Text-Mining code demos: Basic NLP

Structure of the Day

- Background
- Data Analysis
- Simple Models

LUNCH

- Deep Learning
- Prompting LLMs

Fundamental Text Tasks

- Translation
- Summarization
- **Classification**
- **Information Extraction**

Classification

★★★★★ Can't fault it

★★★★★ Excellent, effective, product.

★★★★★ Does what you ask

★☆☆☆☆ Camera can easily be disabled by thieves

★☆☆☆☆ Not fit for purpose as a security camera

★☆☆☆☆ Not worth the time

Classification

Classification

Classification

I have been working with Archie, a 10-year-old diabetic cat. He currently receives 3 units of ProZinc insulin

Cat vs Dog
Neutered / Spayed?

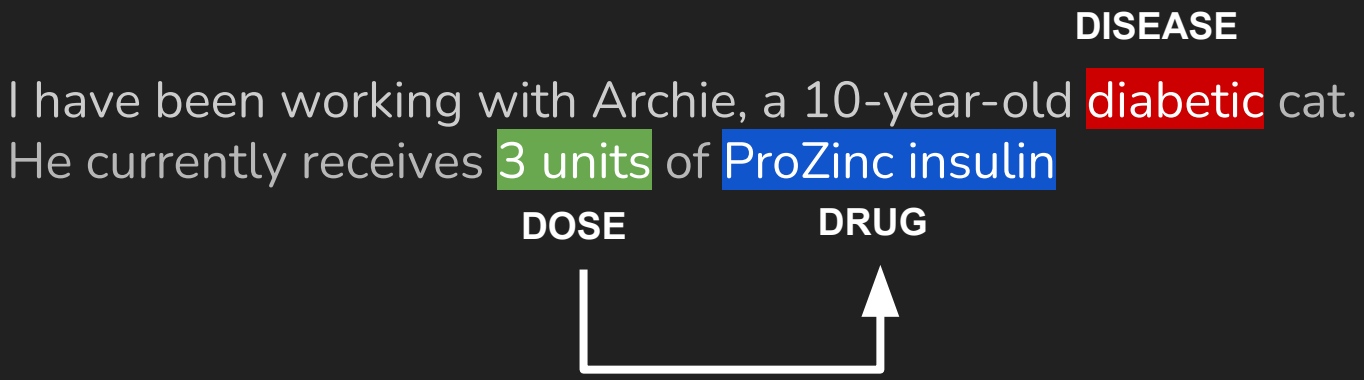
Information Extraction

DISEASE

I have been working with Archie, a 10-year-old diabetic cat.
He currently receives 3 units of ProZinc insulin

DOSE DRUG

Information Extraction



Information Extraction

DISEASE

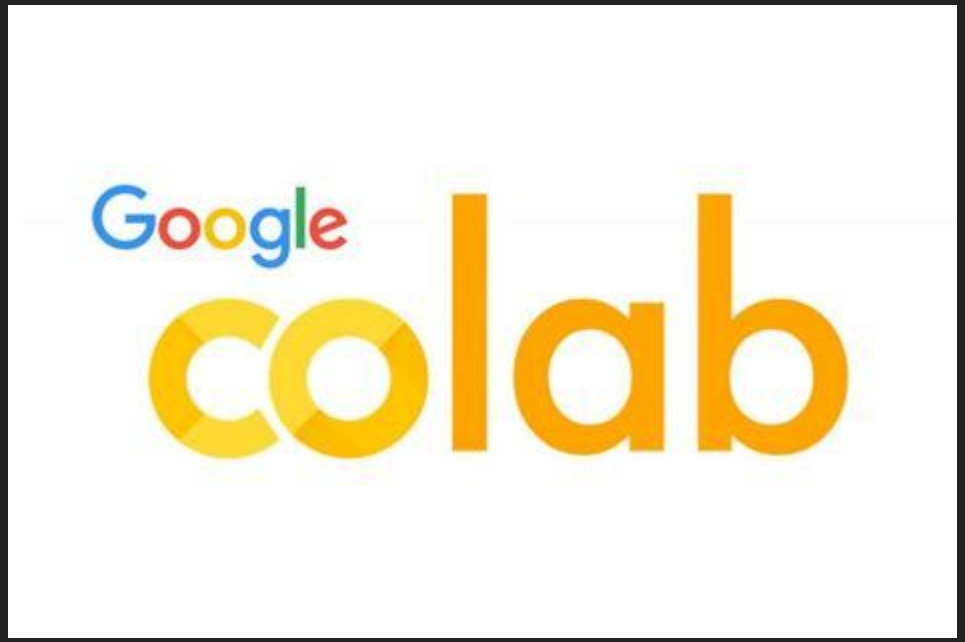
I have been working with Archie, a 10-year-old diabetic cat.
He currently receives 3 units of ProZinc insulin

DOSE **DRUG**

ProZinc 40 IU/ml Suspension for Injection for Cats and Dogs	
MA holder	Boehringer Ingelheim Vetmedica Gmbh
VM number	EU/2/13/152/001-002
Territory	Northern Ireland
Aligned product	
Associated documents	View EPAR
Date of issue	12/07/2013
Authorisation route	Centralised
Active substances	Insulin

