COMP 3122 - Artificial Intelligence with Python

Week 1

github.com/kamrik/ML1

https://georgebrowntech.slack.com/signup

Administrative things

- Slack workspace
- Office hours - right before this lecture (Thu 13:00-13:50)
- Assignments - there will be some, auto-graded by a script.
- Mid-term - week before the intersession
- Recommended: attend (or volunteer) at PyCon Canada on November 10-11

What is "Intelligence"?

- The ability to acquire and apply knowledge and skills.
  - [According to Oxford dictionary](#)

- Acquire how?

- How does a 2 year old baby learn?
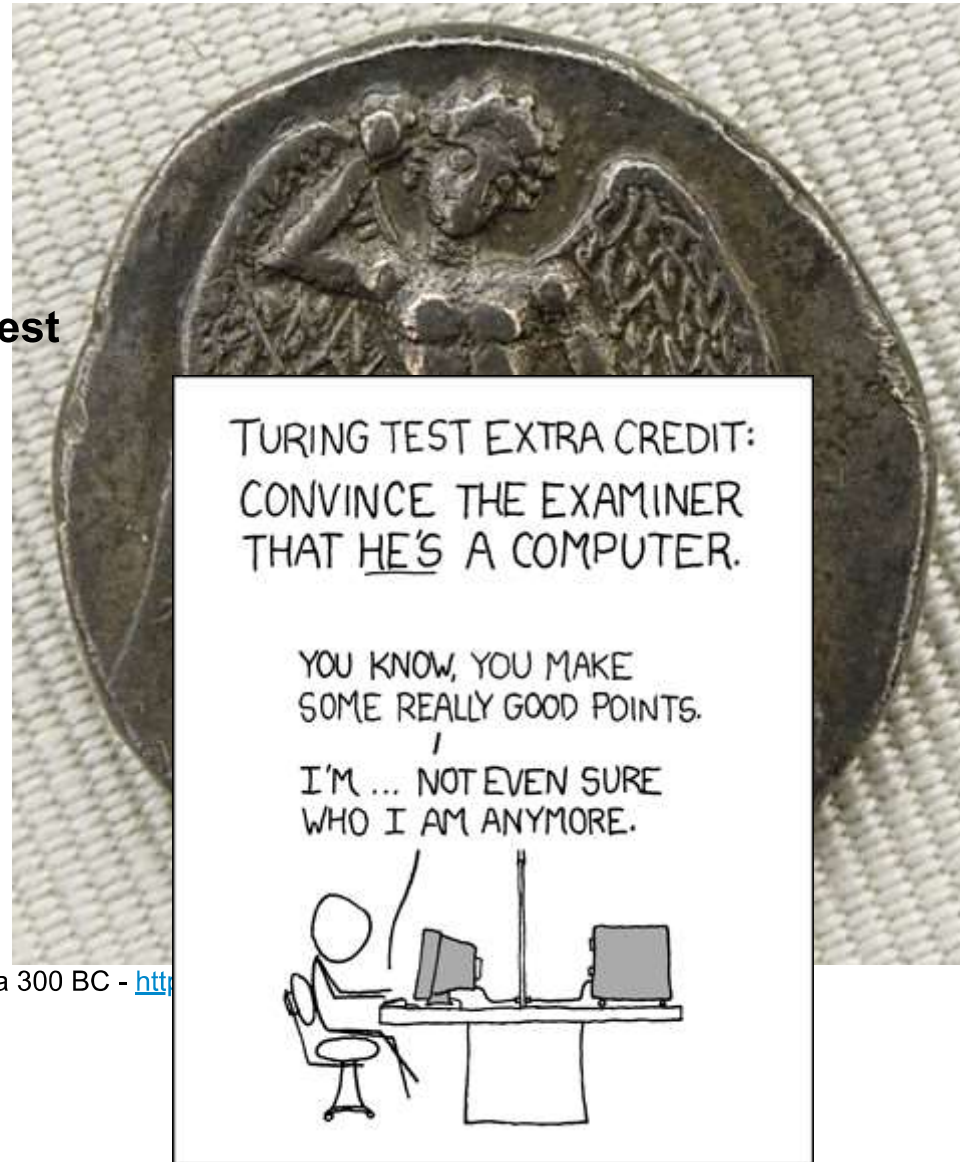
AI vs. Machine Learning vs. Data science

Further reading to further confuse you:

