DIGITAL METHODS FOR ANALYSING TEXTS
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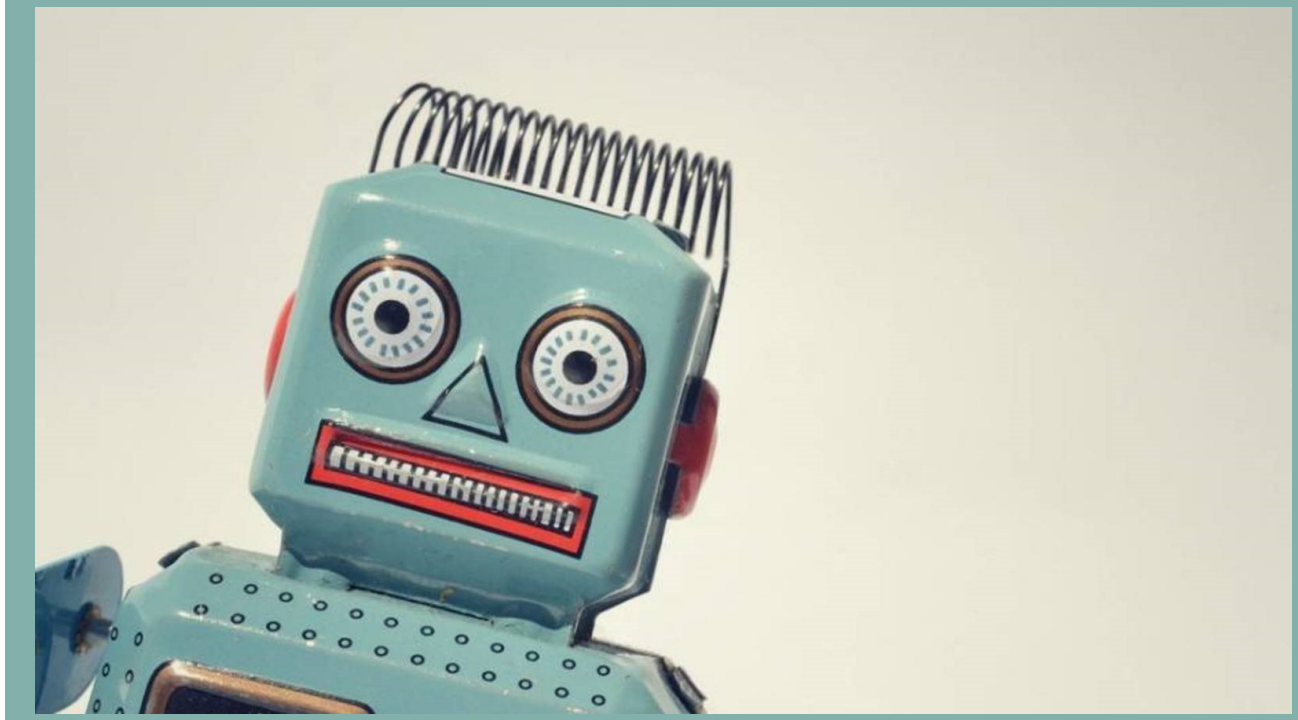
01_Introduction to text mining



Ana Valdivia
Research Associate
King's College London

WHO AM I?//

Ana Valdivia

Research Associate at Security Flows (King's College London, UK)

PhD in Natural Language Processing (Universidad de Granada, Spain)

Research interests:

- *Fairness, Accountability, Transparency in AI*
- *Natural Language Processing*
- *Data Feminism*
- *Design Justice*
- *Hype in AI and Big Data*

WHO ARE YOU?//

Who are you?

What do you expect from this course?

ABOUT THIS COURSE//

- Familiarises PhD students with the main **text mining** techniques in social science and develops basic skills in **digital methods.**

- You will learn how to approach and **manage text data**, **analyse texts**, and **visualize** this information.

- Every **Monday** and **Wednesday** from 10AM to 1PM.

Session date	Lecture	Lecture topic	Seminar topic
12 April	1	Introduction to text mining	Import text data
14 April	2	Analysing **text**	Methods for text preprocessing
19 April	3	Analysing **words**	Methods for word analysis
21 April	4	Analysing **relations**	Methods for co-ocurrence analysis
26 April	5	**Topic** modelling	Methods for analysing context
28 April	6	Text mining in the **real world**	Analysing your own text

INTRODUCTION
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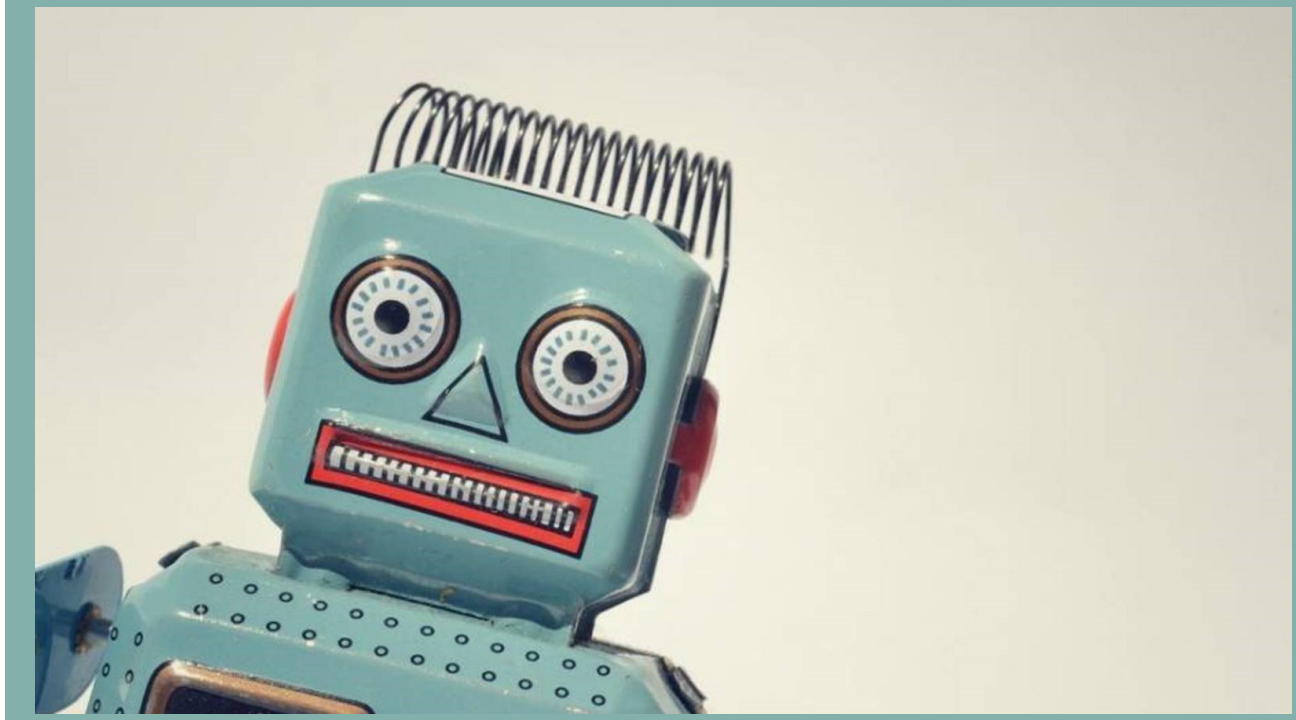