Python Environment

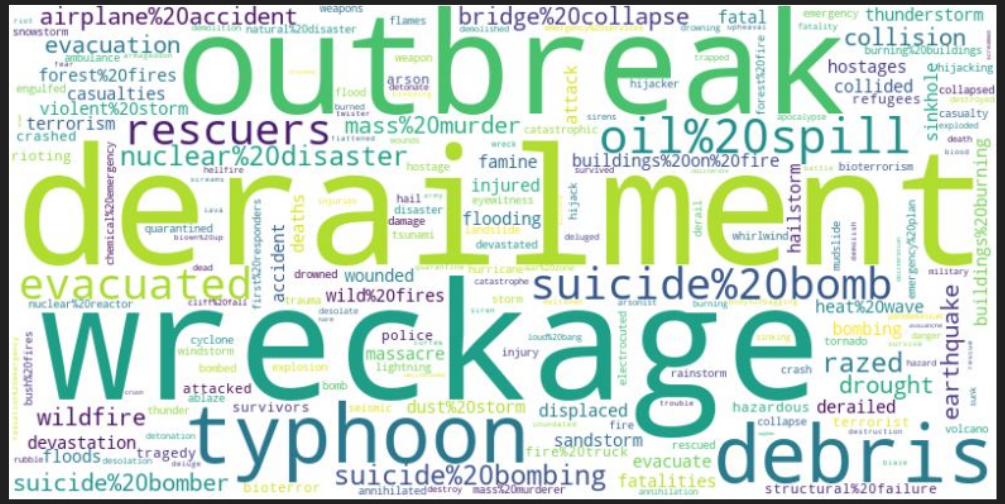
- Colab
- Local Machine
- Bede



https://t.ly/FmAjD

https://github.com/ghomasHudson/text-mining-demos-workshop

Notebook 1: Analysing the datasets

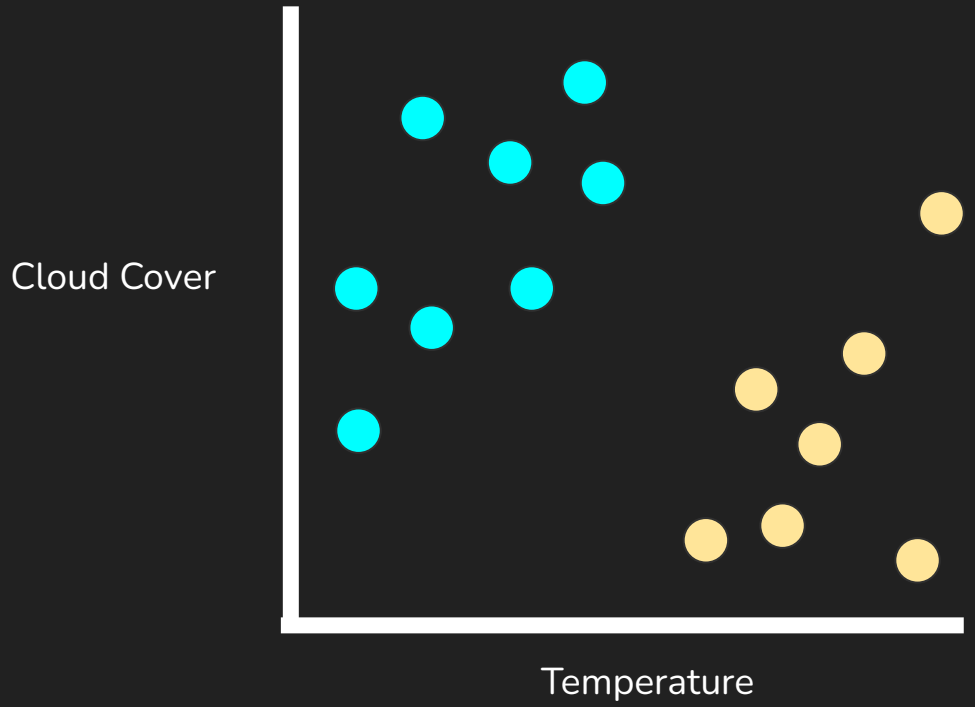


Simple Models

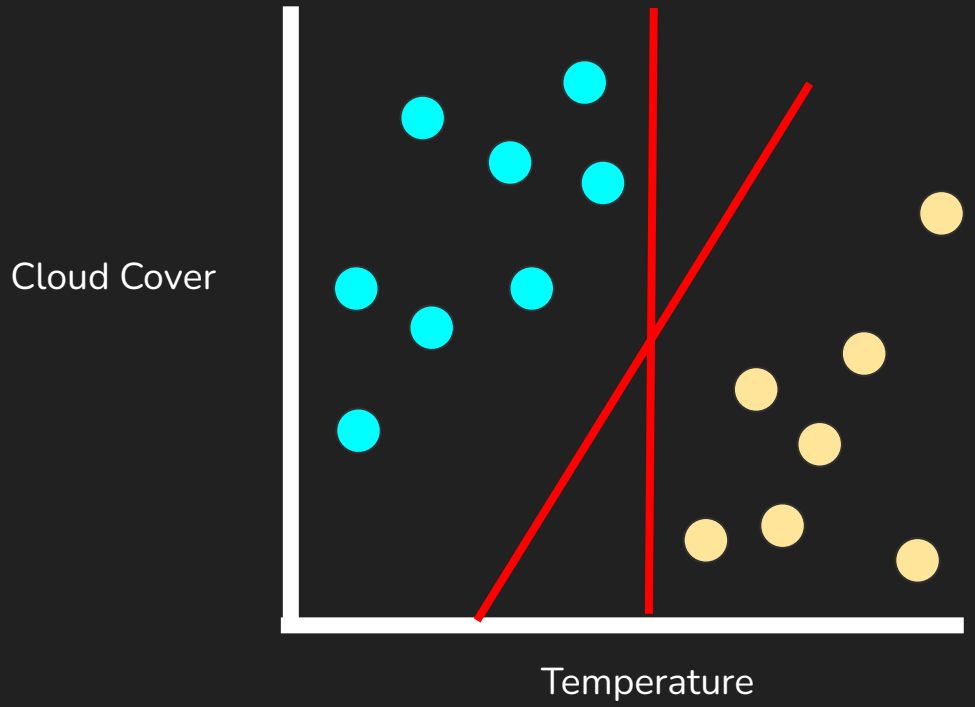
A Simple Model

Temperature	Cloud Cover	Rain
3.3	10	N
