(Natural Language Processing with)

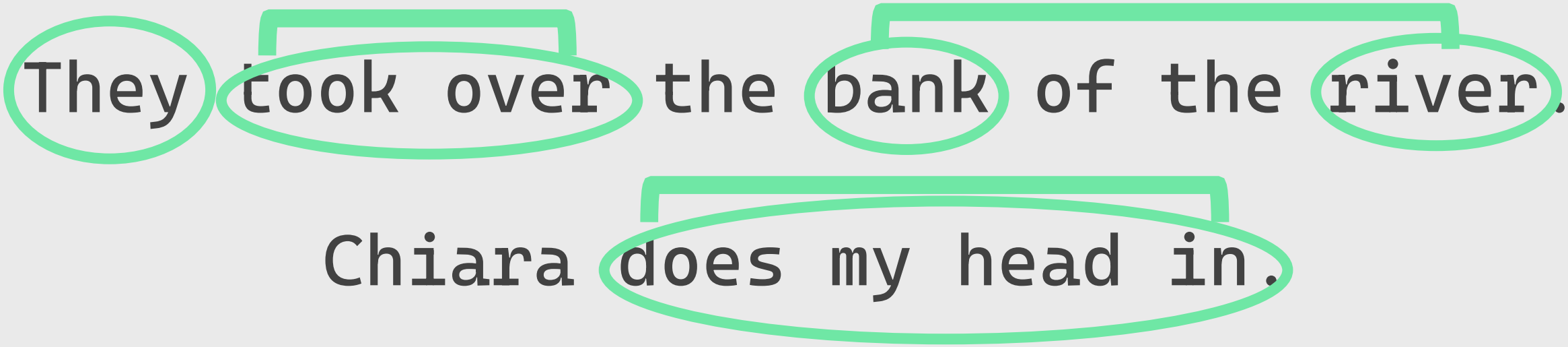
HUGGINGFACE

A GENTLE INTRODUCTION

CHIARA COTRONEO

What is NLP?

Natural language processing is a branch of artificial intelligence concerned with giving computers the ability to understand text and spoken words in much the same way human beings can.



Example tasks

Task	Description	Modality	Pipeline identifier
Text classification	assign a label to a given sequence of text	NLP	pipeline(task="sentiment-analysis")
Text generation	generate text that follows a given prompt	NLP	pipeline(task="text-generation")
Name entity recognition	assign a label to each token in a sequence (people, organization, location, etc.)	NLP	pipeline(task="ner")
Question answering	extract an answer from the text given some context and a question	NLP	pipeline(task="question-answering")
Fill-mask	predict the correct masked token in a sequence	NLP	pipeline(task="fill-mask")
Summarization	generate a summary of a sequence of text or document	NLP	pipeline(task="summarization")
Translation	translate text from one language into another	NLP	pipeline(task="translation")

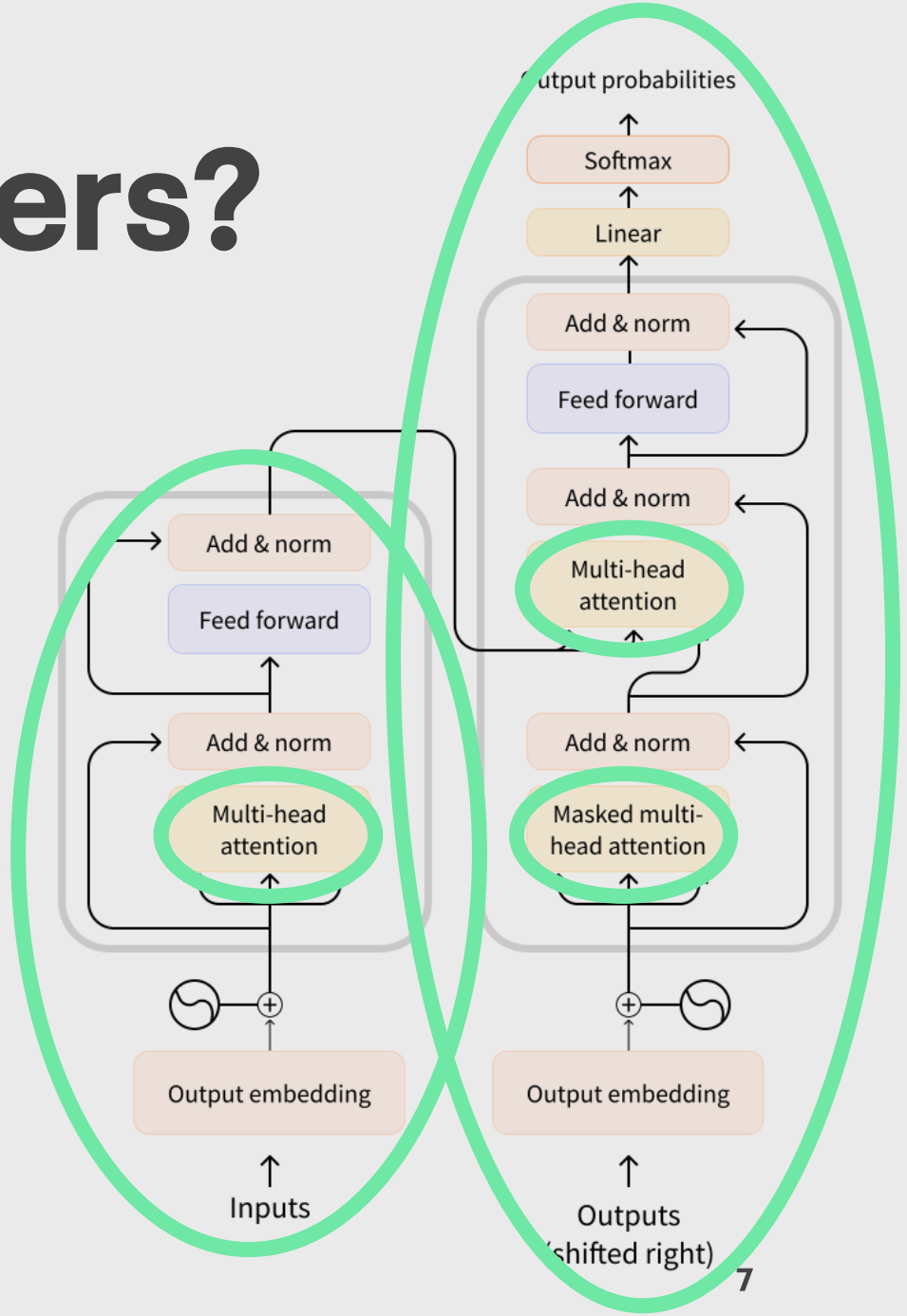
What is HuggingFace?