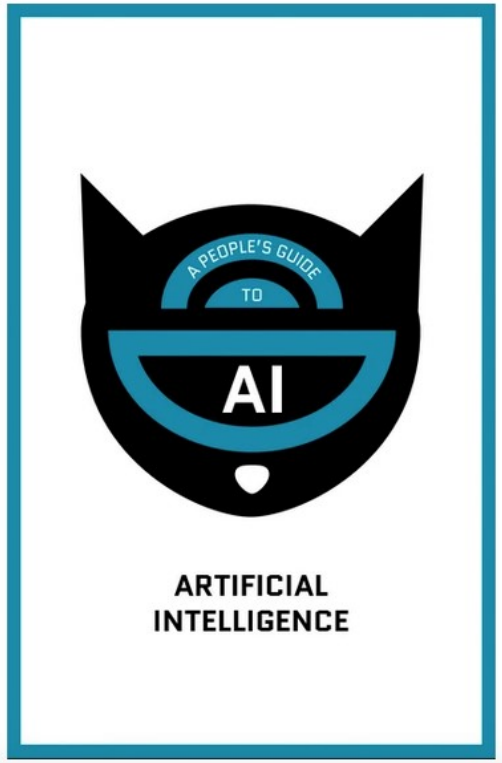
INTRODUCTION//

What is AI?

When you hear the words **“Artificial Intelligence”**, what are the first three things that come to your mind?

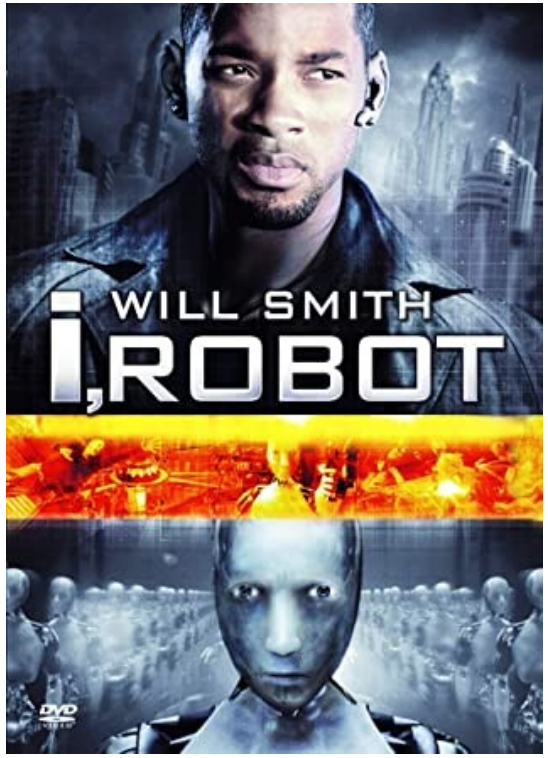
1. _____
2. _____
3. _____

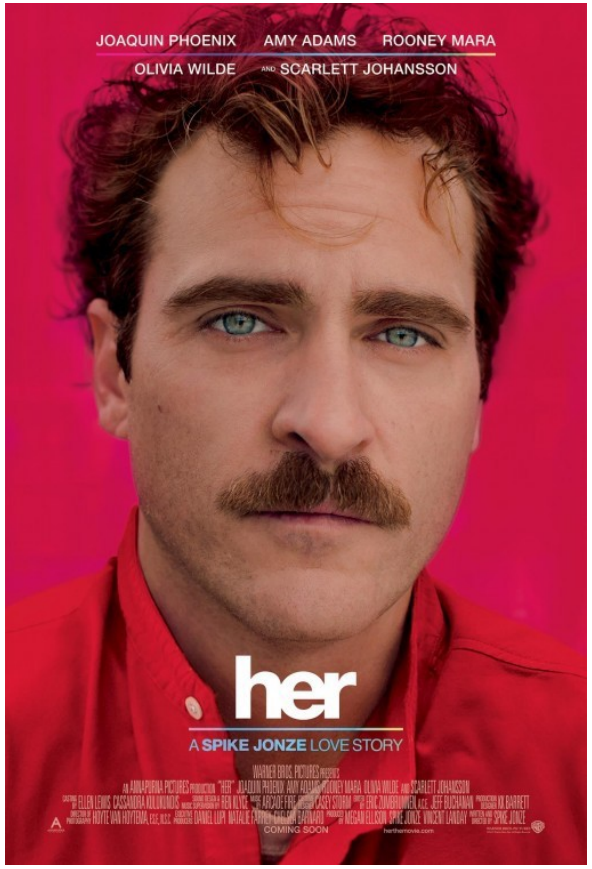
Write here



INTRODUCTION//

What is AI?





INTRODUCTION//

What is AI?

We need to **demystify** Artificial Intelligence.

INTRODUCTION//

What is AI?

We need to **demystify** Artificial Intelligence.

INTRODUCTION//

What is AI?

