

# Class 11

# Natural Language Understanding

## H Academy

March 22th, 2021 - By Nathan Landman



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### Ecuador / Capital



## Quito

Quito, the capital of Ecuador, was founded in the 16th century on the ruins of an Inca city and stands at an altitude of 2,850 m. Despite the 1917 earthquake, the city has the best-preserved, least altered historic centre in Latin America.

[whc.unesco.org](http://whc.unesco.org) › list

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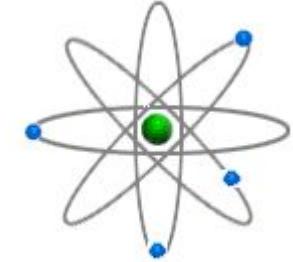
Bogota

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# Class Agenda

1. History of natural language in computers
2. Overview of technologies
3. New advances

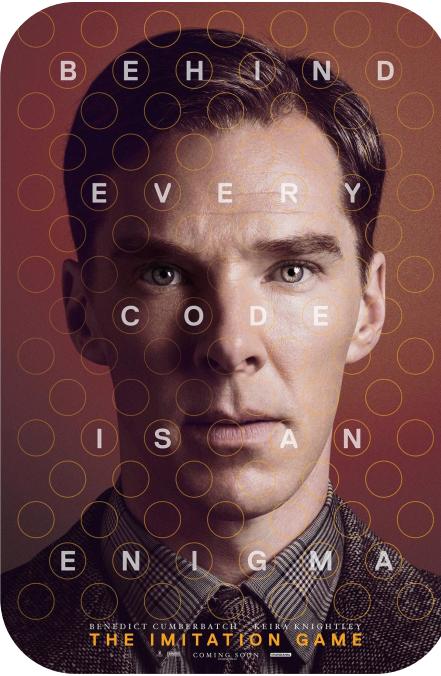
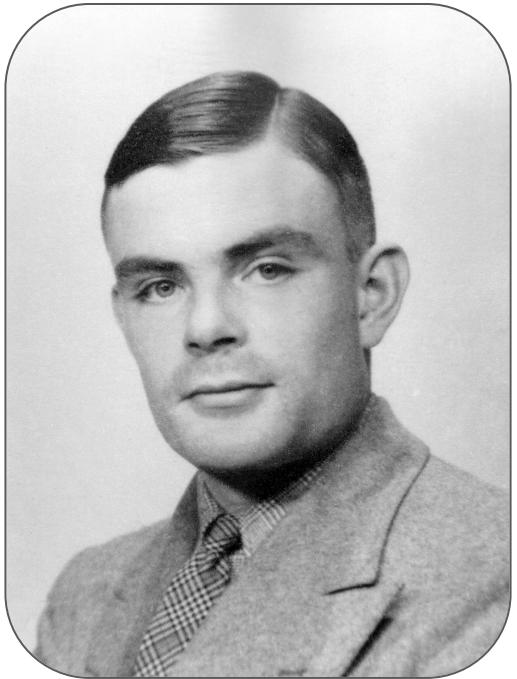