0.4	80	Y
…	…	…

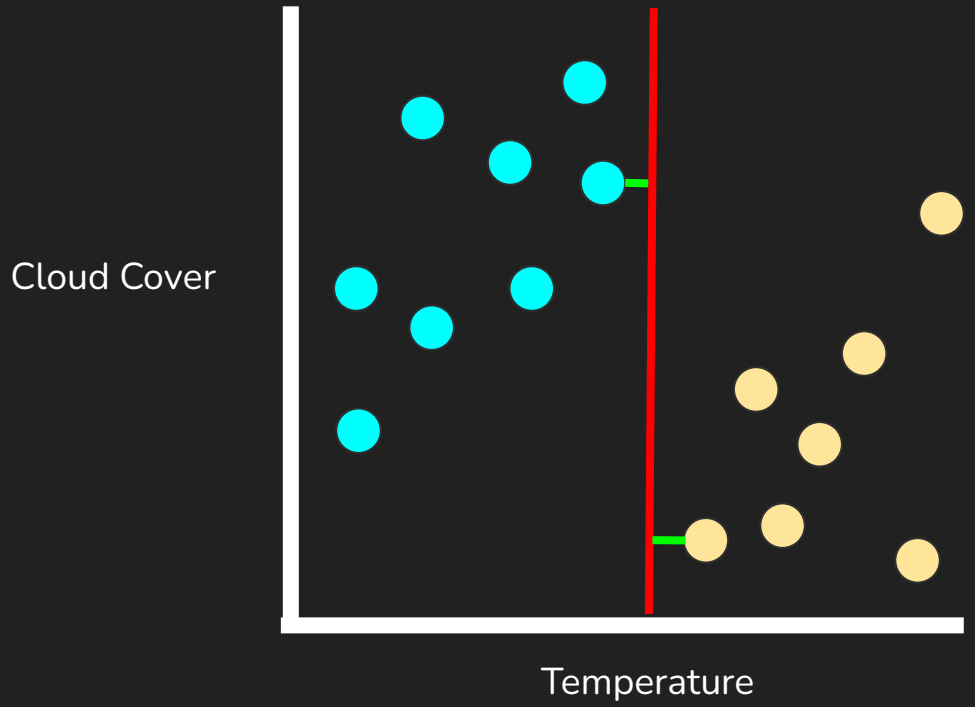
A Simple Model



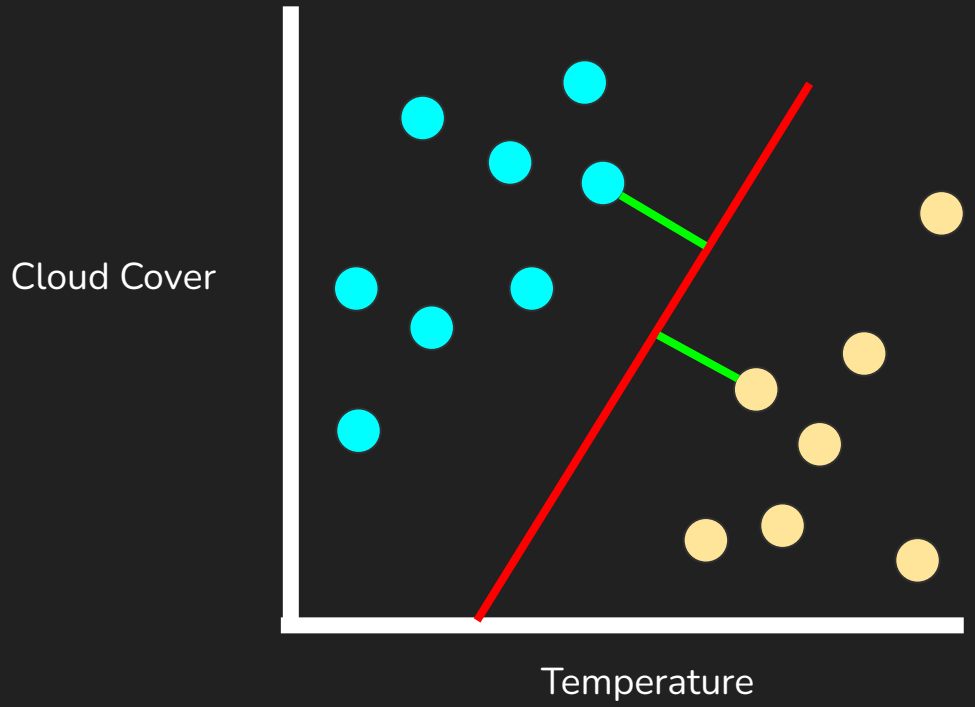
A Simple Model



A Simple Model



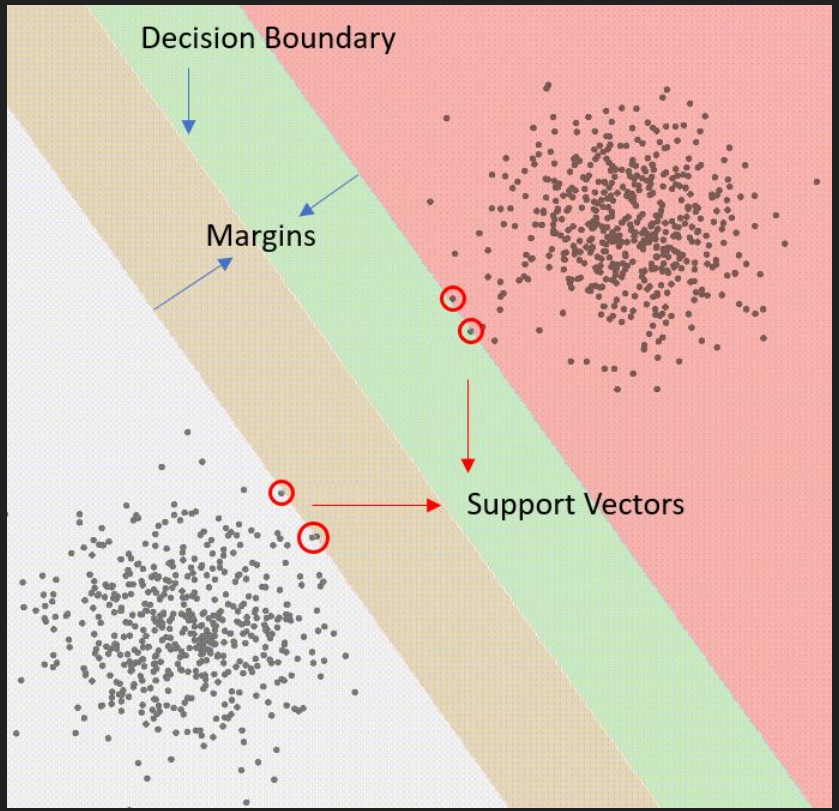
A Simple Model



SVMs for Text

	forest	fire	near	...	help	...
Forest fire near La Ronge Sask. Canada	1	1	1		0	
Help my house is on fire. The fire is huge.	0	2	0		1	