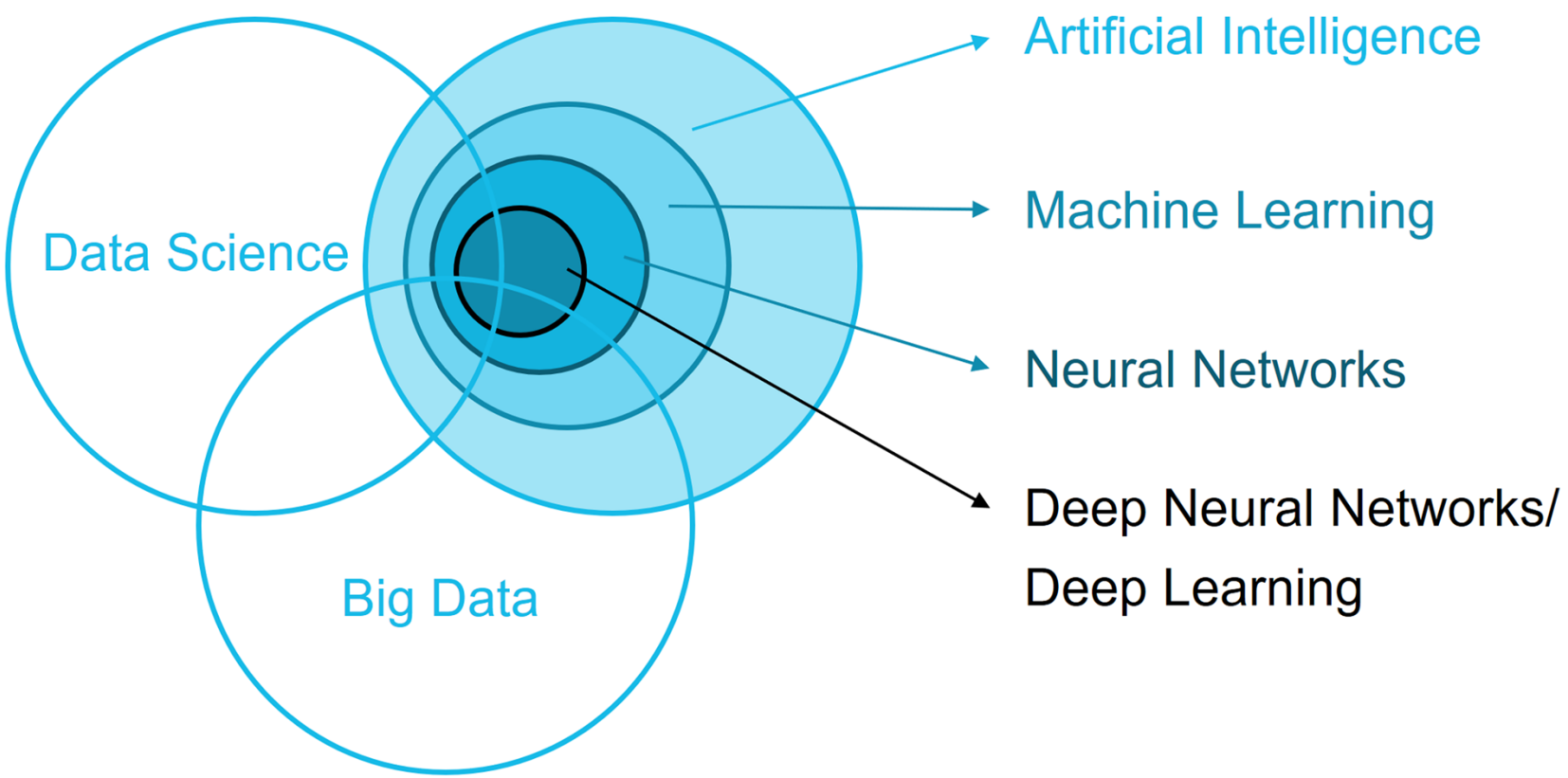
*What is **intelligence**?*

“Artificial intelligence (AI) **systems are software** (and possibly also hardware) **systems designed by humans** that, given a complex goal, **act in the physical or digital dimension** by *perceiving their environment* through **data acquisition**, interpreting the collected structured or unstructured data, reasoning on the knowledge, or **processing the information**, derived from this data and **deciding the best action(s) to take** to **achieve** the given **goal**.”

European Comission.

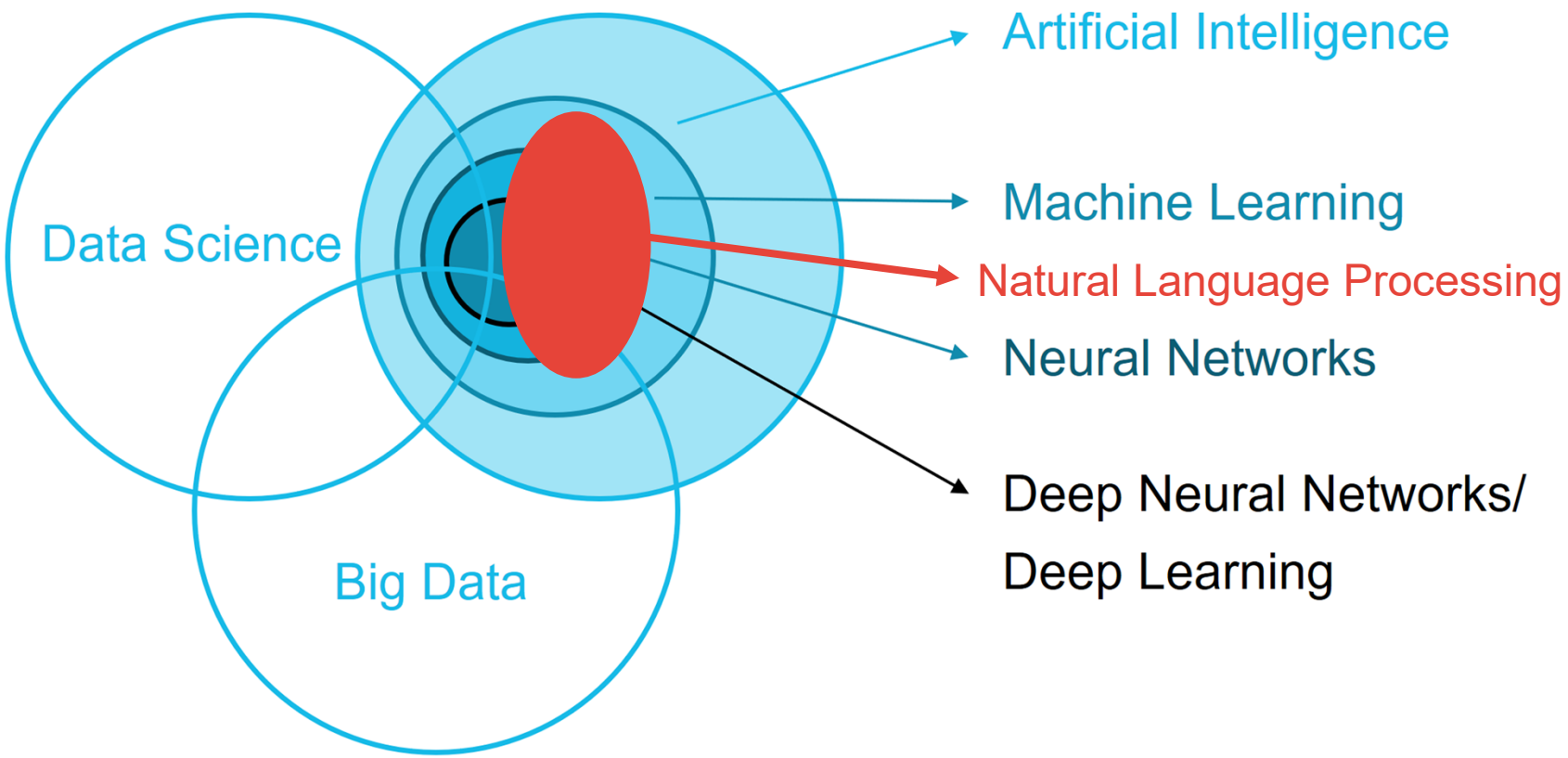
INTRODUCTION//

What is AI?