https://www.huggingface.co

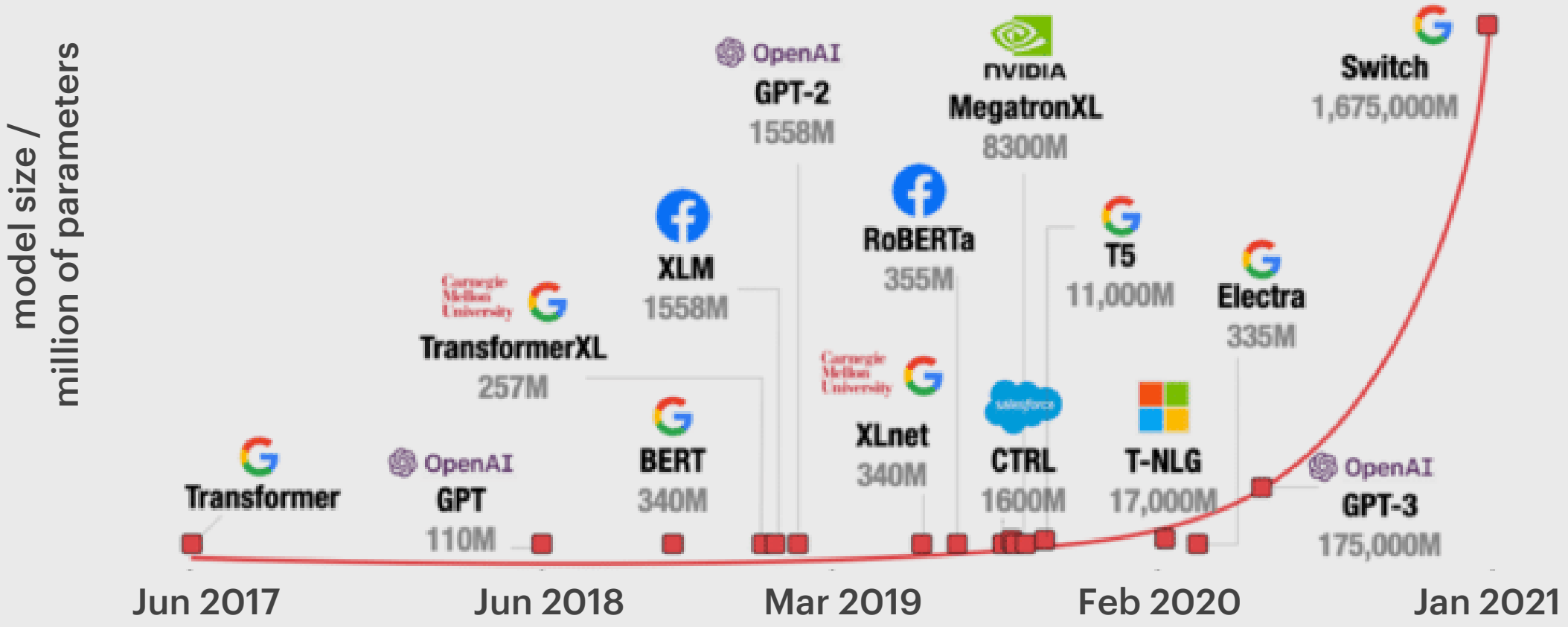
- open-source provider of machine learning technologies
- easy to use Python library
- APIs and tools to easily access pre-trained (transformer) models for:
  - 📝 Natural Language Processing: text classification, named entity recognition, question answering, language modelling, summarization, translation, multiple choice, and text generation
  - 🖼️ **Computer Vision**: image classification, object detection, and segmentation.
  - 🗣️ **Audio**: automatic speech recognition and audio classification

What are transformers?

- **Machine learning models** originally designed for NLP (translation)
- **Encoder/decoder architecture** (underlying Neural Networks)
- **attention layers**: model learns to pay specific attention to certain other words in the sentence you passed when dealing with the representation of each word.



What makes them special?



References

- HuggingFace course:
  https://huggingface.co/course/chapter1/1

- Attention is all you need (Vaswani *et al*), first transformers paper:
  https://arxiv.org/abs/1706.03762