Notebook 2: SVMs for disaster tweet classification



The Problem with Bag of Words

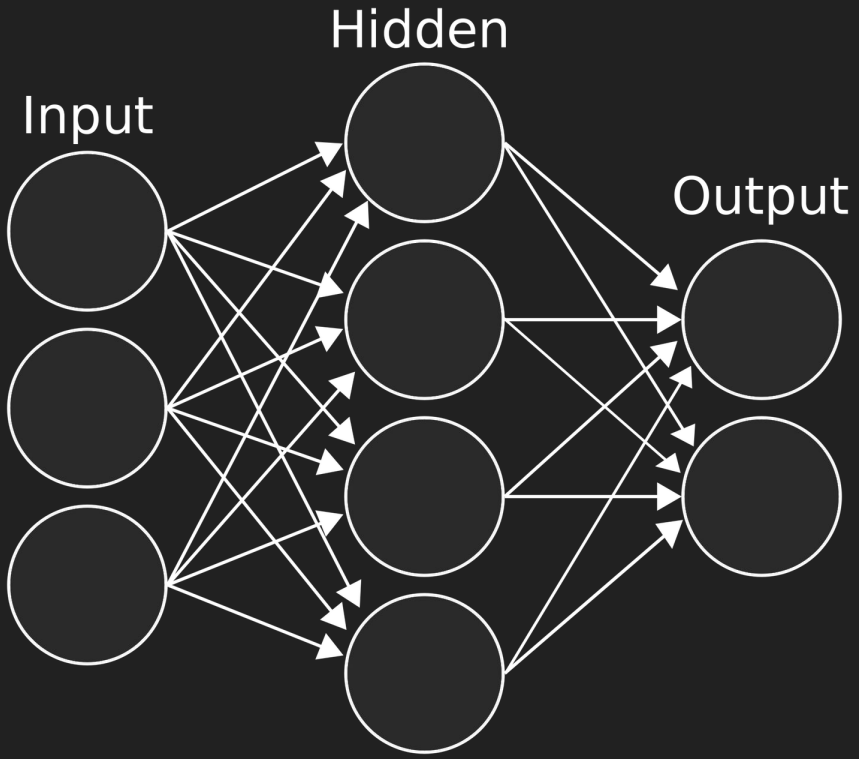
I have been working with a 10-year-old diabetic cat. **He** is treated with 3 units of ProZinc insulin.

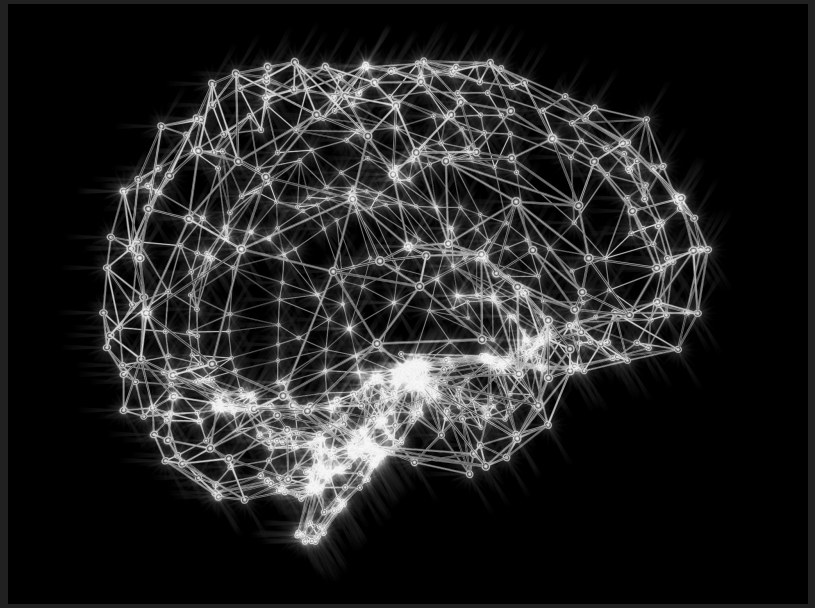
The Problem with Bag of Words

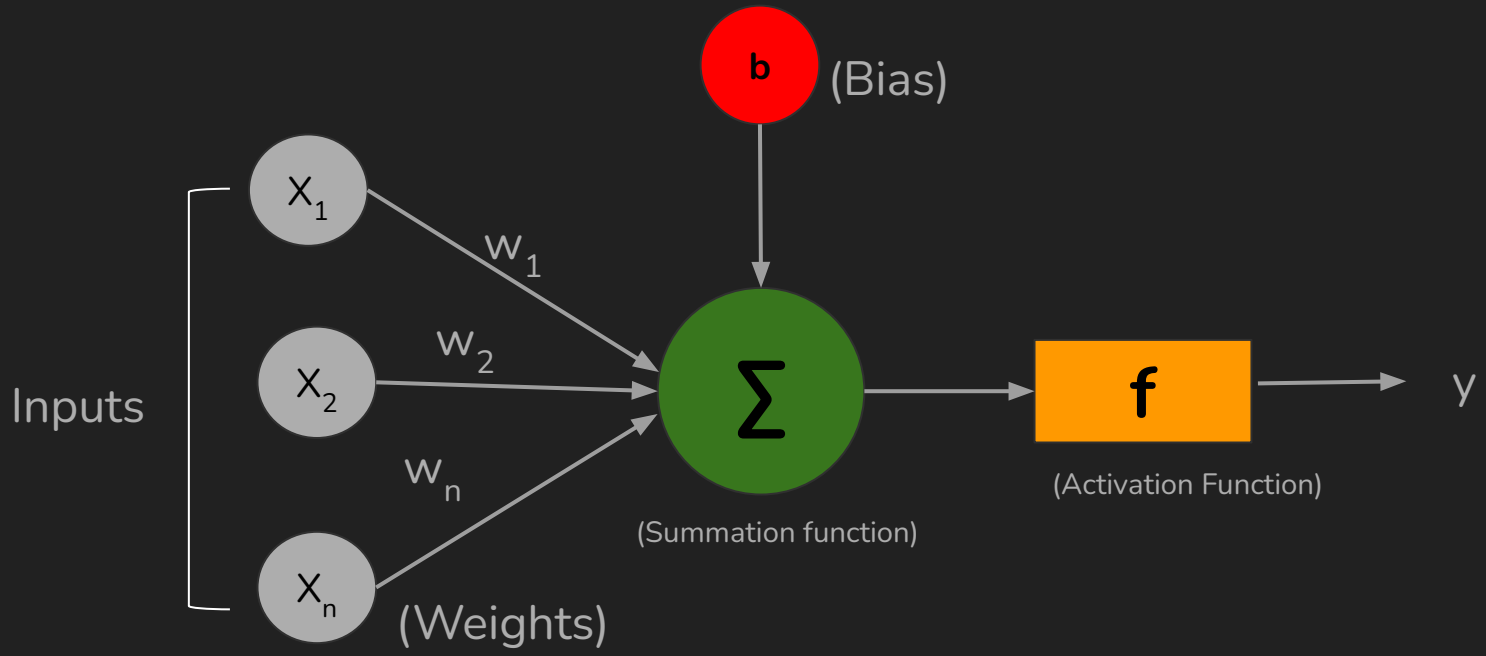
The Owner brought Jess into the surgery yesterday. **He** mentioned a history with diabetes.