INTRODUCTION//

What is AI?



INTRODUCTION//

What is Natural Language Processing?

Digital Methods to Analyse Text = Natural Language Processing

INTRODUCTION//

What is Natural Language Processing?

“**Human language** appears to be unique phenomenon, without significant analogue in the animal world.”

Noam Chomsky.

INTRODUCTION//

What is Natural Language Processing?

Natural Language Processing (NLP) is a sub-field of Artificial Intelligence that is focused on enabling computers to ~~understand~~, **process** and generate human languages, ~~to get computers closer to a human-level understanding of language~~.

INTRODUCTION//

What is Natural Language Processing?

Data

+

Computation performance

=

Natural Language Processing

INTRODUCTION//

Could you list three NLP-based applications?

1. _____

2. _____

3. _____

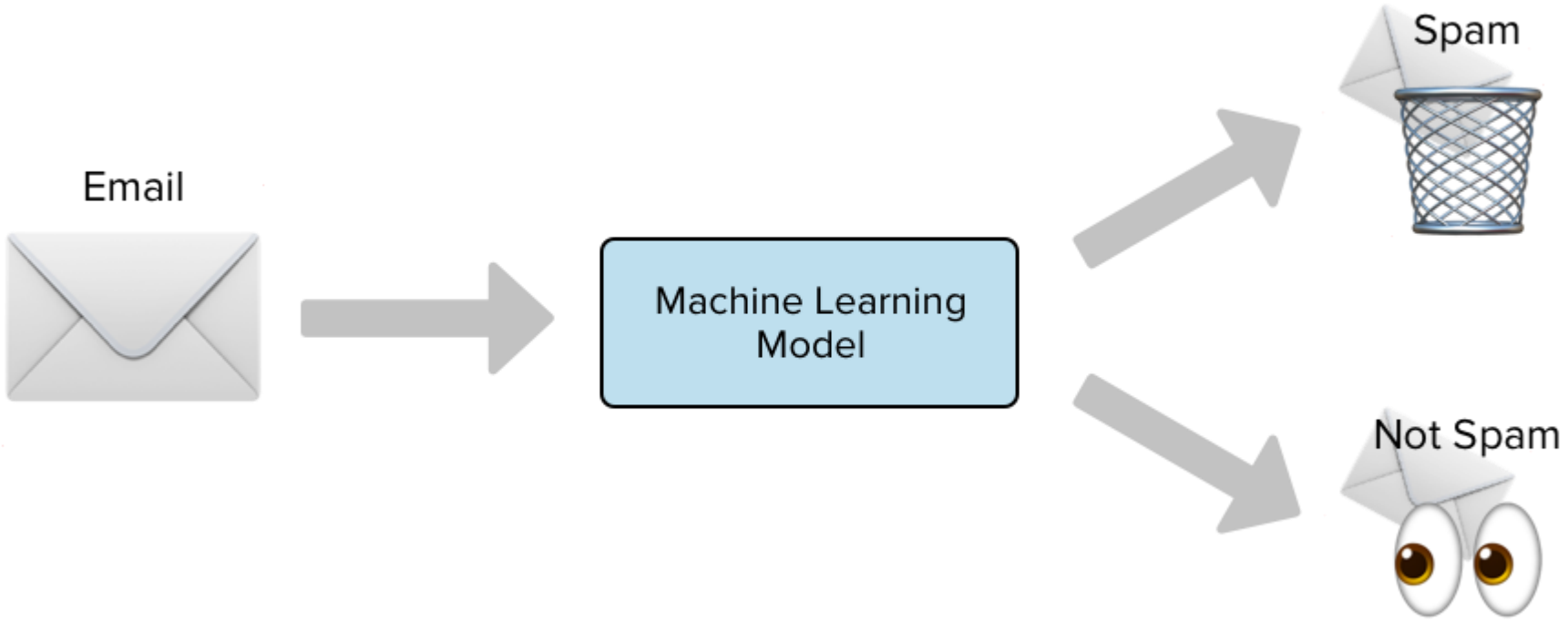
Write here

INTRODUCTION//

How do you think spam detection works?

INTRODUCTION//

How do you think spam detection works?



INTRODUCTION//

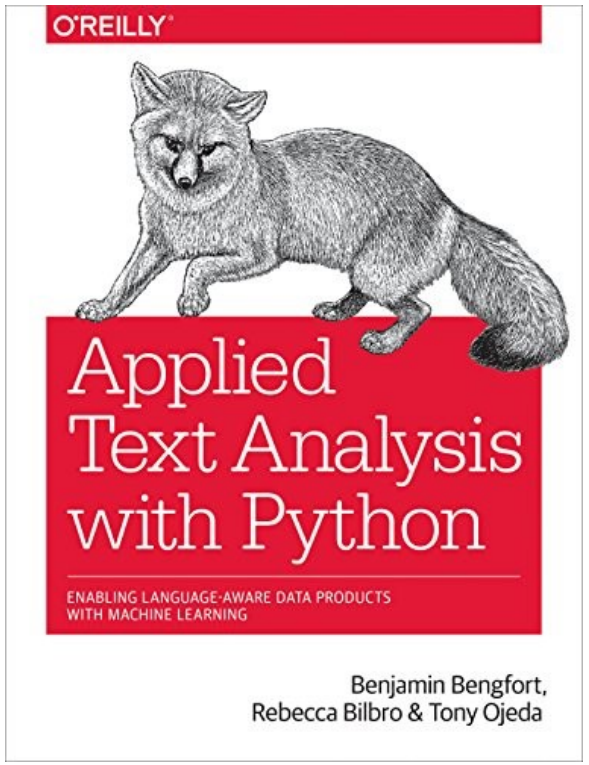
What is Natural Language Processing?

