INTRODUCTION TO NLP

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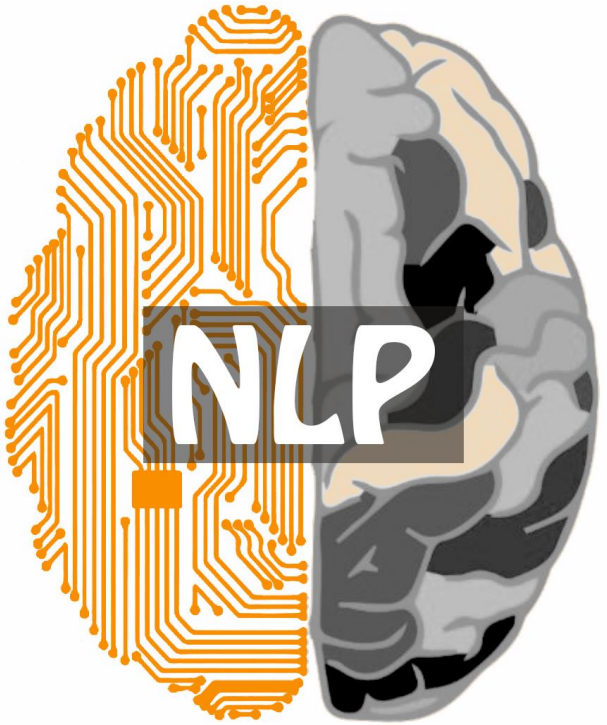
INTRODUCTION

- **Natural Language Processing**, usually shortened as NLP,
- is a branch of artificial intelligence that deals with the interaction between computers and humans using the **natural language**



- The ultimate objective of NLP is
- to read,
- decipher,
- understand, and
- make sense of the human languages in a manner that is valuable

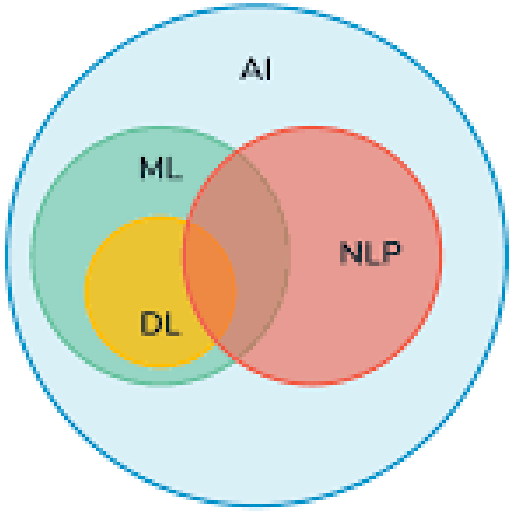
- Most NLP techniques rely on machine learning to derive meaning from human languages

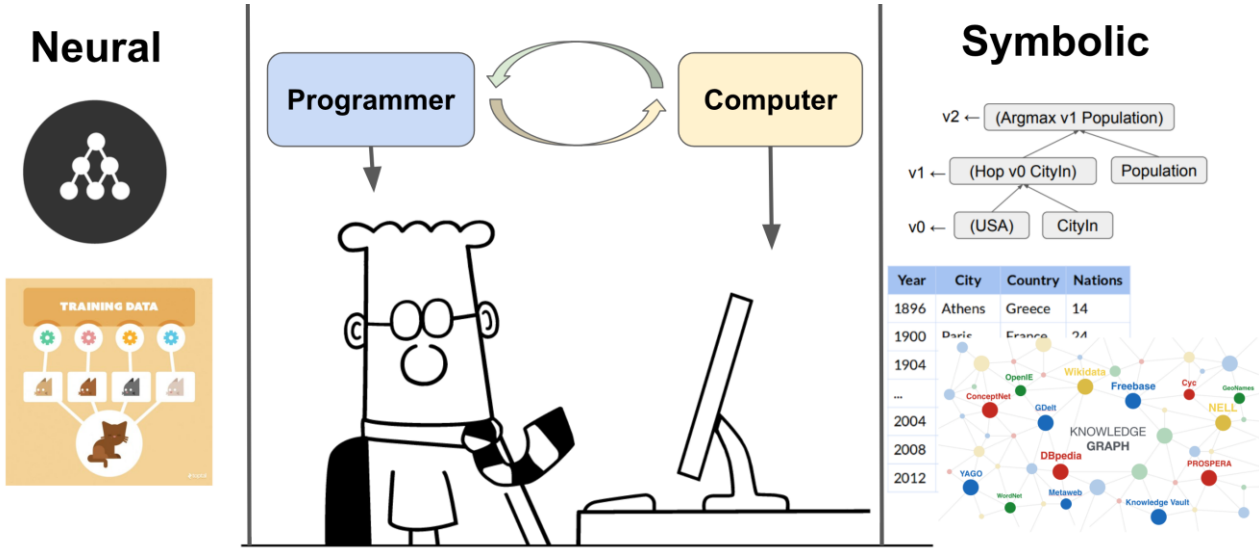
- ***OR SIMPLY***
- Natural Language Processing is the technology used to aid computers to understand the human's natural language

- It's not an easy task teaching machines to understand how we communicate

- **HISTORY**

- Symbolic NLP (1950s - early 1990s)
  - collection of rules, with questions and matching answers
- Statistical NLP (1990s - 2010s)
  - based on complex sets of hand-written rules
- Neural NLP (present)
- representation learning and deep neural network-style machine learning methods





HUMAN MACHINE INTERACTION USING NLP

- A typical interaction between humans and machines using Natural Language Processing could go as follows:
- 1. A human talks to the machine
- 2. The machine captures the audio
- 3. Audio to text conversion takes place
- 4. Processing of the text's data
- 5. Data to audio conversion takes place
- 6. The machine responds to the human by playing the audio file

WHAT IS NLP USED FOR?