# Brief History of NLP



Academy

# 1950 - The Turing Test



## MIND A QUARTERLY REVIEW OF PSYCHOLOGY AND PHILOSOPHY

### I.—COMPUTING MACHINERY AND INTELLIGENCE

By A. M. TURING

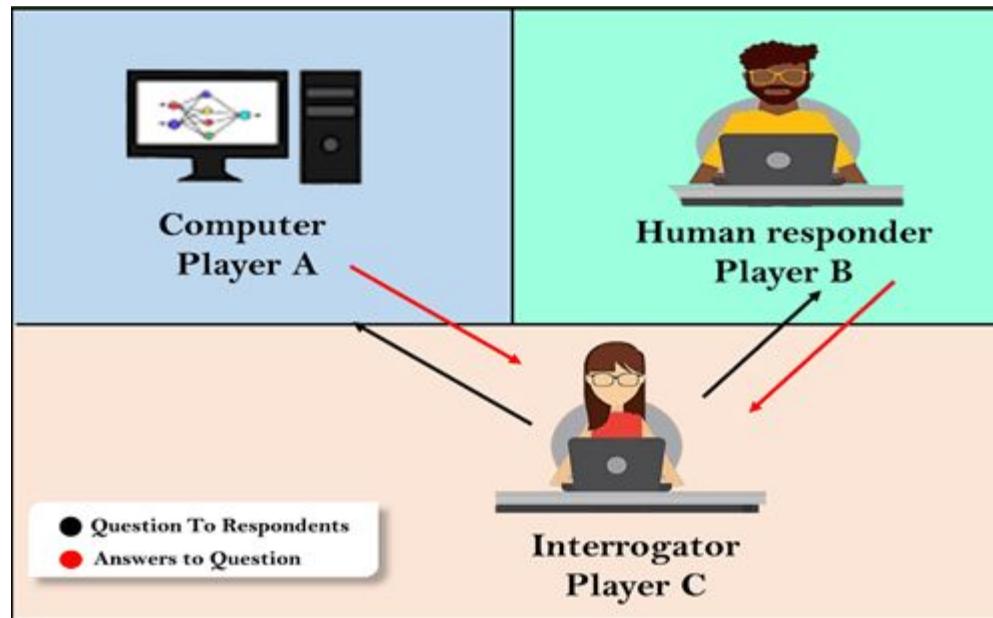
#### 1. *The Imitation Game.*

I PROPOSE to consider the question, 'Can machines think ?' This should begin with definitions of the meaning of the terms 'machine' and 'think'. The definitions might be framed so as to reflect as far as possible the normal use of the words, but this attitude is dangerous. If the meaning of the words 'machine' and 'think' are to be found by examining how they are commonly used it is difficult to escape the conclusion that the meaning and the answer to the question, 'Can machines think ?' is to be sought in a statistical survey such as a Gallup poll. But this is absurd. Instead of attempting such a definition I shall replace the question by another, which is closely related to it and is expressed in relatively unambiguous words.

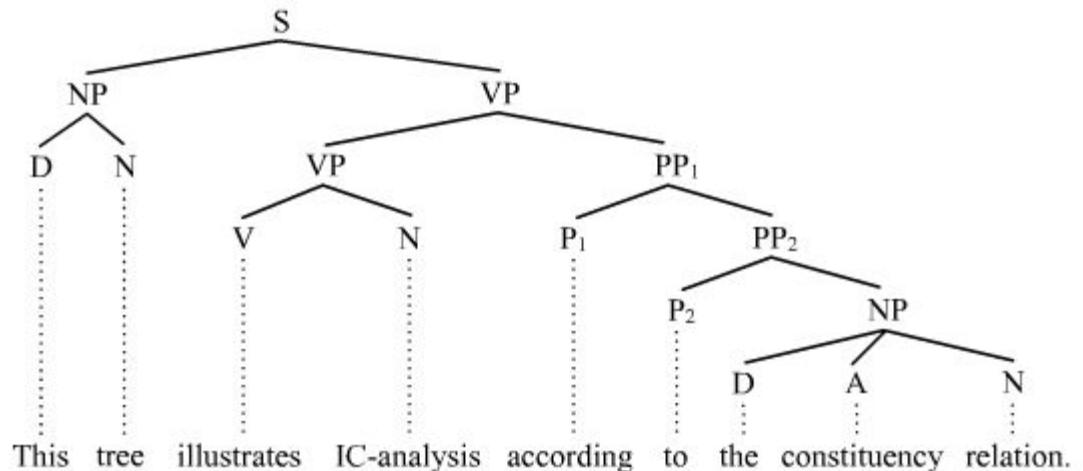
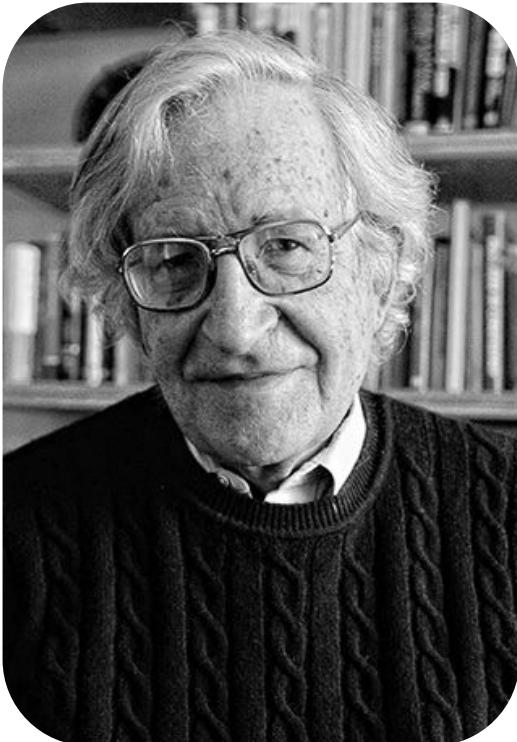
The new form of the problem can be described in terms of a game which we call the 'imitation game'. It is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. He knows them by labels X and Y, and at the end of the game he says either 'X is A and Y is B' or 'X is B and Y is A'. The interrogator is allowed to put questions to A and B thus :