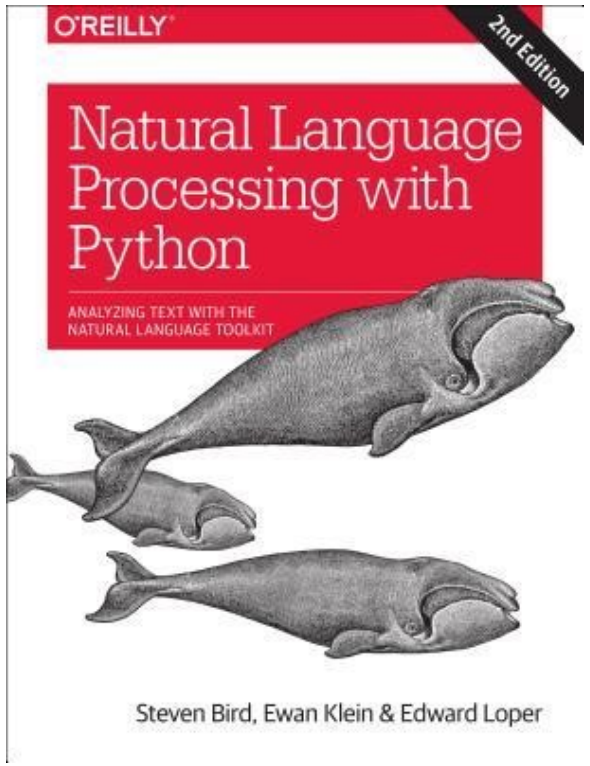
We will learn **basic skills** to deal with text in different layers:

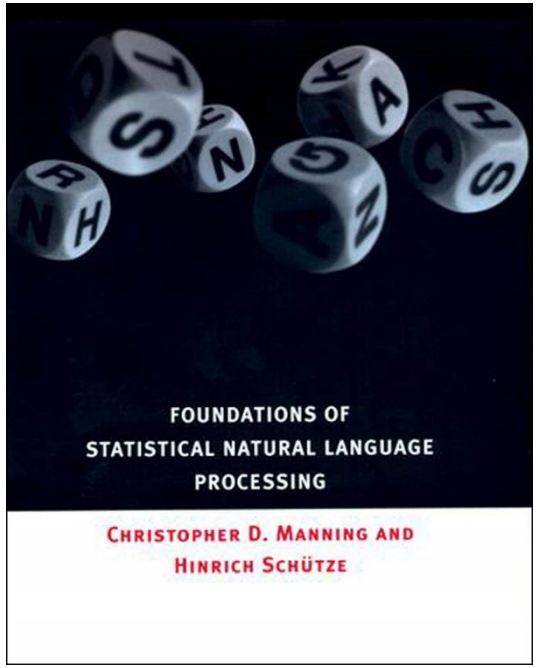
- Text,
- words,
- relations, and
- topics.

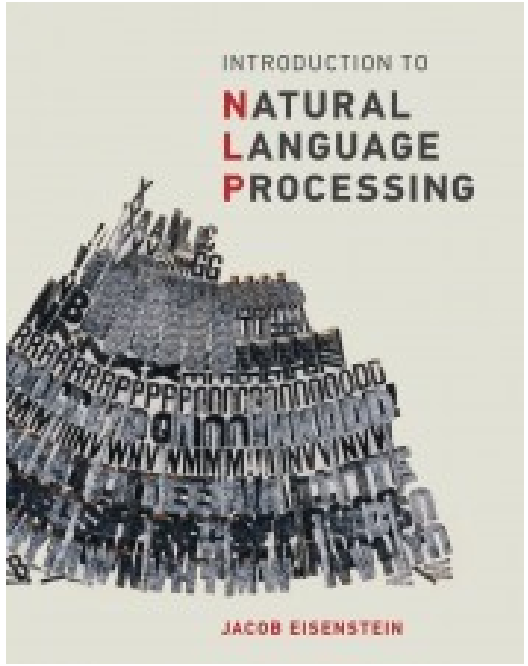
INTRODUCTION//

Books









HISTORY OF NLP
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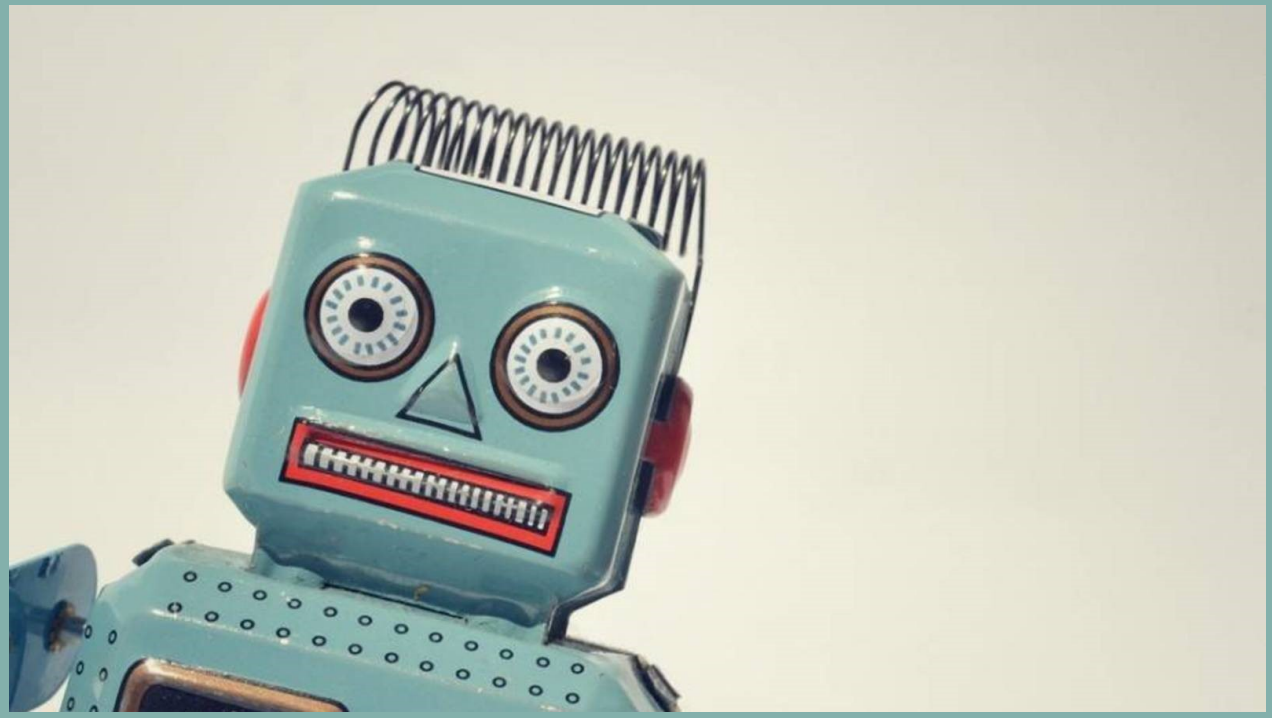
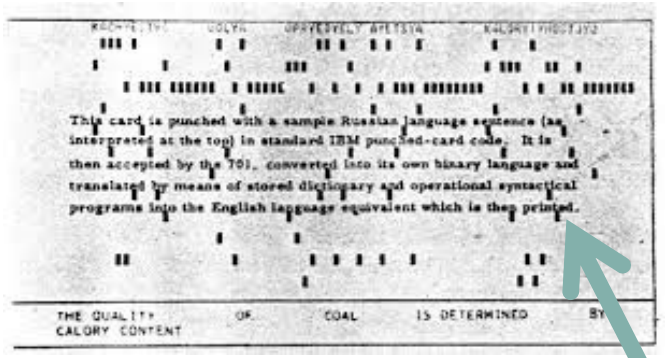


HISTORY OF NLP//

The **history** of **NLP** (and AI) is **military history:**

- **Computing Machinery and Intelligence** by Alan Turing (**1950**).
- **The Georgetown-IBM System**, a machine translation system (**1954**).
- **PARRY**, a chatbot to simulate a person with paranoid schizophrenia (**1972**).

