

CS4618: Artificial Intelligence I

Introduction

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Initialization

In [1]:

```
%reload_ext autoreload
%autoreload 2
%matplotlib inline
```

In [2]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

About CS4618

Lecturer:	Derek Bridge, Room G-61, Western Gateway Building d stop bridge amphora cs plip ucc plop ie www.cs.ucc.ie/dbridge.html (http://www.cs.ucc.ie/dbridge.html).
Credit weighting:	5-credit elective
Prerequisites:	CS2515, CS2516 (Algorithms & Data Structures) Lots of notation and formulae, especially vectors and matrices Python programming
Course web site:	www.cs.ucc.ie/~dgb/courses/ai1.html (http://www.cs.ucc.ie/~dgb/courses/ai1.html).

About CS4618

Lectures:	2 × 1 hr per week
Labs:	1 × 2 hr per week
Private study:	At least 2 hrs per week

About CS4618

Examination:	1.5 hr written exam (80% of the marks)
Continuous assessment:	Short programming assignment(s) (20% of the marks)
How to fail:	Skip lectures & labs; avoid private study; cram just before; expect the exam to be a memory test
How to pass:	Attend lectures & labs; summarize the notes; tackle the lab activities properly; expect a problem-solving exam

Plagiarism

1. Plagiarism is presenting someone else's work as your own. It is a violation of UCC Policy and there are strict and severe penalties.
2. You must read and comply with the UCC Policy on Plagiarism www.ucc.ie/en/exams/procedures-regulations/ (<http://www.ucc.ie/en/exams/procedures-regulations/>).
3. The Policy applies to all work submitted, including software.
4. You can expect that your work will be checked for evidence of plagiarism or collusion.
5. In some circumstances it may be acceptable to reuse a small amount of work by others, but only if you provide explicit acknowledgement and justification.
6. If in doubt ask your module lecturer prior to submission. Better safe than sorry!

What is intelligence?

- Some people define it in terms of outward behaviours, e.g. the *Turing Test*
- Some people define it in terms of various skills, e.g. reasoning, planning, learning, ... or playing chess, composing poetry, ...
- Think about my far-from-perfect definition before the next lecture:
A system's degree of intelligence is defined in terms of its capacity to act autonomously and rationally when faced with disorder, uncertainty, imprecision and intractability.

Is AI even possible?

<p>No: there's a special and essential ingredient that can't be replicated, e.g. soul, spirit, consciousness, free will, creativity, humour, ...</p> <p>Perhaps we can simulate intelligence:</p> <ul style="list-style-type: none">• Outwardly, systems may <i>behave as if</i> intelligent• But the way they achieve this behaviour (the internal process) doesn't qualify as true thinking	<p>Yes, we can build true human-like intelligence</p>	<p>Yes, we can build true intelligences but they won't necessarily be like us AI = alien intelligence</p>
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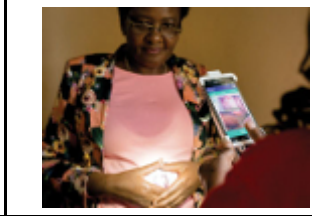

- Where do you sit in this table? Or, do you have a different view?

Why do we want to build intelligent systems?

- The main goal of AI is to build smarter tools
- Some rough-and-ready definitions:
 - A **tool** is an object that a creature uses intentionally to transform another object (possibly including the creature itself)
 - A tool is only **useful** if it:
 - **increases throughput**: more output for the same or less input (better use of scarce resources, including time); and/or
 - **reduces externalities**: fewer undesirable side-effects (e.g. less pollution, lower risks to life and limb, etc.)

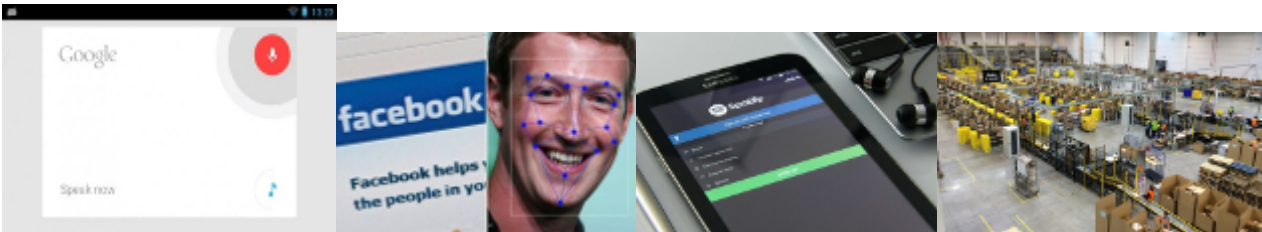
Examples

- So, based on the previous definitions, why do we want to build...

...self-driving vehicles?	...intelligent news filters?	...medical diagnosis tools?	...bomb disposal robots?
			

The State of AI, 2018



- On the one hand, all your favourite social media companies use AI



- On the other hand, a wide range of industries are using it
 - See State of AI, 2018 (<https://www.stateof.ai>).

Narrow AI versus Artificial General Intelligence (AGI)

- Journalists are exaggerating AI success stories (narrow AI) to imply that AGI is just around the corner
- And if AGI is just around the corner, then maybe we need to think about the risks

 <p>"the most serious threat to the survival of the human race"</p>	 <p>"The development of full artificial intelligence could spell the end of the human race...It would take off on its own, and re-design itself at an ever increasing rate"</p>
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A dose of realism

- We are not even close to AGI

Some advice for journalists writing about AI (<http://togelius.blogspot.ie/2017/07/some-advice-for-journalists-writing.html>).



"AI is a collection of methods ... that can do something impressive, such as playing a game or drawing pictures of cats. However, you can safely assume that the same system cannot both play games and draw pictures of cats. ... [Journalists can] make it seem like there are machines with general intelligence out there. There are not."



"I don't work on not turning AI evil today for the same reason I don't worry about the problem of overpopulation on the planet Mars."

- In fact, to a large extent we're not even working on AGI
- The real risk:
 - The problem is not that AI is too good. The problem is that AI is not good enough