

Artificial Intelligence

COMP3411/9814

<http://www.cse.unsw.edu.au/~cs3411>

Lecturers

- Prof. Claude Sammut
- Dr. Armin Chitizadeh (Lecturer-in-Charge)
- Dr. Franciso Cruz

Course Admin

Dr. Tatjana Zrimec

- Please direct all questions to WebCMS forum or mail to
 - cs3411@cse.unsw.edu.au
- Do not email or message Teams direct to lecturers or admin

Timetable

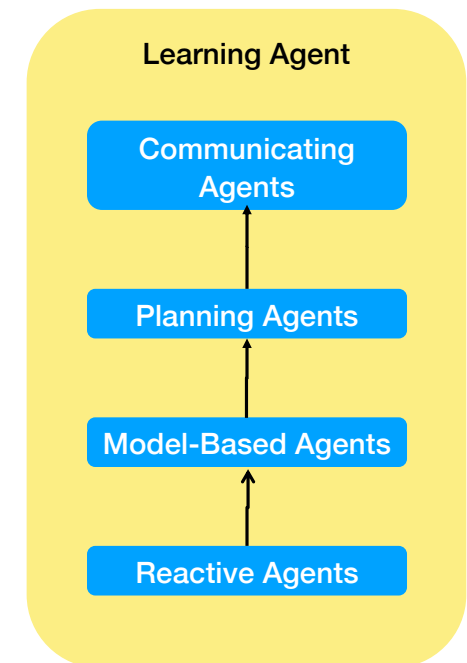
	Monday	Tuesday	Wednesday	Thursday		Friday
09:00 - 10:00						
10:00 - 11:00			Tut - W10A	Tut - H10A		Tut - F10A
11:00 - 12:00			Tut - W11A	Tut - H11A		Tut - F11A
12:00 - 1300			Tut - W12A	Tut - H12A		Lecture in-person (Mathews A) (Echo360)
13:00 - 14:00						
14:00 - 15:00			Tut - W14A	Tut - H14A		Tut - F14A
15:00 - 16:00			Tut - W15A	Tut - H15A		
16:00 - 17:00		Lecture in-person (Mathews A) (Echo360)	Tut - W16A	Tut - H16A (online)		
17:00 - 18:00			Tut - W17A	Tut - H17A	Tut - H17B (online)	
18:00 - 19:00			Tut - W18A (online)	Tut - H18A (online)		

Online Tutorials

- Most tutorials are full
- If you want to attend tuts online, in first week, pick the most suitable time and attend via BB Collaborate
- Tutor will count students so we can determine if and when to schedule additional classes

Course Plan

- Introduce AI concepts through intelligent agents
- Start with very simple reactive agents
- Progress by adding more capabilities
- End with agents that learn, reason and communicate



Course Outline

Week 1

- 1 Introduction
 - 1.1 History of AI
 - 1.2 Agents
- 2 Reactive Agents
 - 2.1 Perception and Action
 - 2.2 Production Rules
 - 2.3 Hierarchical control and subsumption

- 3 Planning Agents
 - 3.1 Search

Week 2

- 3.1 Search (continued)
- 3.2 Constraint Solving

Week 3

- 3.3 Rewards instead of goals (Reinforcement Learning)

Week 4

- 4 Robot Vision
 - 4.1 Image processing
 - 4.2 Scene analysis
- 5 Neural Networks
 - 5.1 Linear Threshold Units
 - 5.2 Backpropagation

Week 5

- 6 Knowledge Representation
 - 6.1 Feature-based vs iconic representations
 - 6.2 Logic
 - 6.3 The Resolution Principle
 - 6.4 Reasoning using Horn Clauses (Prolog)

Week 7

- 6.5 Learning Rules
 - 6.5.1 Propositional Rules (Decision trees)
 - 6.5.2 First-order (Inverse Resolution)
- 7 Representing Common-sense Knowledge
 - 7.1 Semantic Networks
 - 7.2 Frames

Week 8

- 8 Planning Methods Based on Logic
 - 8.1 The Situation Calculus
 - 8.2 Forward and Backward Search Methods
 - 8.3 Partial-Order Planning

