



EDAP01: Artificial Intelligence or AI: Artificiell Intelligens

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EDAP01: Artificial Intelligence or Not a Deep Learning course!

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EDAP01: Artificial Intelligence or only a bit of Machine Learning course

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EDAP01: Artificial Intelligence or Breadth of Artificial Intelligence Techniques

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Plan for today

- Brief intro (AIMA Chapter 1)
- Administrative stuff
- Agents (AIMA Chapter2)

What is (Artificial) Intelligence?





What is (Artificial) Intelligence?

What is Intelligence?



What is (Artificial) Intelligence?

What is Intelligence?

- adaptivity



What is (Artificial) Intelligence?

What is Intelligence?

- adaptivity
- learning



What is (Artificial) Intelligence?

What is Intelligence?

- adaptivity
- learning
- problem solving capability



What is (Artificial) Intelligence?

What is Intelligence?

- adaptivity
- learning
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- creativity



What is (Artificial) Intelligence?

What is Intelligence?

- adaptivity
- learning
- problem solving capability
- creativity
- logical reasoning



What is (Artificial) Intelligence?

What is Intelligence?

- adaptivity
- learning
- problem solving capability
- creativity
- logical reasoning
- ...

Can it be compared? Measured?



What is Artificial Intelligence?

Artificial intelligence (AI) is the intelligence of machines and the branch of computer science that aims to create it.

Textbooks define the field as “the study and design of intelligent agents,” where an **intelligent agent** is a system that **perceives** its environment and takes **actions** that maximize its chances of success.



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Late John McCarthy, who coined the term in 1956, defines it as *“the science and engineering of making intelligent machines.”* (Wikipedia)



In 1997:

Automated chess player beats the World Chess Champion Gari Kasparov

How much intelligence does that require?



In 2005:

Automated agent traders account for over 50% of portfolio trades by value most weeks on the New York Stock Exchange and, in some weeks, as much as 70% of portfolio trades.

Problems: “2010 flash crash”



In 2011:

Cleverbot: <https://www.youtube.com/watch?v=WnzlbyTZsQY>



In 2016:





In 2018:

Google Duplex: <https://www.youtube.com/watch?v=D5VN56jQMWM>

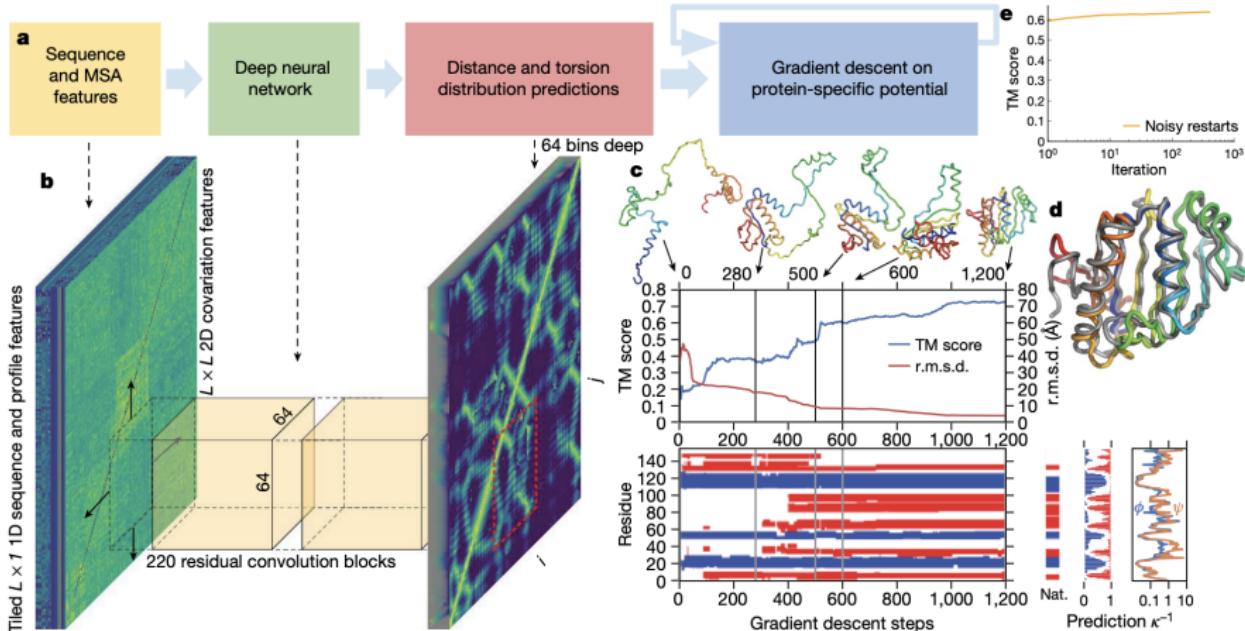


A couple of agents more ...