Example of a punched card with a Russian sentence and English translation (Georgetown-IBM System)



To read more about the Georgetown-IBM System, click here.

HISTORY OF NLP//

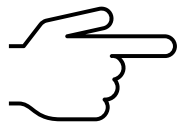
It has rapidly evolved thanks to **gamers.**

A **graphics processing unit** (**GPU**) is a specialized **electronic circuit.**

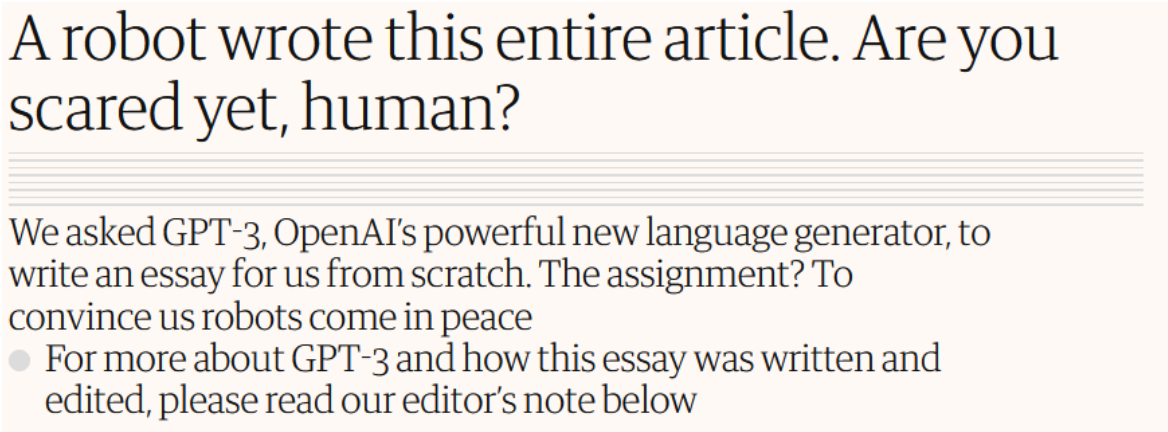
HISTORY OF NLP//

Where are we now?

- **Watson** (IBM), question-answering computer system (**2006**).
- **Virtual assistants**, Siri, Amazon Alexa, Cortana, Google Assistant (**2011-2016**).
- **GPT-3** (OpenAI), autoregressive language model that uses deep learning to produce human-like text (**2020**).



See this video.


A robot wrote this entire article. Are you scared yet, human?

We asked GPT-3, OpenAI's powerful new language generator, to write an essay for us from scratch. The assignment? To convince us robots come in peace

For more about GPT-3 and how this essay was written and edited, please read our editor's note below

HISTORY OF NLP//

Are you impressed by the **performance** of this **chatbot**?

Have you had **good experience** when **interacting** with **chatbots**?

HISTORY OF NLP//

NLP (and AI) is far from being ***general*** **intelligent**.

HISTORY OF NLP//

However, it is good at analysing **large amount of data** and **identifying patterns** on it.

Which is super difficult for us, the human beings.

LANGUAGE AS DATA
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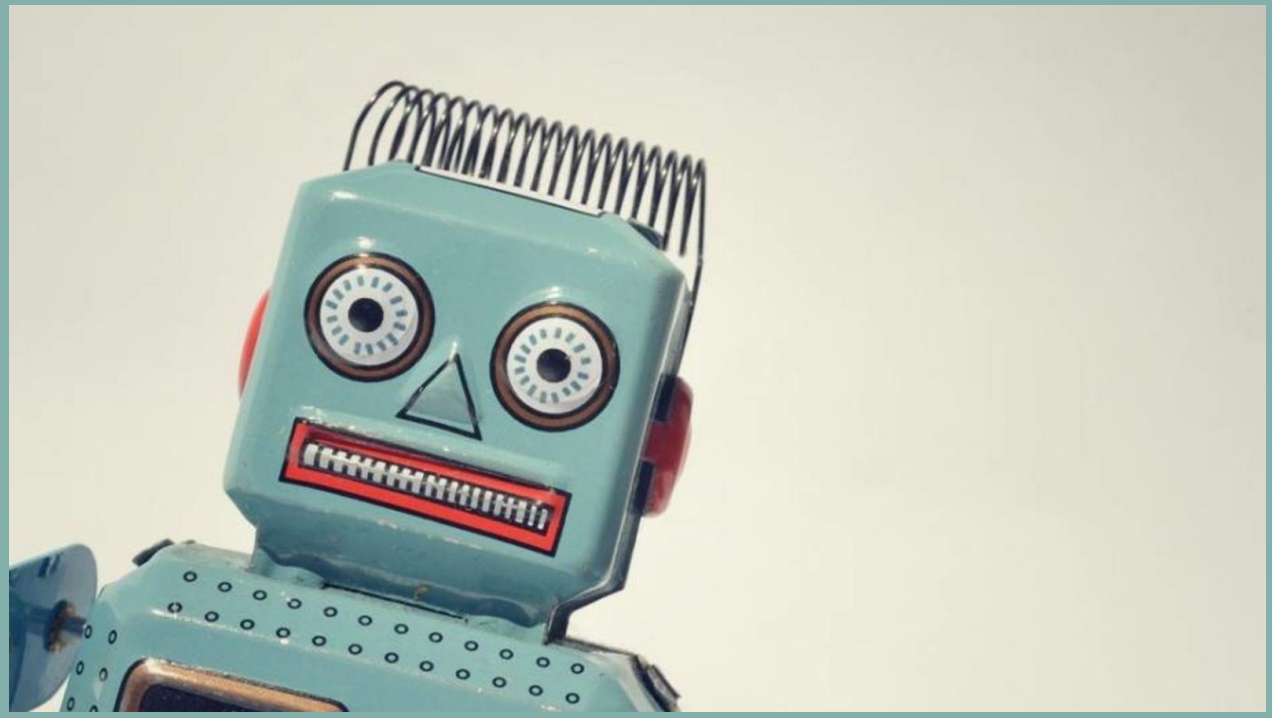