Neural Networks

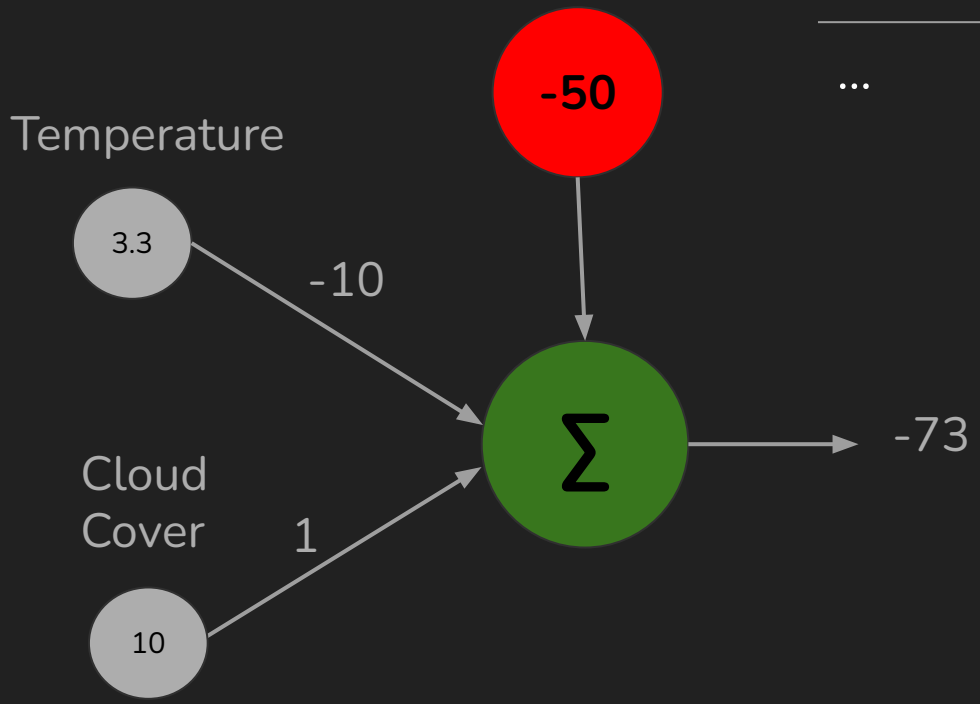
Neural Networks



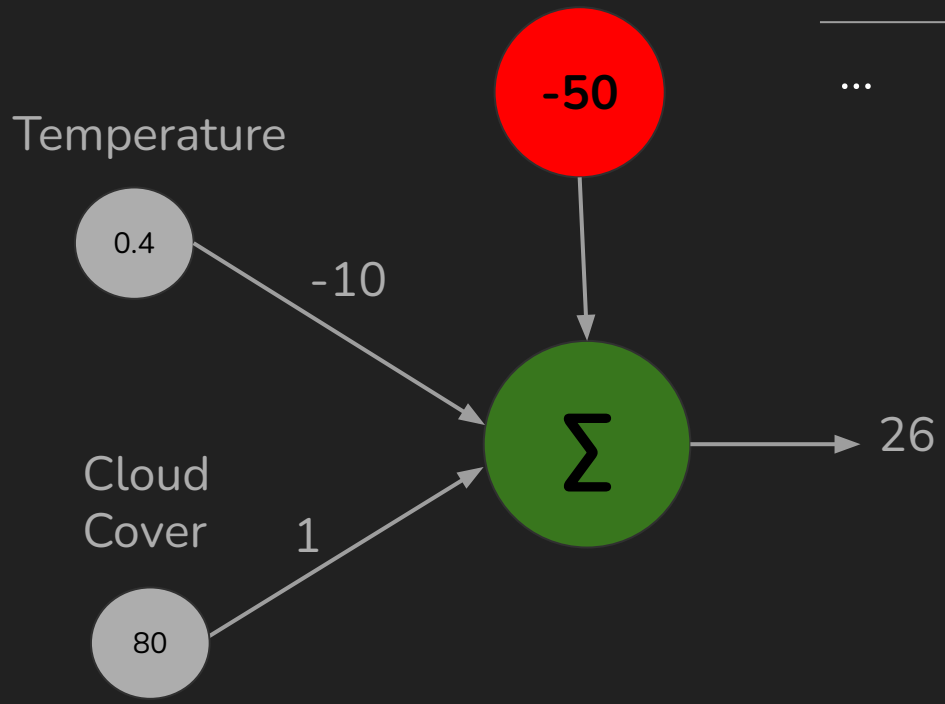



b
(Bias)
Inputs
X_1
X_2
X_n
w_1
w_2
w_n
Σ
(Summation function)
f
(Activation Function)
y
(Weights)

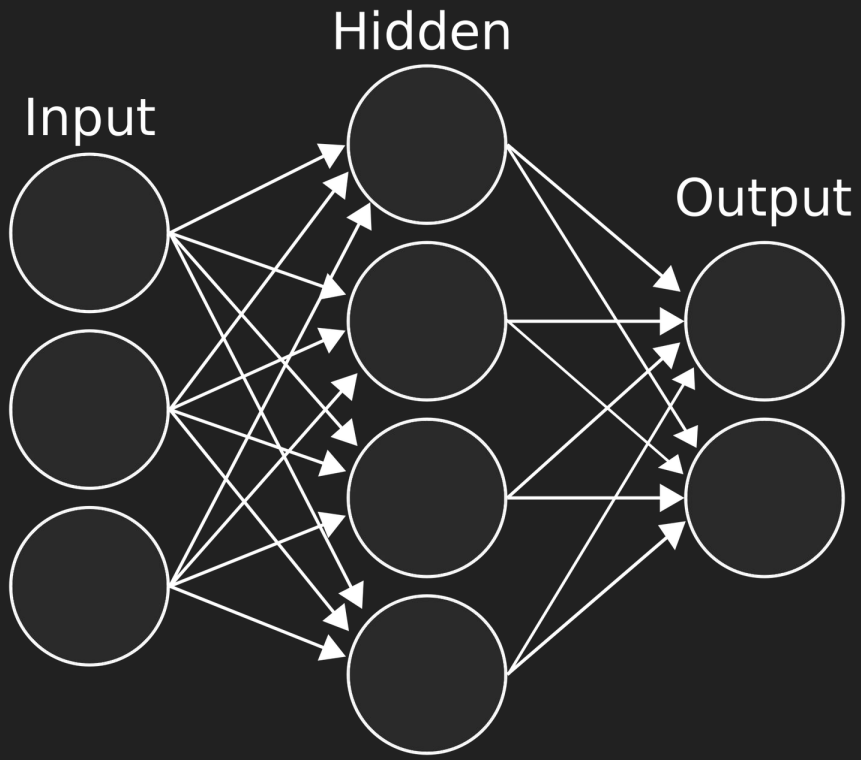
Temperature	Cloud Cover	Rain
3.3	10	N
0.4	80	Y
…	…	…



Temperature	Cloud Cover	Rain
3.3	10	N
0.4	80	Y
...	...	...