- IBM Watson;
<https://www.youtube.com/watch?v=Sp4q60BsHoY>
- Ishiguro's Geminoid;
<https://www.youtube.com/watch?v=KP128gCxcno>
- Google car; <https://www.youtube.com/watch?v=MqUbdd7ae54>
- Boston Dynamics robots.
<https://www.youtube.com/watch?v=fn3KWM1kuAw>



2020: Deep NNs rule

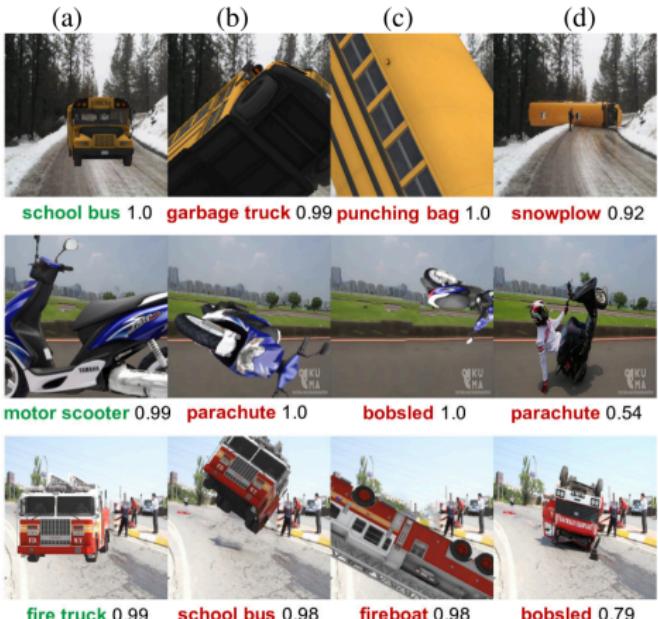


<https://deepmind.com/blog/article/>

alphaFold-a-solution-to-a-50-year-old-grand-challenge-in-bi



2020: Deep NNs rule



<https://arxiv.org/pdf/1811.11553.pdf>



Winograd Schemas

Joan made sure to thank Susan for all the help she had given.
Who had given the help?

- Susan
- Joan



Winograd Schemas

Joan made sure to thank Susan for all the help she had given.
Who had given the help?

- Susan
- Joan

Joan made sure to thank Susan for all the help she had **received**.
Who had **received** the help?

- Susan
- Joan



More Winograd Schemas

The trophy would not fit in the brown suitcase because it was too small.

What was too small?

- the trophy
- the brown suitcase



More Winograd Schemas

The trophy would not fit in the brown suitcase because it was too small.

What was too small?

- the trophy
- the brown suitcase

The town councillors refused to give the angry demonstrators a permit because they feared violence.

Who feared violence?

- the town councillors
- the angry demonstrators



Subdomains of Artificial Intelligence

- Search, Problem solving
- Reasoning, Logical reasoning, Probabilistic reasoning
- **Machine Learning**
- Natural Language Processing
- Perception, Computer Vision
- Autonomous Robots
- Knowledge Processing
- ...



State of the art

- Human-level AI back on the agenda
- 1997: Deep Blue defeats Kasparov
- Robbins conjecture (mathematics) proven after decades of human attempts
- Autonomous driving, flying, sailing, ...
- Logistics and warfare for Gulf, Iraq and Afghanistan
- 2011: Siri; Watson defeats humans in Jeopardy
- Medical diagnoses and treatment
- 2016: Alpha Go defeats Lee Sedol
- 2017: Deep Stack defeats professionals in Heads-up no-limit Texas hold'em poker; AlphaGo Zero defeats AlphaGo
- 2020: Deep Learning everywhere