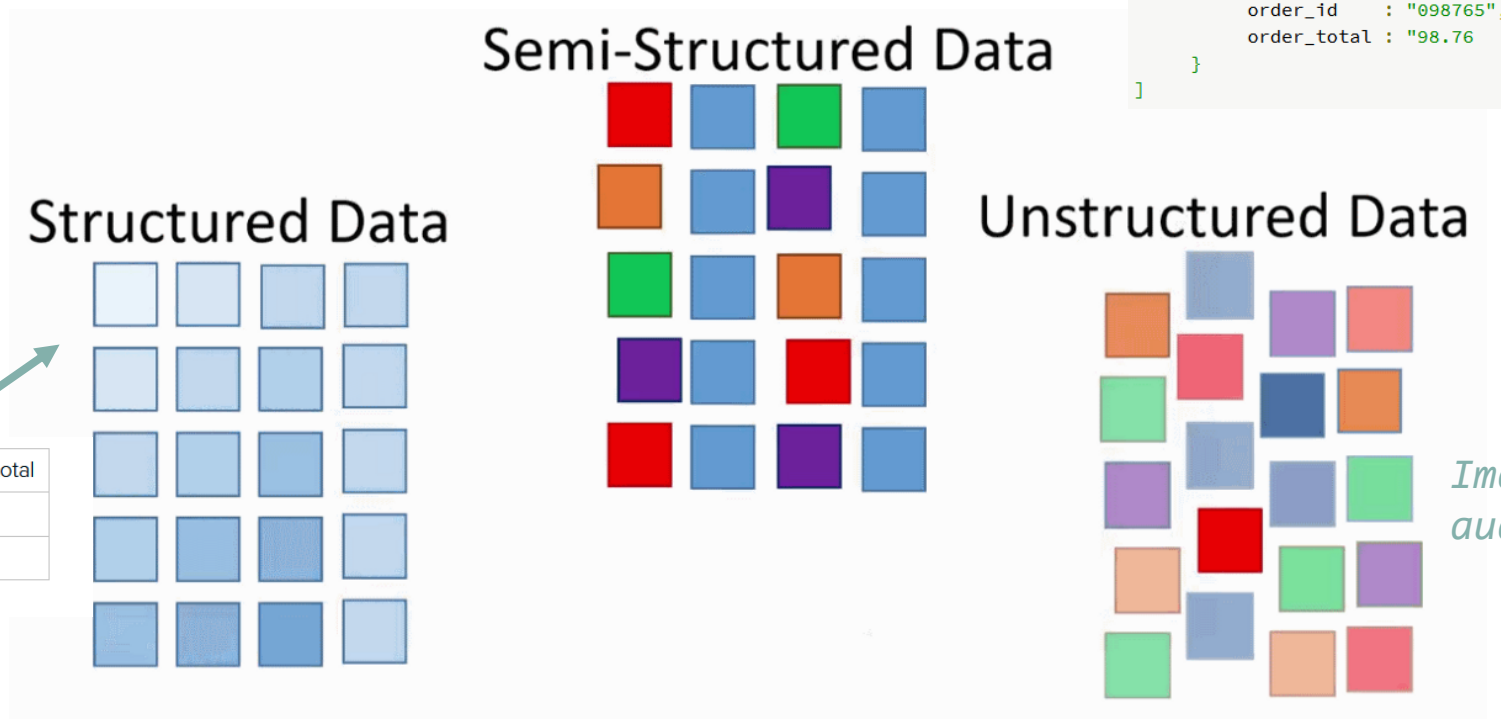
LANGUAGE AS DATA//

Unstructured data

Language is **unstructured data** that has been produced by people to be understood by other people.

Json files, csv

```
[
    {
        first_name  : "Jane",
        last_name   : "Smith",
        order_id    : "123456",
        order_total : "12.34"
    },
    {
        first_name  : "John",
        last_name   : "Doe",
        order_id    : "098765",
        order_total : "98.76
    }
]
```



Tables

first_name	last_name	order_id	order_total
Jane	Smith	123456	12.34
John	Doe	098765	98.76

Images, text, audios

LANGUAGE AS DATA//

Unstructured data

Language is **unstructured data** that has been produced by people to be understood by other people.

Title	Keywords	Date	Text
Aung San Suu…	Myanmar	01/03/2021	…
Women earning two-thirds…	Pay gap	01/03/2021	…
Alleged leakers of…	Labour	01/03/2021	…

LANGUAGE AS DATA//

Which other columns we could include?

Title	Keywords	Date	Text
Aung San Suu…	Myanmar	01/03/2021	…
Women earning two-thirds…	Pay gap	01/03/2021	…
Alleged leakers of…	Labour	01/03/2021	…