Week 9

- 9 Reasoning with Uncertain Information
 - 9.1 Probability and Probabilistic Inference
 - 9.2 Bayes Nets
 - 9.3 Learning Bayes Nets

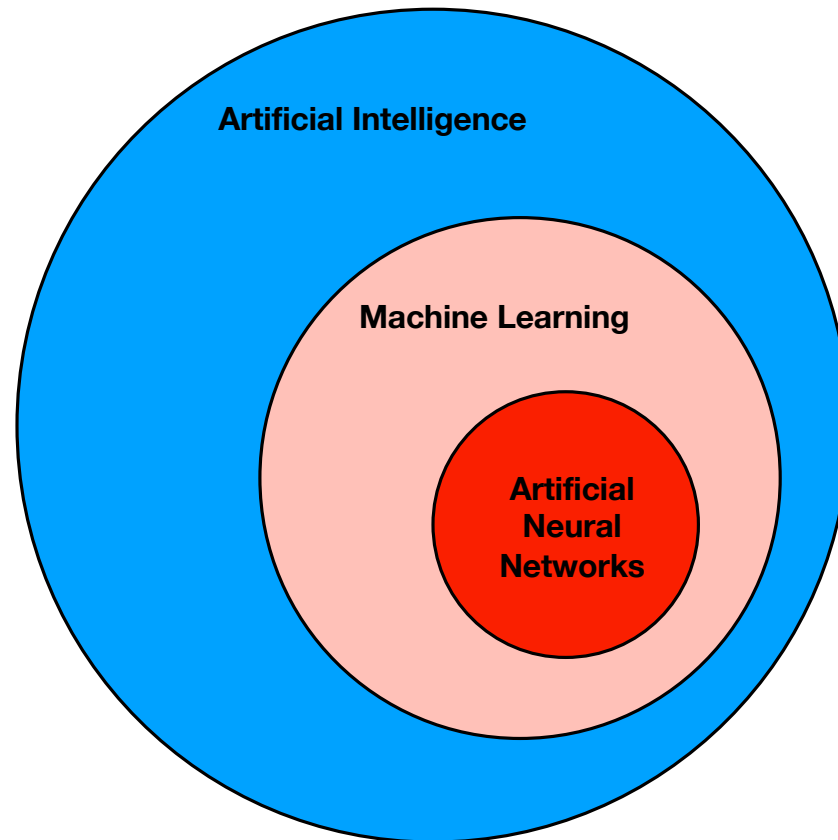
Week 10

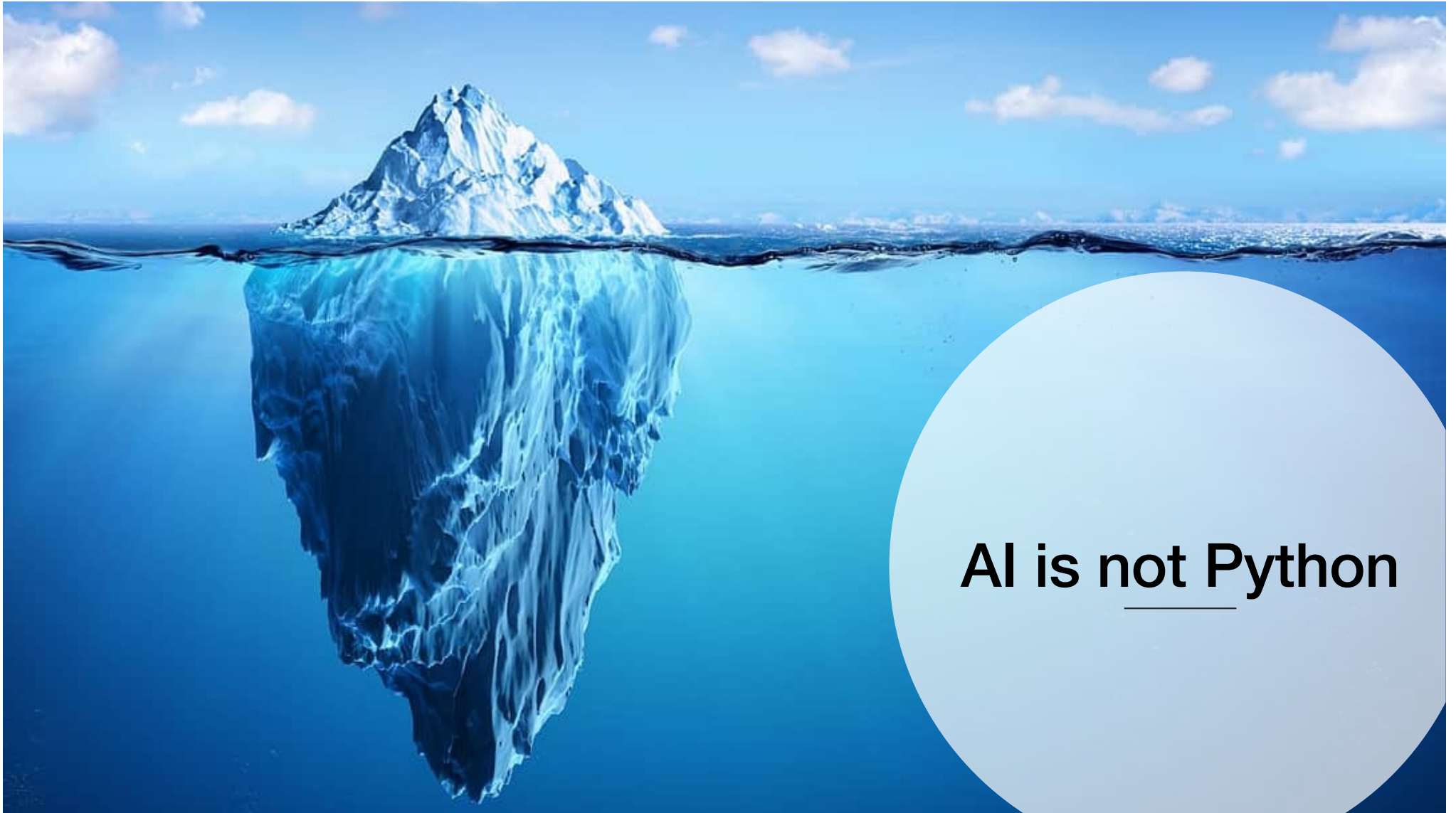
- 10 Communicating agents
 - 10.1 Language
 - 10.2 Conversational agents (ChatGCPT)

Assessment

- Assessment will consist of:
 - Quizzes (2 or 3 week intervals) 10%
 - Assignments $3 \times 10 = 30\%$
 - Final Exam 60%
- To pass, you must score
 - at least 16/40 for the assignments and quizzes
 - at least 24/60 for the exam
 - a combined mark of at least 50/100

AI is not ML is not ANN





AI is not Python

Related Courses

- COMP3431 Robot Software Architectures
- COMP4418 Knowledge Representation and Reasoning
- COMP9417 Machine Learning and Data Mining
- COMP9444 Neural Networks and Deep Learning
- COMP9491: Applied Artificial Intelligence
- COMP9517 Machine Vision
- VIP projects and 4th Year Thesis topics (incl RoboCup)

Texts & References

Recommended Text:

- David L. Poole and Alan K. Mackworth *Artificial Intelligence: Foundations of Computational Agents*, 2nd Edition, 2017.
- Nils Nilsson, *Artificial Intelligence: A New Synthesis*, Morgan Kaufmann, 1998

Additional reference material

- Stuart Russell and Peter Norvig, *Artificial Intelligence: a Modern Approach*, 4th Edition, Prentice Hall, 2020.
- Ivan Bratko, *Programming in Prolog for Artificial Intelligence*, 4th Edition, Pearson, 2013.

Online Resources

- Poole & Mackworth: <http://artint.info/2e/html/ArtInt2e.html>
- Nilsson: <https://www-sciencedirect-com.wwwproxy1.library.unsw.edu.au/book/9781558604674/artificial-intelligence-a-new-synthesis>
- SWI Prolog: <https://www.swi-prolog.org/Download.html>