Neural Networks



Transformers

Attention Is All You Need

Ashish Vaswani* Google Brain avaswani@google.com

Noam Shazeer* Google Brain noam@google.com

Niki Parmar* Google Research nikip@google.com

Jakob Uszkoreit* Google Research usz@google.com

Llion Jones* Google Research llion@google.com

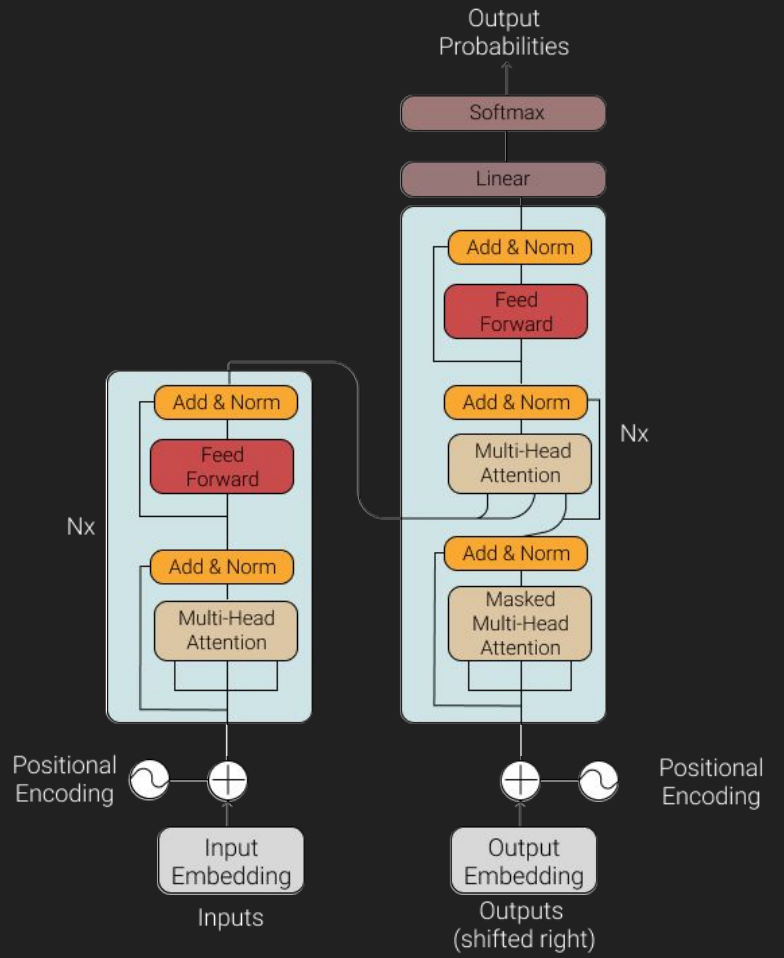
Aidan N. Gomez* † University of Toronto aidan@cs.toronto.edu

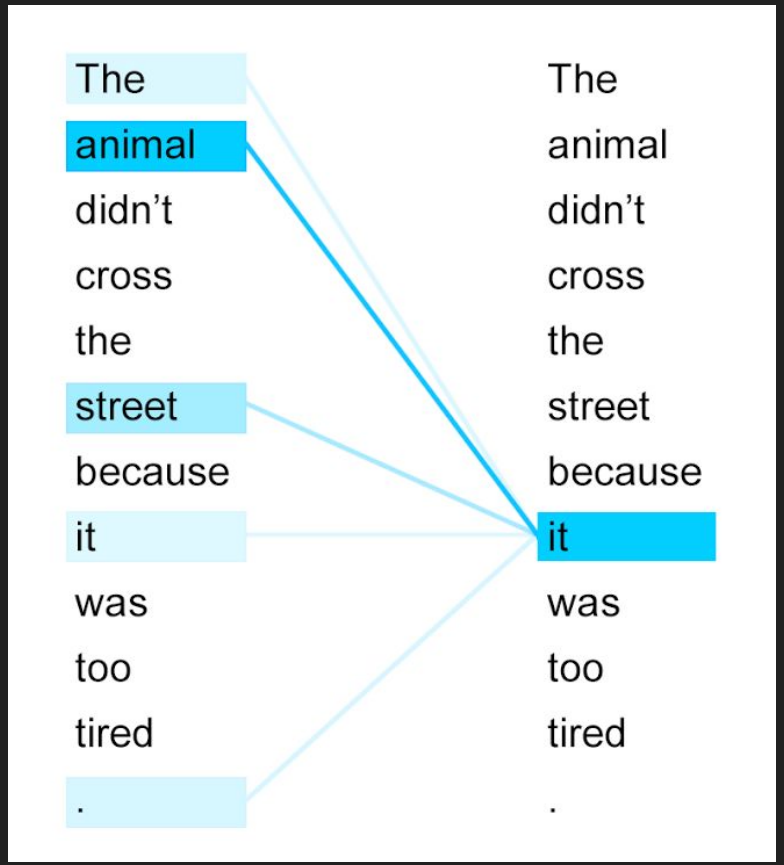
Łukasz Kaiser* Google Brain lukaszkaiser@google.com