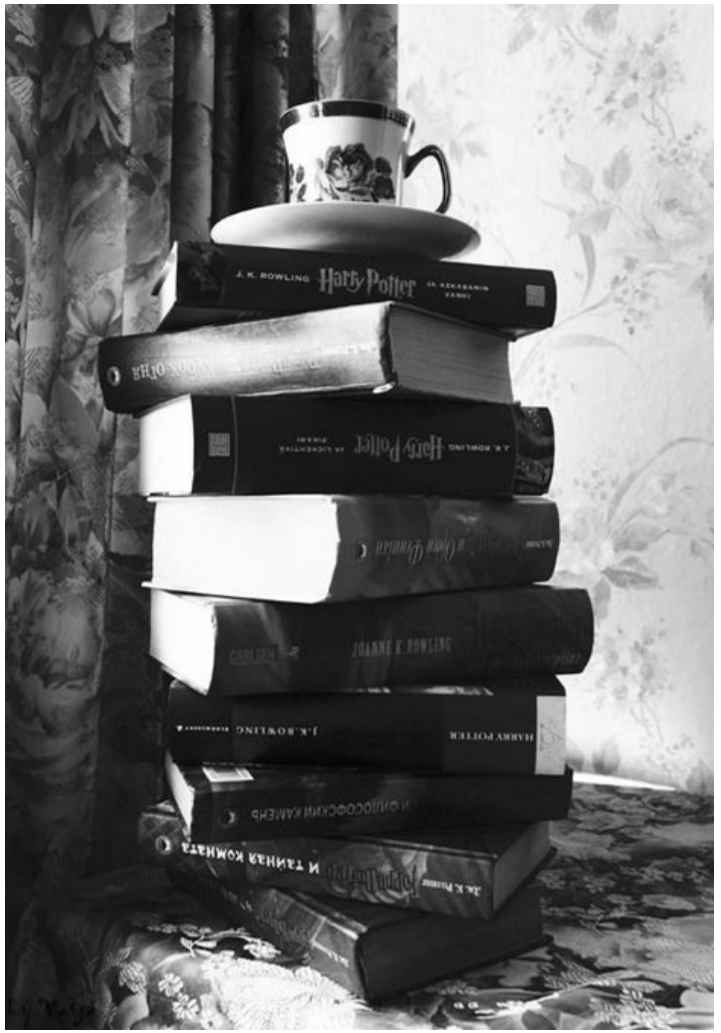
LANGUAGE AS DATA//

Building a Custom Corpus

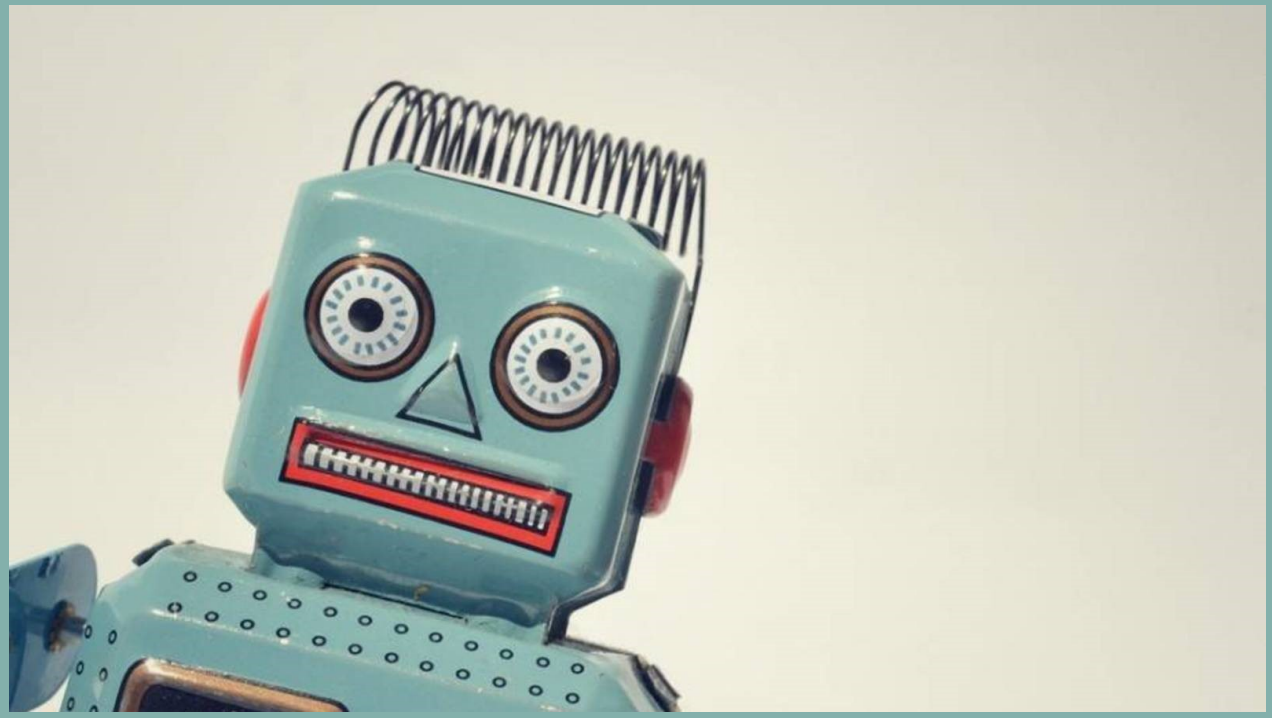
Corpora are collections of related documents that contain natural language.

A **corpus** can be large or small, though generally they consist of dozens or even hundreds of gigabytes of data inside of thousands of documents.

- **Annotated**: Supervised learning algorithms.
- **Unannotated**: Unsupervised learning algorithms.



JUPYTER NOTEBOOKS //



JUPYTER NOTEBOOKS//

Python is a **programming language** that lets you work quickly and integrate systems more effectively…

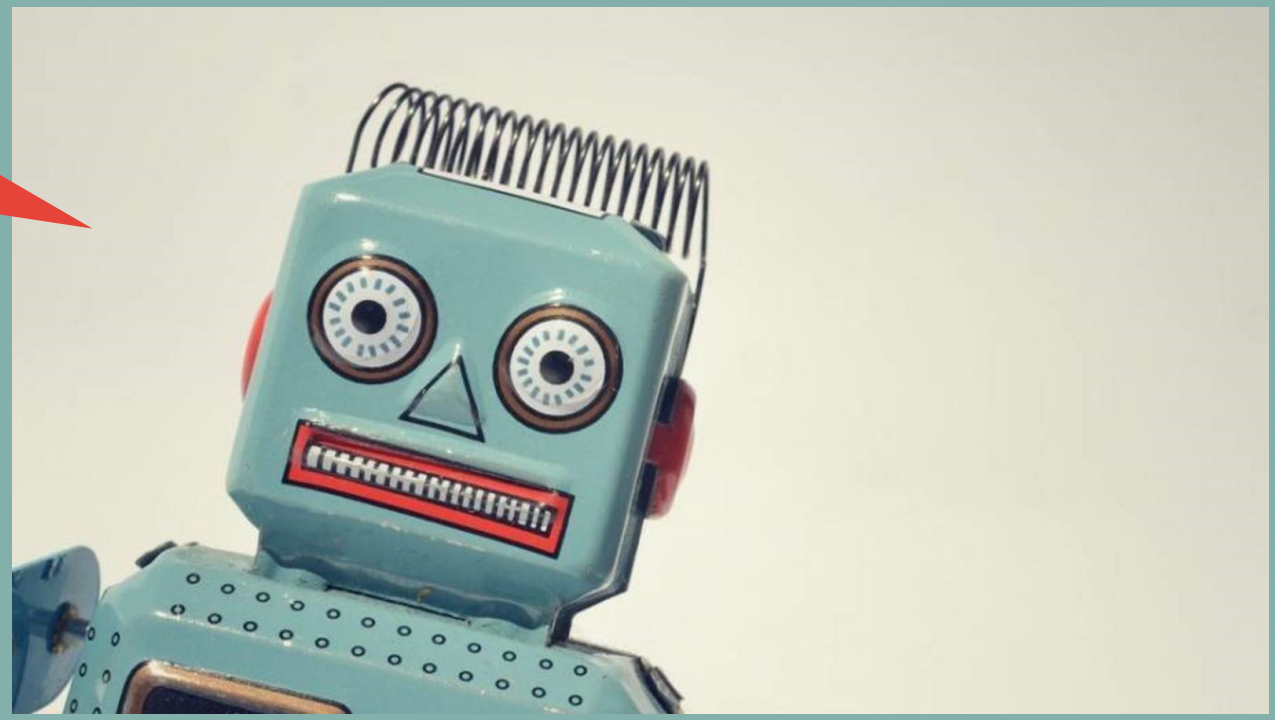
It contains relevant NLP **libraries** to analyse text (NLTK, Spacy and Gensim)

JUPYTER NOTEBOOKS//

The **Jupyter Notebook** is a web application that allows to create documents that contain live code cells, visualizations, explanatory text and equations:

- Interactive
- Support multiple languages (Python)
- Extensible
- And it’s **open source**!

LET'S CODE!



WE'LL BE BACK IN 15 MIN...