C : Will X please tell me the length of his or her hair ?  
Now suppose X is actually A, then A must answer. It is A's  
28 433

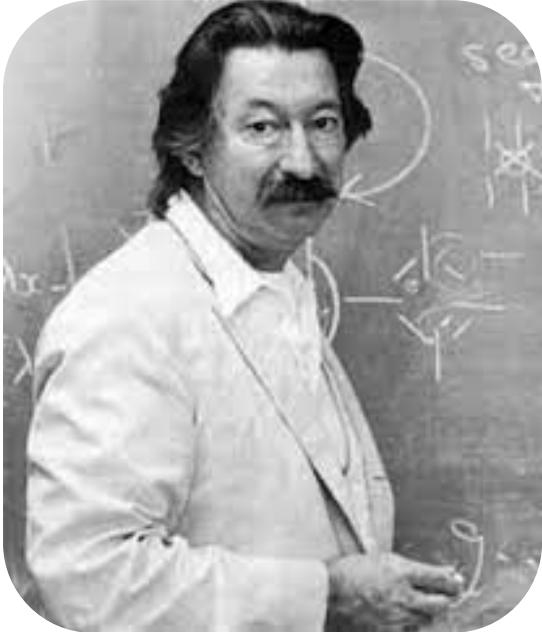
# 1950 - The Turing Test - “Can machines think?”



# 1957 - Linguistics: Chomsky and Syntactic Structures



# 1966 - Joe Weizenbaum's ELIZA



Welcome to

EEEEEE	LL	III	ZZZZZ	AAAAA
EE	LL	II	ZZ	AA AA
EEEEEE	LL	II	ZZZ	AAAAAAA
EE	LL	II	ZZ	AA AA
EEEEEE	LLLLL	III	ZZZZZ	AA AA

Eliza is a mock Rogerian psychotherapist.

The original program was described by Joseph Weizenbaum in 1966.  
This implementation by Norbert Landsteiner 2005.

ELIZA: Is something troubling you ?

YOU: Men are all alike.

ELIZA: What is the connection, do you suppose ?

YOU: They're always bugging us about something or other.

ELIZA: Can you think of a specific example ?

YOU: Well, my boyfriend made me come here.

ELIZA: Is it important to you that your boyfriend made you come here ?

YOU: He says I'm depressed much of the time.

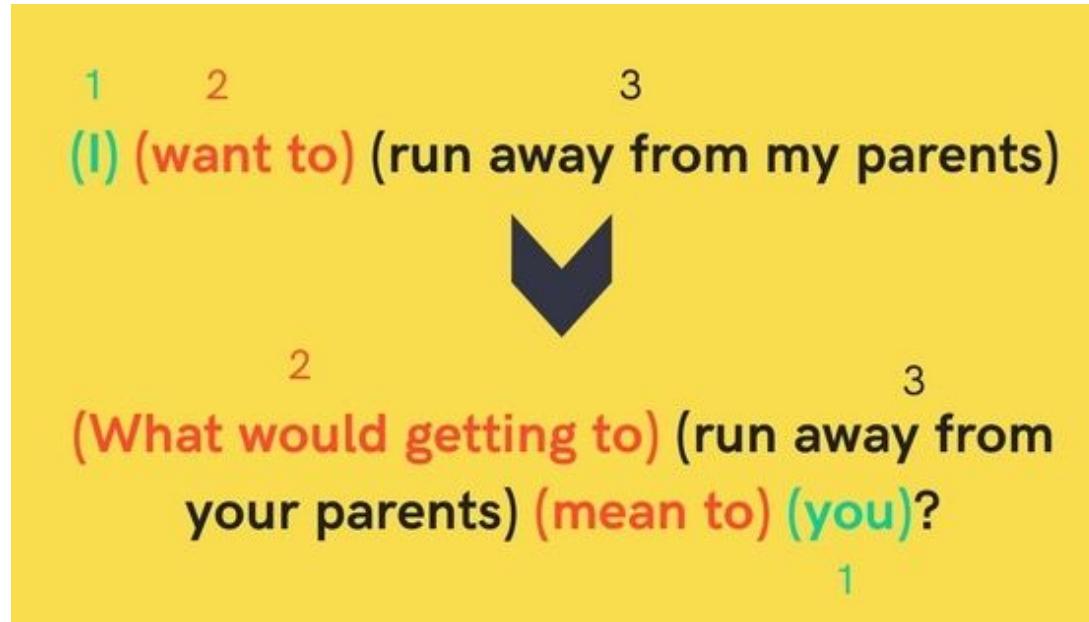
ELIZA: I am sorry to hear that you are depressed.