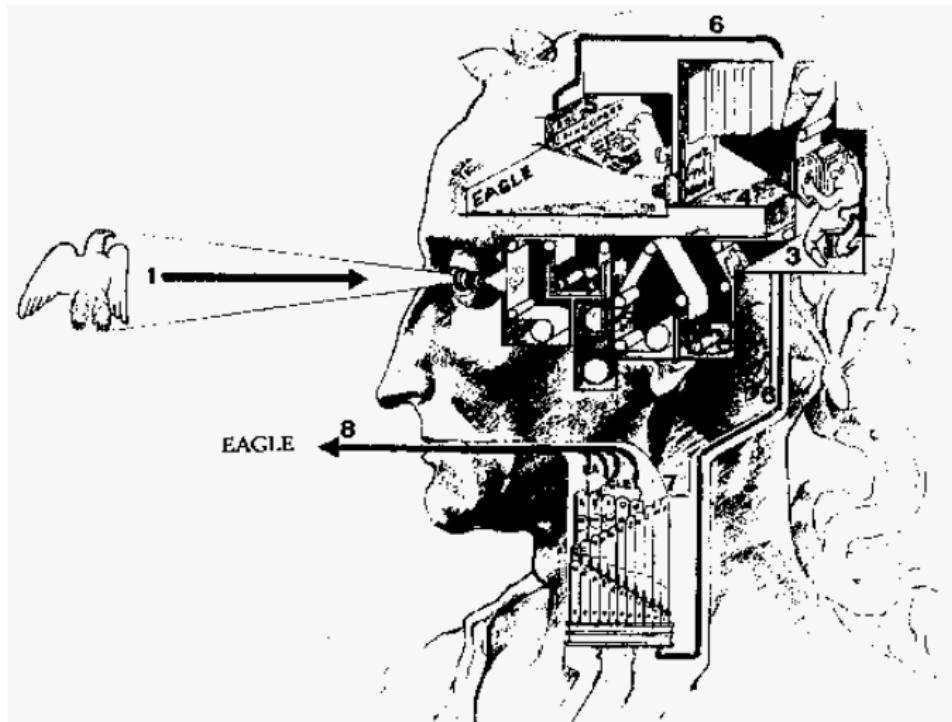


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- 2020: Deep Learning everywhere (you have data)...



What's in the course





What's also in the course

OCH NÄSTA GENERATIONS MOBILER ÄR STAMCELLSODLADE
FÖR INTEGRERING MED SÅLVÅ HÖRSELORGANET: HAMMAREN,
STÄDET, STIGBYGELN OCH APPEN..





Ethics

- enhancements of our capacities (bodies, minds)
 - do we want that?
 - can we afford not having that?
- elderly care, rehabilitation, medicine
vs. war-fighting, sex, socializing
- emotional artificial partners
- large finances come from military sources (e.g., DARPA)
 - defensive
 - preventive attacks
 - robots that kill

Do we have the **right** to create robot servants?



About the course

- EDAP01: Artificial Intelligence (aka TFRP20)
- <http://cs.lth.se/edap01>
- <https://canvas.education.lu.se/courses/10352>
- Teachers: Pierre Nugues, Elin Anna Topp, Stefan Larsson, Jacek Malec
- Administrator: Ulrika Templing (expedition@cs.lth.se)



Contents

- 7,5 hp (ECTS), A level
- Lectures (15), normally Wednesdays, 13–15 and Fridays, 13–15, Zoom
- Three programming and reading assignments, INDIVIDUAL!
- Home reading (textbook, articles)
- S. Russell, P. Norvig, Artificial Intelligence, a Modern Approach, 3rd int. ed., Prentice Hall



Evaluation

- **Programming and reading assignments:** Important: both correctness **and presentation** count. Give you PASS (3) for the course;
- Complexity level of programming assignments may vary, although we strive for even division of labour;
- all involve reading a scientific paper and incorporating what you have learnt into your assignment report;
- **Exam:** optional, if you want higher grade (4 or 5).

but

- We need your feedback ...
- Kursombud (course representatives) need to be chosen



Programming assignments

- ➊ Adversarial search
- ➋ Logistic regression
- ➌ Probabilistic reasoning

TAs will answer your questions.

NOTE! Each assignment has its set of TAs!



Programming assignment submission

- The submission is to be done via canvas, according to the procedure described in the assignment text.
- All assignments have to be handed in (as pdf documents + code) **on time!**
- Announcement: L3, L5, L9
- Deadlines: roughly L7, L9, L13 (check the details on each assignment page)
- Scheduled consultation time (resurstdid), 6 hrs a week before deadline
- You need all three approved to write the exam.



Registration!

EDAP01: Make sure you register for the course in LADOK!

TFRP20: Make sure you confirm your attendance today by
mailing Jacek immediately, 16:30 at the latest!



End of the admin stuff

Questions? Comments?

Please elect a course representative. Thank you.