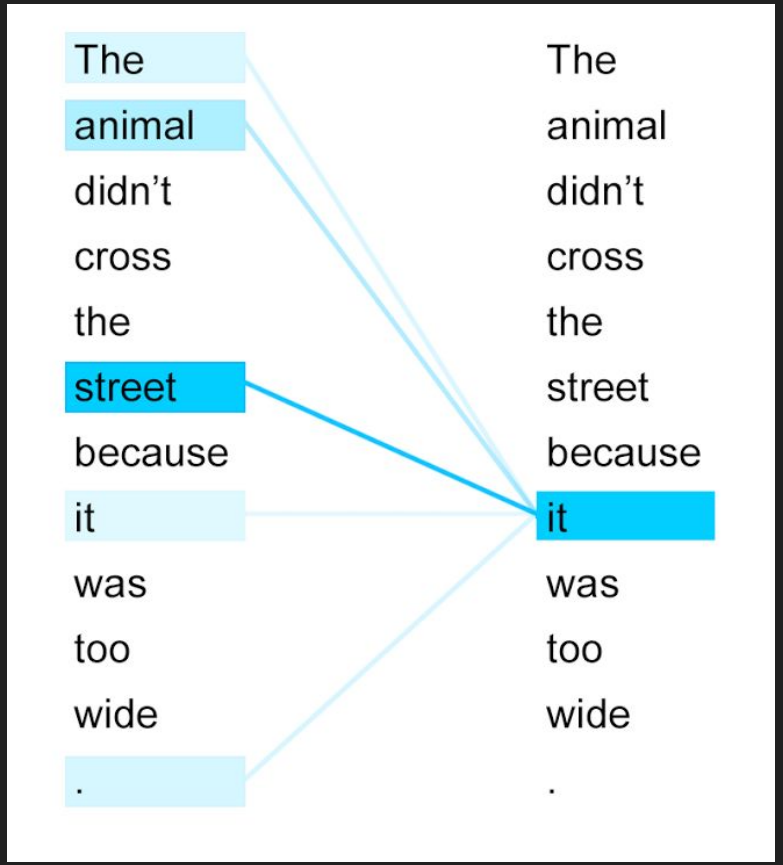
Illia Polosukhin* ‡ illia.polosukhin@gmail.com

Abstract

The dominant sequence transduction models are based on complex recurrent or convolutional neural networks that include an encoder and a decoder. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles, by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.




The
animal
didn’t
cross
the
street
because
it
was
too
tired
.
The
animal
didn’t
cross
the
street
because
it
was
too
tired
.


The
animal
didn’t
cross
the
street
because
it
was
too
wide
.
The
animal
didn’t
cross
the
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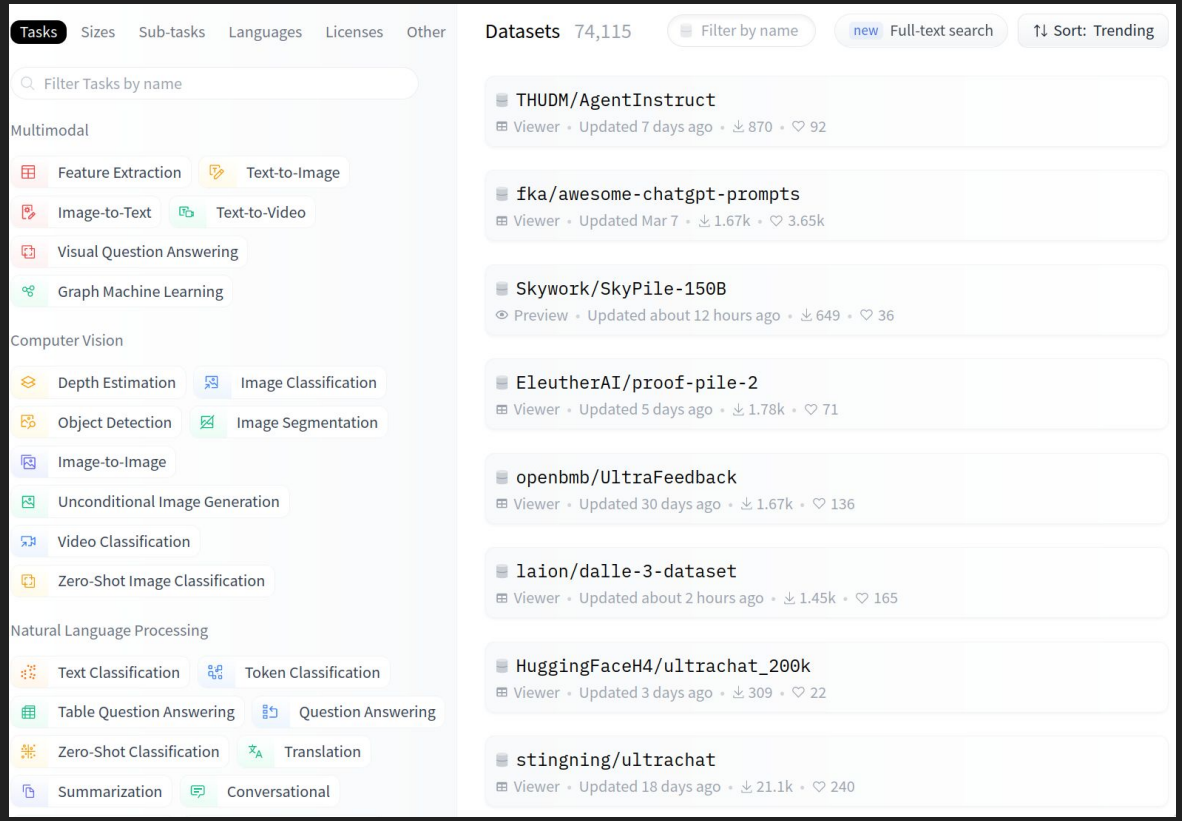
because
it
was
too
wide
.

Language Models

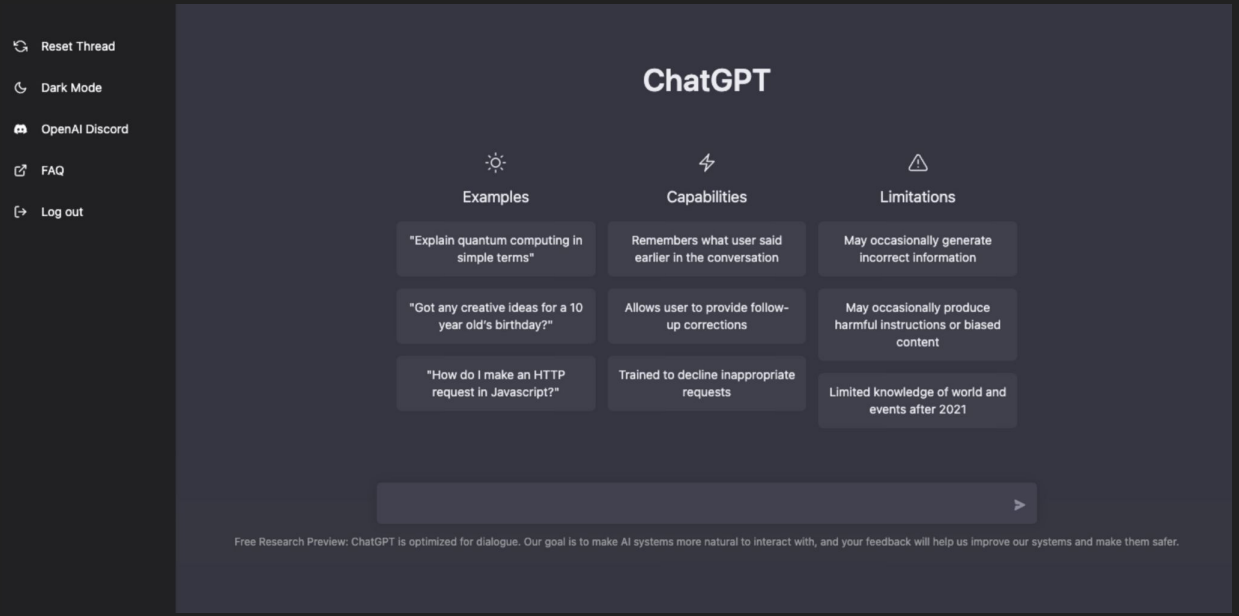
Notebook 3: Applying Transformers

Huggingface Hub



No labels?

