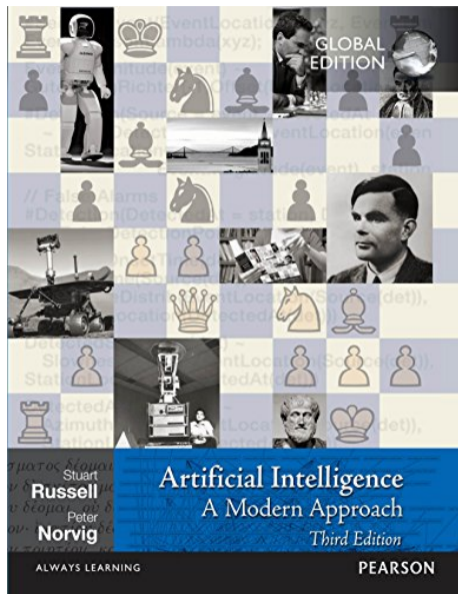
Acknowledgments & Disclaimer

- Many examples & figures in these slides are from the AIMA book
- Some other material presented in these slides (text, figures, examples) is courtesy of the following people, listed in alphabetical order:
  - Pieter Abbeel
  - Anca Dragan
  - Dan Klein
  - Nikita Kitaev
  - Tom Lenaerts
  - Michela Milano
  - Dana Nau
  - Maria Simi
  - ... (others to be added)

  and, of course,
  - Stuart Russell & Peter Norwig

Requirements

- It is assumed some basic background in the following topics:
    - basic mathematics
    - probability theory
    - algorithms and data structures
    - programming
- Some background in the following topics could be useful (but not necessary):
    - Boolean logic
    - automata and formal languages
    - software engineering

Note

The adopted textbook "Artificial Intelligence. A Modern Approach" provides appendixes with mathematical background and some notes on languages and algorithms.

Exam

- The exam will consist in a script session, with a combination of multiple-answer questions, brief open questions, and small exercises,
- Aims at assessing the acquired knowledge about both the main concepts and the main techniques.
- This script exam may be handled either on paper or (in part or completely) at the terminal, depending on circumstances.
- The final evaluation will consider both the acquired knowledge and the acquired skills in solving small exercises.

Depending on various circumstances, the exam modalities might be subject to variations, which in case will be communicated to student in due time.

To copy at exams very dangerous is!

Outline

Attendance & Lesson Recordings

- As general rule from University of Trento, in compliance with National Laws, and modulo further different decisions, will be given classes will be given in presence
- To attend classes, students must follow UNITN safety access protocols
- If possible and in compliance with general UNITN directives, classes may be video-recorded
    - if so, the recordings will be made available at the URL of the course
    - if not so, students can access last year's course recordings

Notice: Safe Behaviour for COVID-19 at DISI

The following rules are STRICT

All students are always supposed:

- to access DISI only if in possess of a green pass (*)
  - he/she may be asked to show his/her green pass together with an ID
- to access DISI only if personally autorized (via the UNITN app)
- to follow the access rules:
  - to check-in/check-out with the app
- to wear a mask, covering both mouth and nose
- to sanitize hands when both entering and exiting classes
- to respect inter-personal safety distance
- to access/exit rooms one at a time, respecting safety distances
- to sit only on admissible and available seats
- after breaks, to sit in the same seats as before the break
- ...

(*) violating this rule is a legal offence, which can be prosecuted by police

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Notice: Safe Behaviour for COVID-19 at DISI [cont.]

What if...

- If a student feels sick at home, in particular with flu/COVID-like symptoms, he/she must stay at home!
- If a student feels sick in classrooms, in particular with flu/COVID-like symptoms:
  - he/she (and classmates) must immediately notify the teacher
  - he/she must immediately leave the room and move to outside the porter, avoiding any contact $\implies$ he/she will be taken care of
  - classmates must stay away from him/her and not touch him/her without safety gloves
- if a student who has previously attended classes is found positive to COVID, he/she must immediately inform DISI

Remark

If a student willingly refuses to comply to the rules (in particular, to show his/her green pass) the teacher or any rector delegate (including the students in charge of checking green passes) is supposed to take his/her data and to call & inform the DISI COVID19-safety responsible or DISI director. If the student refuses to provide an ID, the latter is supposed to call the police. (No kidding!)

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Marsellus Wallace doesn't like students without a green pass...

©"Pulp Fiction", by Q. Tarantino