Artificial Intelligence

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Agenda

- The grave difficulties we face.
- The path forward.

Difficulty #1: Definitions

- Even defining AI raises thorny/interesting philosophical questions:

  - How do we define intelligence?

  - What is the connection between intelligence and consciousness? (if any)

  - Is it possible for a machine to be intelligent (or conscious)?

  - If we *can* create intelligent machines, *should* we?

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- First step for us:

  - Computing Machinery and Intelligence (Alan Turing, 1950)

The Mix for This Course

Pie chart showing the mix for this course: Technical Issues 95.00%, Philosophy 5.00%.
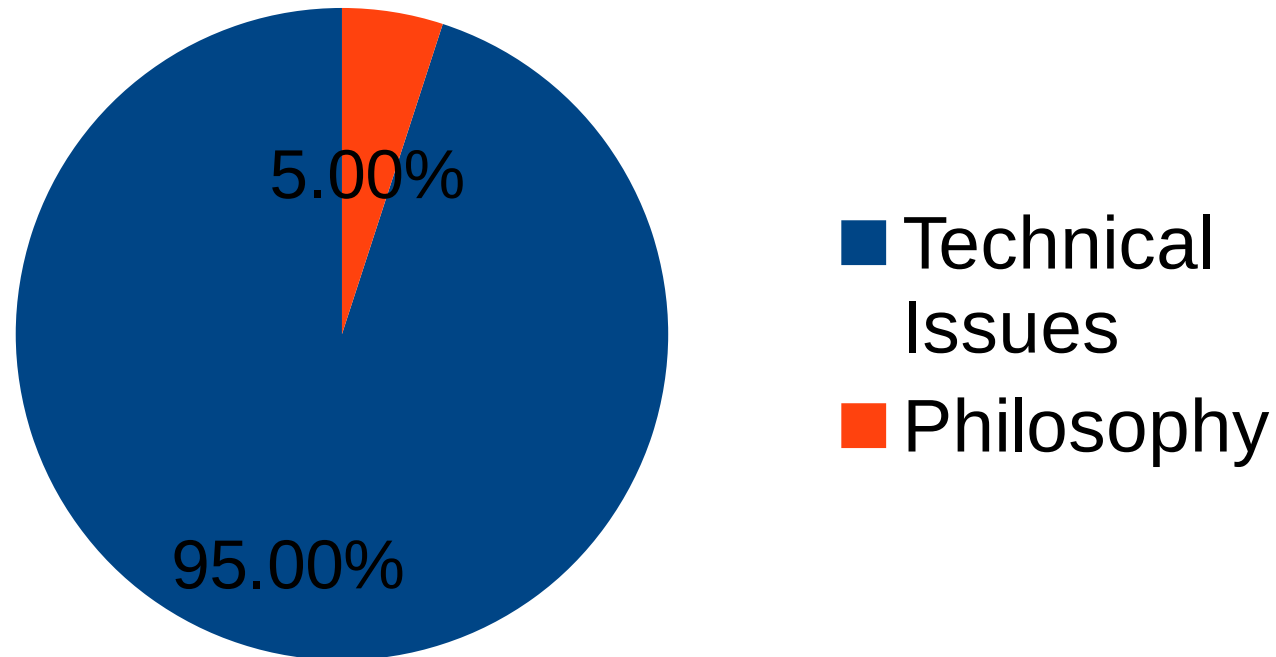
Difficulty #2:
AI is a Mess

Problem Domains

	Computer Vision	Robotics	Natural Language Understanding	Artificial Creativity	...
Graph Search					
Logic					
Constraint Satisfaction					
Probabilistic/ Statistical methods					
Planning					
Control Theory					
Machine Learning/ Neural Networks					
...					

Algorithmic Approaches

Difficulty #3:
Modern AI is Mathy

Full papers from the 2016 International Joint Conference on Artificial Intelligence (IJCAI 16)

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- Once a problem is solved it no longer counts as AI

- The problems that are left are often *fundamentally* hard

A Bit of History

- *Shakey the Robot* (1969)
- The Thinking Machine
- Also check out:
  The Quest for Artificial Intelligence

  Nils Nilsson, 2010.

What Went Wrong?

- Today's computers are (very roughly) one million times more powerful than those available in 1970.

Boom/Hype (?)

"Over the past four years, six companies in particular —
Google, Facebook, Apple, Amazon, Microsoft and the Chinese
firm Baidu — have touched off an arms race for A.I. talent,
particularly within universities. Corporate promises of resources
and freedom have thinned out top academic departments. It has
become widely known in Silicon Valley that Mark Zuckerberg,
chief executive of Facebook, personally oversees, with phone
calls and video-chat blandishments, his company's overtures to
the most desirable graduate students. Starting salaries of seven
figures are not unheard-of. Attendance at the field's most
important academic conference has nearly quadrupled."

The Great A.I. Awakening, NY Times Magazine, GIDEON LEWIS-KRAUSDEC. 14, 2016

The Plan

- In one semester we can:
  - Develop a sense for why the problems are hard
  - Focus on foundations

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- In one semester we can:
  - Develop a sense for why the problems are hard
  - Focus on foundations
- The good news:
  - All other areas of CS are pointless and boring in comparison to AI.