YOU: It's true. I am unhappy.

ELIZA: Can you explain what made you unhappy ?

YOU:

# 1966 - Joe Weizenbaum's ELIZA



# 1966 - Joe Weizenbaum's ELIZA

*"Eliza simulated conversation by using a "pattern matching" and substitution methodology that gave users an illusion of understanding on the part of the program, but had no built in framework for contextualizing events." - [Wiki](#)*

```
Welcome to
EEEEEELL      IIII    ZZZZZZ  AAAAAA
EE      LL      II      ZZ      AA      AA
EEEEEELL      II      ZZZ      AAAAAAAA
EE      LL      II      ZZ      AA      AA
EEEEEELLLLL  IIII    ZZZZZZ  AA      AA

Eliza is a mock Rogerian psychotherapist.
The original program was described by Joseph Weizenbaum in 1966.
This implementation by Norbert Landsteiner 2005.

ELIZA: Is something troubling you ?
YOU: Men are all alike.
ELIZA: What is the connection, do you suppose ?
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ELIZA: Can you think of a specific example ?
YOU: Well, my boyfriend made me come here.
ELIZA: Is it important to you that your boyfriend made you come here ?
YOU: He says I'm depressed much of the time.
ELIZA: I am sorry to hear that you are depressed.
YOU: It's true. I am unhappy.
ELIZA: Can you explain what made you unhappy ?
YOU:
```

# Thought Experiment... Does my friend know Spanish?

The image shows two side-by-side screenshots of the Google Translate interface.

**Left Screenshot (English to Spanish):**

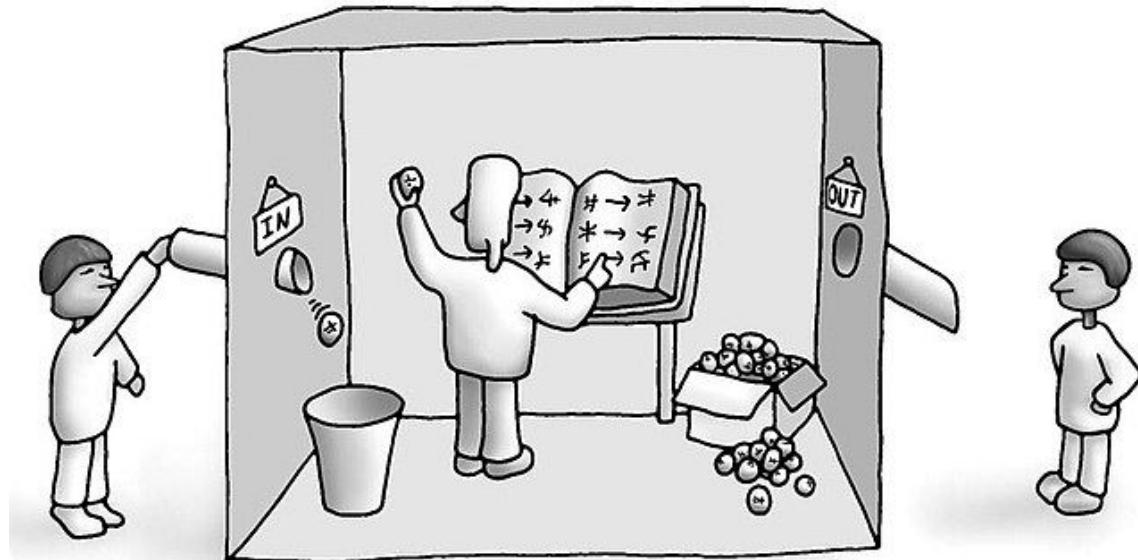
- Top bar: Google Translate
- Language pair: English (dropdown) -> Spanish (dropdown)
- Input field: "hello" (orange highlight)
- Output: "hola"
- Dictionary entry: "hello" (interjection)
  - 1. ¡hola
  - 2. ¡caramba
  - 3. jaló
  - 4. ¡diga
  - 5. ¡oiga
- Buttons: "Enter Conversation Mode" (blue button), "Alpha!" (red link)

**Right Screenshot (Spanish to English):**

- Top bar: Google Translate ?
- Input: "hola"
- Output: "hola como estas" (highlighted in green)
- Input: "hello how are you"
- Output: "I am fine thank you" (highlighted in blue)
- Input: "Estoy bien gracias"
- Text input field: "Responder en español" (highlighted in green)

# 1980 - The Chinese Room

The **Chinese room** argument holds that a digital computer executing a program cannot be shown<sup>[1]</sup> to have a "mind", "understanding" or "consciousness",<sup>[a]</sup> regardless of how intelligently or human-like the program may make the computer behave.