- Natural Language Processing is the driving force behind the following common applications:
- Language translation applications such as Google Translate

- Word Processors such as Microsoft Word and Grammarly that employ NLP to check grammatical accuracy of texts.

- Interactive Voice Response (IVR) applications used in call centers to respond to certain users' requests.

- Personal assistant applications such as OK Google, Siri, Cortana, and Alexa.

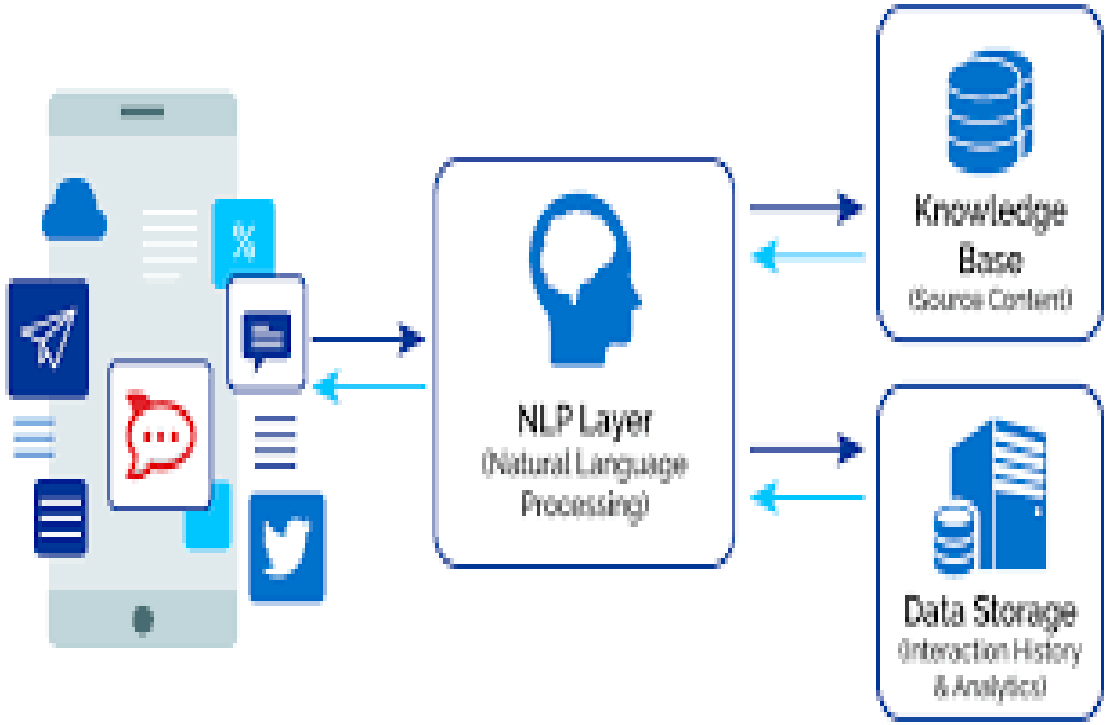
WHY IS NLP DIFFICULT?

- It's the **nature of the human language** that makes NLP difficult.
- The **rules that dictate the passing of information** using natural languages are not easy for computers to understand.
- Some of these **rules can be high-leveled and abstract**;
  - for example, when someone uses a sarcastic remark to pass information.
- On the other hand, some of these **rules can be low-levelled**;
  - for example, using the character "s" to signify the plurality of items.
- Comprehensively **understanding the human language requires understanding both the words and how the concepts are connected to deliver the intended message**.
- While humans can easily master a language, the **ambiguity and imprecise characteristics** of the natural languages are what make NLP difficult for machines to implement.

HOW NLP WORKS?

- NLP entails **applying algorithms to identify and extract the natural language rules** such that the unstructured language data is converted into a form that computers can understand
- When the text has been provided, the computer **will utilize algorithms to extract meaning associated with every sentence and collect the essential data** from them.

- Sometimes, the computer may fail to understand the meaning of a sentence well, leading to obscure results.
- **For example**, a humorous incident occurred in the 1950s during the translation of some words between the English and the Russian languages.
- Here is the biblical sentence that required translation:
- *"The spirit is willing, but the flesh is weak."*
- Here is the result when the sentence was translated to Russian and back to English:
- *"The vodka is good, but the meat is rotten."*



TECHNIQUES USED IN NLP

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