Prompting


Reset Thread
Dark Mode
OpenAI Discord
FAQ
Log out
ChatGPT
Examples
"Explain quantum computing in simple terms"
"Got any creative ideas for a 10 year old's birthday?"
"How do I make an HTTP request in Javascript?"
Capabilities
Remembers what user said earlier in the conversation
Allows user to provide follow-up corrections
Trained to decline inappropriate requests
Limitations
May occasionally generate incorrect information
May occasionally produce harmful instructions or biased content
Limited knowledge of world and events after 2021
Free Research Preview: ChatGPT is optimized for dialogue. Our goal is to make AI systems more natural to interact with, and your feedback will help us improve our systems and make them safer.

Notebook 4: Prompting for Text-mining

Can we improve prompting further?

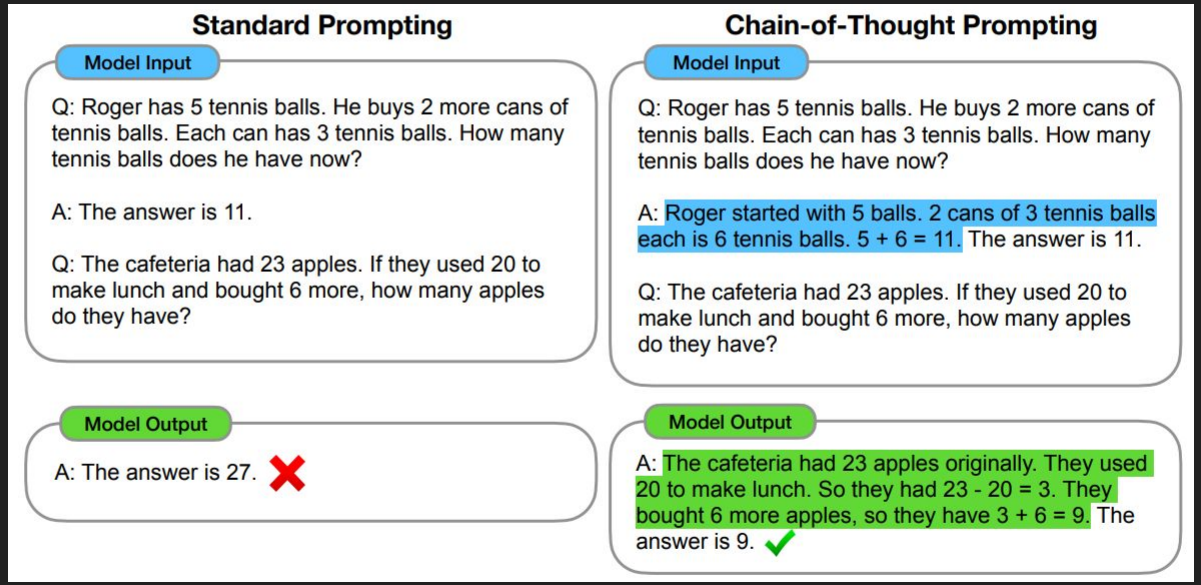
Yes

Lots of ways

www.promptingguide.ai

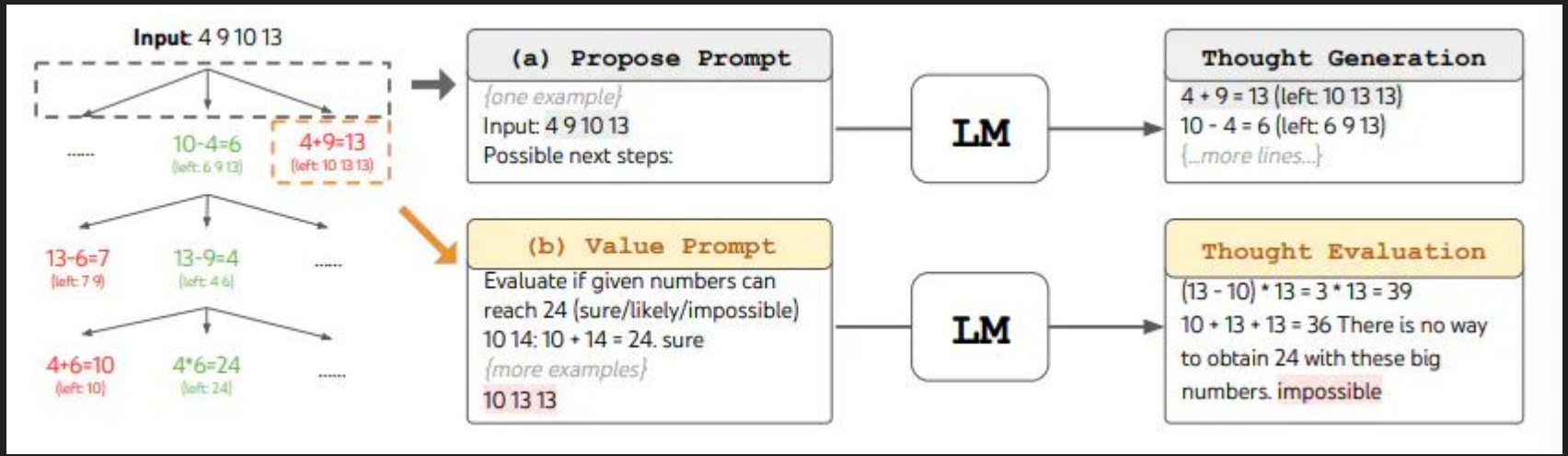
Chain of thought

Break down complex problems



Tree of thought

Pick the best way to break down complex problems



Notebook 5: Chain of Thought