# An Update to the Turing Test



## STRONG AI

AKA artificial general intelligence, an AI system with generalized human cognitive abilities. When presented with an unfamiliar task, it has enough intelligence to find a solution.



## WEAK AI

AKA narrow AI, an AI system that is designed and trained for a particular task. Example: a virtual personal assistant, such as Apple's Siri.

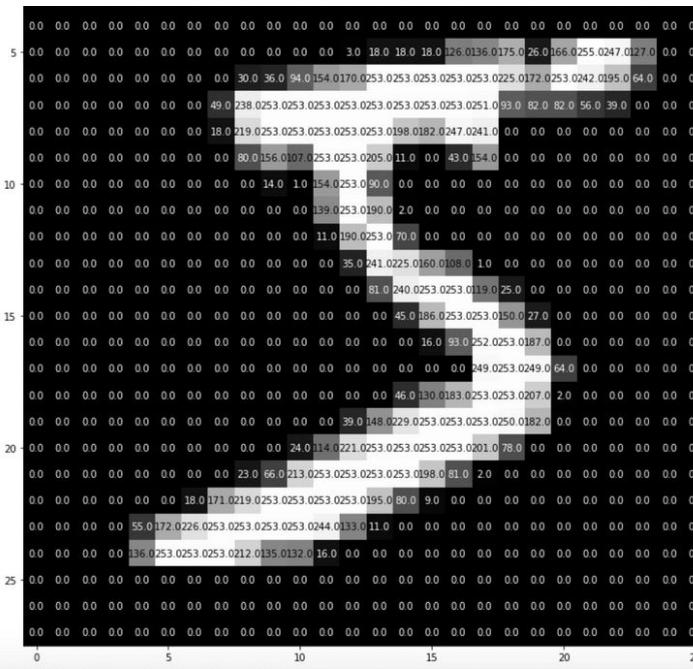
# Processing Language



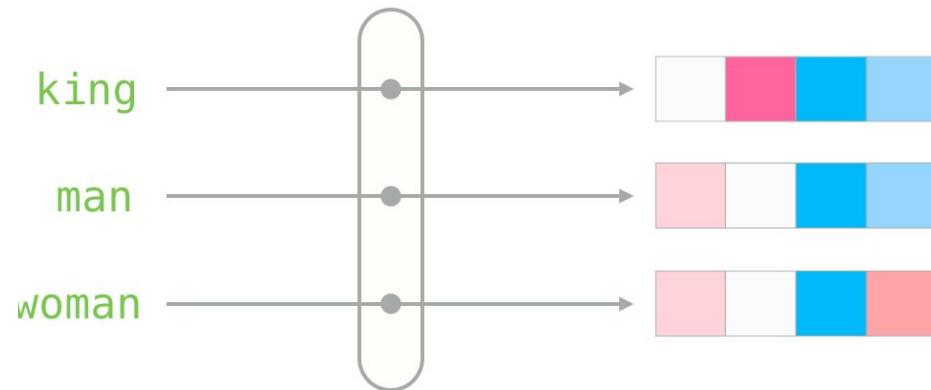
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# Digital representation of Text

## Digital Representation of Images



## Digital Representation of Text



# One-Hot Encoding

Human-Readable

Pet
Cat
Dog
Turtle
Fish
Cat

Machine-Readable

Cat	Dog	Turtle	Fish
1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1
1	0	0	0



# One-Hot Encoding

We need a way to compress information such that we don't have to use a vector with 600,000 words!