- [Are you using the term 'AI' incorrectly?](#) by *Cassie Kozyrkov*
- [Ways to think about machine learning](#) by *Benedict Evans*

Brief history of AI
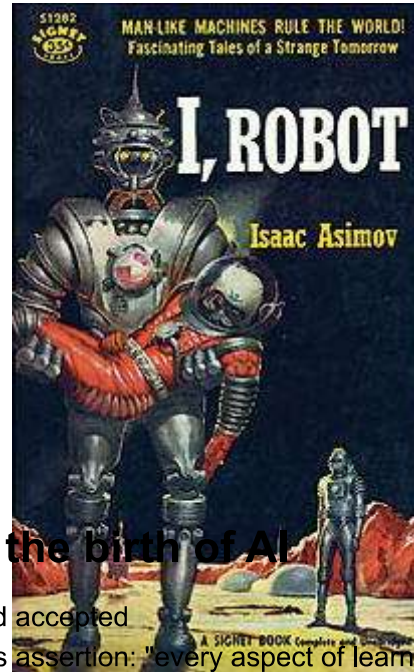
Ancient times - Myth of Talos

1950s - Turing Test

Silver coin from Crete, circa 300 BC - htt

Source: https://xkcd.com/329/

1950s - Azimov's Three Laws of Robotics

Dartmouth Conference 1956: the birth of AI

- The Term Artificial Intelligence discussed and accepted
- The proposal for the conference included this assertion: "every aspect of learning or any other feature of intelligence can be so precisely described that a machine can be made to simulate it"

https://en.wikipedia.org/wiki/Three_Laws_of_Robotics

The AI winters - late 70s and 80s

- Boom and bust cycles of extreme enthusiasm followed by disappointment

Modern times - deep learning

Movies to watch

- Hello World Canada: The Rise of AI (hightly motivating 50 minute documentary)
- The Imitation Game (2014) (about Alan Turing)
- 2001: A Space Odyssey (1968)

Why study machine learning?

Common industrial applications

- Recommendation engines (Netflix, Amazon)
- Ad targeting (Googlbe, Faceook, Cambrdge Analytica)

- Spam filtering
- Credit card fraud detection
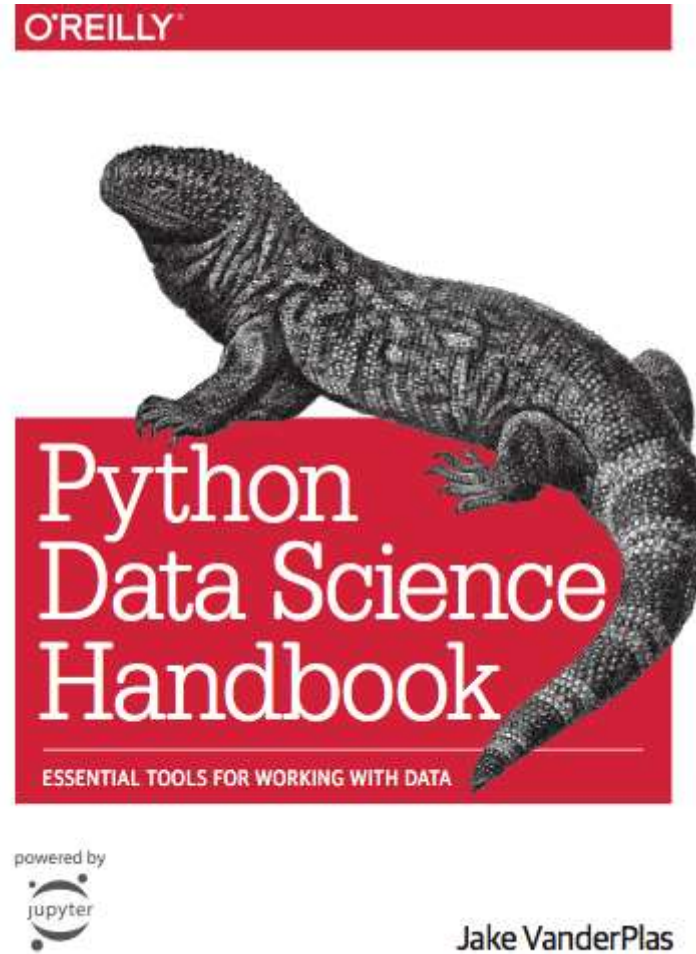- Pattern recognition in sensor data (FitBit)