## WORDS NUMBER COMPARISON BETWEEN FOUR WORLD LANGUAGES

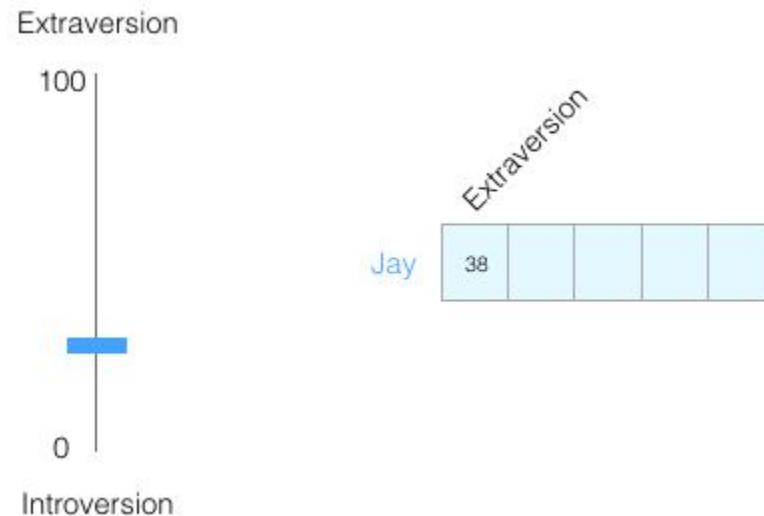


# Digital representation of Text

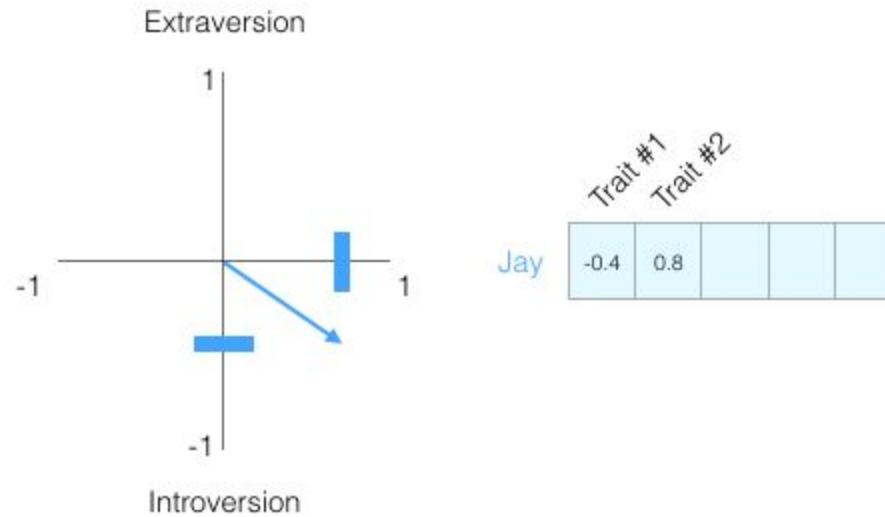
Personality tests are a method of representing a person.

Openness to experience .....	79 out of 100
Agreeableness .....	75 out of 100
Conscientiousness .....	42 out of 100
Negative emotionality .....	50 out of 100
Extraversion .....	58 out of 100

# Digital representation of Text



# Digital representation of Text



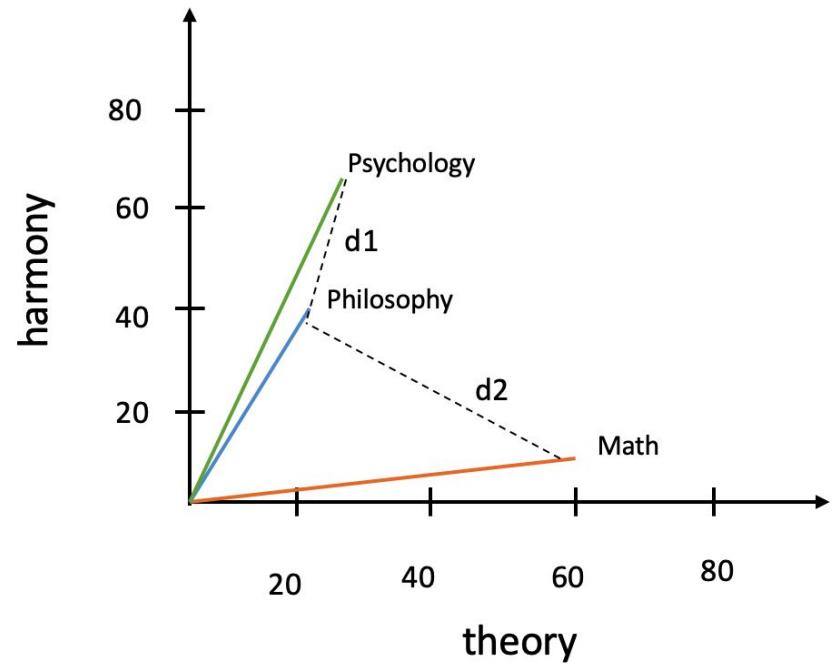
# Digital representation of Text

	Trait #1	Trait #2	Trait #3	Trait #4	Trait #5
Jay	-0.4	0.8	0.5	-0.2	0.3
Person #1	-0.3	0.2	0.3	-0.4	0.9
Person #2	-0.5	-0.4	-0.2	0.7	-0.1

A bit difficult to write 5 dimensional arrows, but try to visualize it anyways.

# Digital representation of Text - Cosine Similarity

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\| \|\mathbf{B}\|} = \frac{\sum_{i=1}^n A_i B_i}{\sqrt{\sum_{i=1}^n A_i^2} \sqrt{\sum_{i=1}^n B_i^2}},$$



# Digital representation of Text

Jay                              Person #1  
cosine\_similarity([ -0.4 0.8 0.5 -0.2 0.3 ], [ -0.3 0.2 0.3 -0.4 0.9 ]) = 0.66 ✓

Jay                              Person #2  
cosine\_similarity([ -0.4 0.8 0.5 -0.2 0.3 ], [ -0.5 -0.4 -0.2 0.7 -0.1 ]) = -0.37

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\| \|\mathbf{B}\|} = \frac{\sum_{i=1}^n A_i B_i}{\sqrt{\sum_{i=1}^n A_i^2} \sqrt{\sum_{i=1}^n B_i^2}},$$

# Digital representation of Text - Takeaways

- 1- We can represent things (and people) as vectors of numbers  
(Which is great for machines!)

Jay	-0.4	0.8	0.5	-0.2	0.3
-----	------	-----	-----	------	-----

- 2- We can easily calculate how similar vectors are to each other

The people most similar to Jay are:

cosine\_similarity ▼

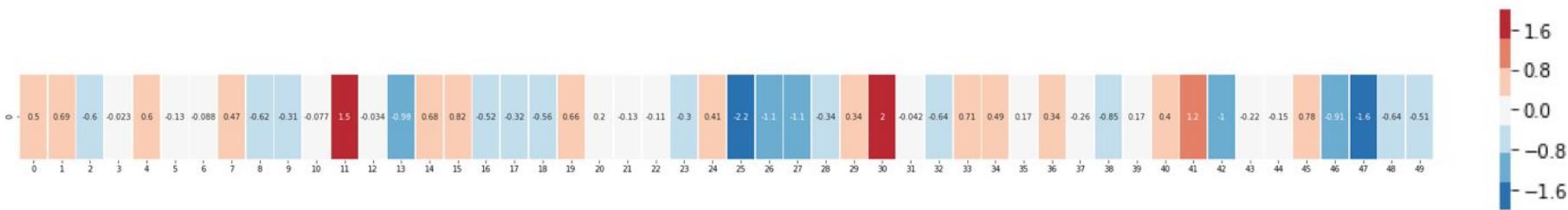
Person #1	0.86
Person #2	0.5
Person #3	-0.20

# Enter Word Embeddings

```
[ 0.50451 , 0.68607 , -0.59517 , -0.022801, 0.60046 , -0.13498 , -0.08813 , 0.47377 , -0.61798 , -0.31012 ,  
-0.076666, 1.493 , -0.034189, -0.98173 , 0.68229 , 0.81722 , -0.51874 , -0.31503 , -0.55809 , 0.66421 ,  
0.1961 , -0.13495 , -0.11476 , -0.30344 , 0.41177 , -2.223 , -1.0756 , -1.0783 , -0.34354 , 0.33505 , 1.9927  
, -0.04234 , -0.64319 , 0.71125 , 0.49159 , 0.16754 , 0.34344 , -0.25663 , -0.8523 , 0.1661 , 0.40102 ,  
1.1685 , -1.0137 , -0.21585 , -0.15155 , 0.78321 , -0.91241 , -1.6106 , -0.64426 , -0.51042 ]
```

Vector Representation  
of the word **King**

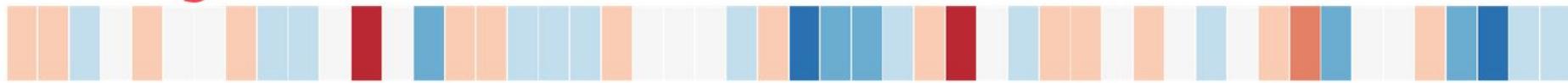
# Enter Word Embeddings



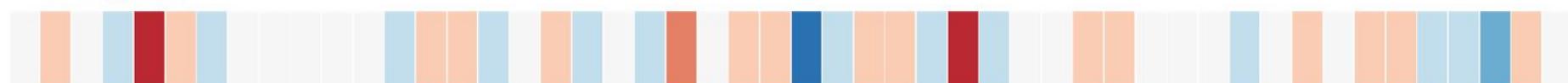
Vector Representation  
of the word **King**