To understand how humans learn

"What I cannot create, I do not understand" - Richard Feynman

about this quote on Quora

Course book

Course book

Python Data Science Handbook by Jake VanderPlas

- Read online: https://jakevdp.github.io/PythonDataScienceHandbook/
- GitHub: https://github.com/jakevdp/PythonDataScienceHandbook
- On Amazon.ca

Book structure - Python libraries

- IPython & Jupyter
- NumPy
- Matplotlib

- Pandas
- Scikit-learn

  It's a handbook and we will be taking a spiral approach

Book sections for this week

- #1. IPython: Beyond Normal Python
- #2. Introduction to NumPy

What this course is NOT about

- Big data
- General purpose AI
- Neural networks
- How AI is about to solve all problems or kill humanity

Course outline

https://github.com/kamrik/ML1/blob/master/Outline.md

slido.com/COMP3122

- I recommend installing Anaconda 3 (full version, not miniconda) on your personal computers.

IPython and Jupyter

IP[y]:

IPython and Jupyter

- **IPython:** improved & interactive Python console / terminal
- **Jupyter Notebook:** Edit and run your code in the browser and mix it with text
- We will be using both
- [Book](#) chapter 1

Jupyter - mix code & text

Tale a look at this notebook - [NYC Taxi data visualisaion](#)

Code cells - with output

```
In [2]:  #code cell
         x = 3
         x * 7
```
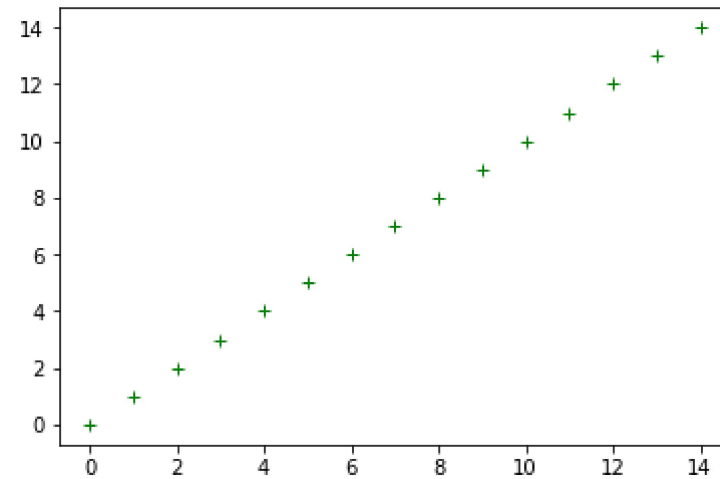
```
Out[2]:  21
```

```
In [3]:  y = [1, 2, 5, 7, "some OTHER text"]
         y
```

Out[3]: [1, 2, 5, 7, 'some OTHER text']

Code with more output

In [5]:
```python
# Ignore the code for now, see the picture
import matplotlib.pyplot as plt
%matplotlib inline
plt.plot(range(15), '+g')
```
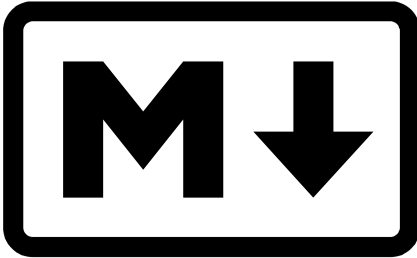
Out[5]: [<matplotlib.lines.Line2D at 0x112f1fe1d30>]

Text cells - Markdown demo

Text cell with:

- Text **formatting**
- links
- and other goodies

Markdown

IPython & Jypyter features

- A lightweight markup language
- Also used on GitHub - README.md are Mardkown files
- Tab completion
- Cheatsheet
- History (arrow up in console)
- https://en.wikipedia.org/wiki/Markdown
- ? and ??
- Wildcards with ? e.g: "*Warning?"
- Magic functions: %run and %paste (there are more, use %lsmagic)
- You can use "?" after magic functions

Magic commands

```
In [6]:  %run ./hello.py
```

```
Hello, COMP 3122 students!

<Figure size 432x288 with 0 Axes>
```

```
In [9]:  name?
```

Plotting data - matplotlib

TBD (in next week's slides for now)

Notebooks in the cloud

- Full Interactive mode
  - Microsoft Azure Notebooks
  - Google collab
  - https://mybinder.org/
  - Kaggle
- View only
  - http://nbviewer.jupyter.org/

- GitHub
- But also have it installed on your computer