# Enter Word Embeddings

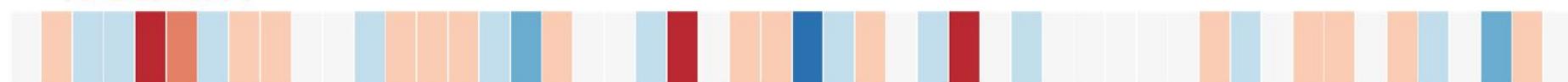
“king”



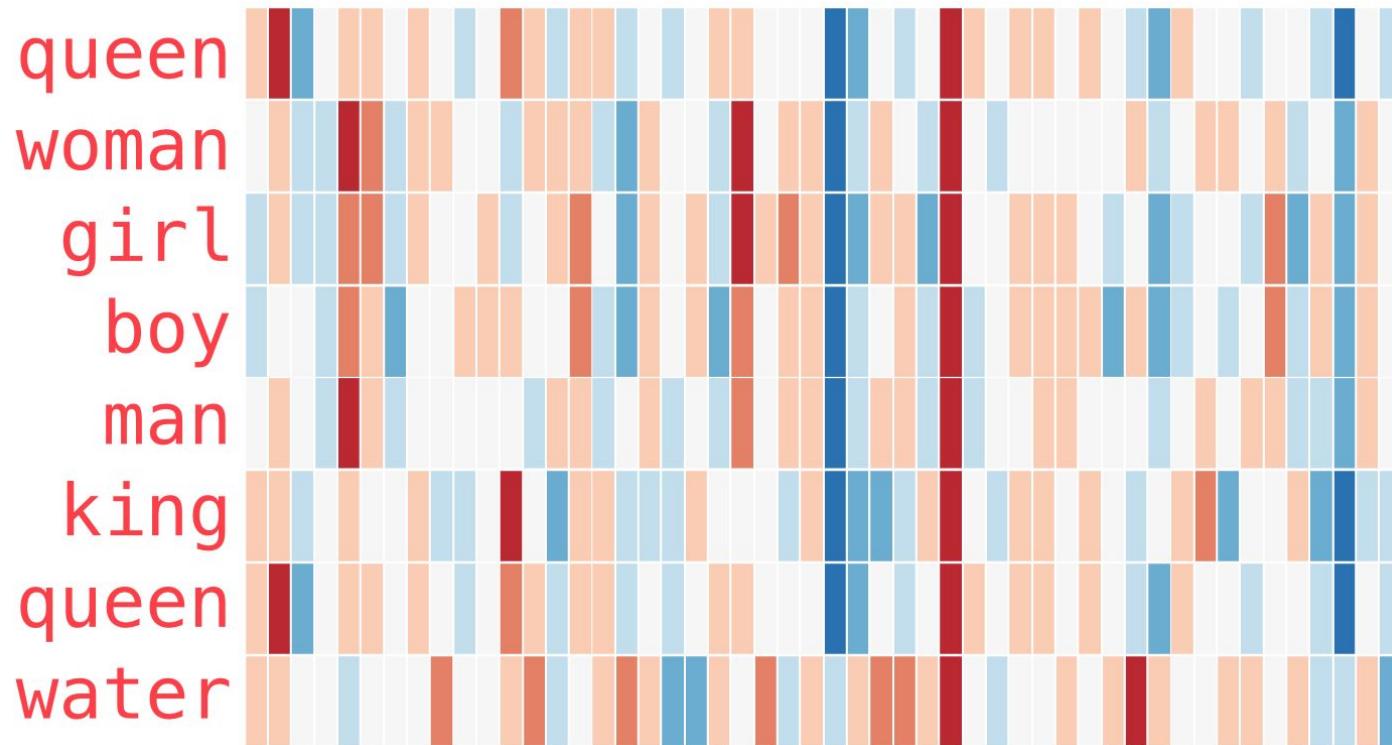
“Man”



“Woman”



# Enter Word Embeddings



# Enter Word Embeddings - The Power of Numerical Words

```
model.most_similar(positive=["king", "woman"], negative=["man"])

[('queen', 0.8523603677749634),
 ('throne', 0.7664333581924438),
 ('prince', 0.7592144012451172),
 ('daughter', 0.7473883032798767),
 ('elizabeth', 0.7460219860076904),
 ('princess', 0.7424570322036743),
 ('kingdom', 0.7337411642074585),
 ('monarch', 0.721449077129364),
 ('eldest', 0.7184862494468689),
 ('widow', 0.7099430561065674)]
```

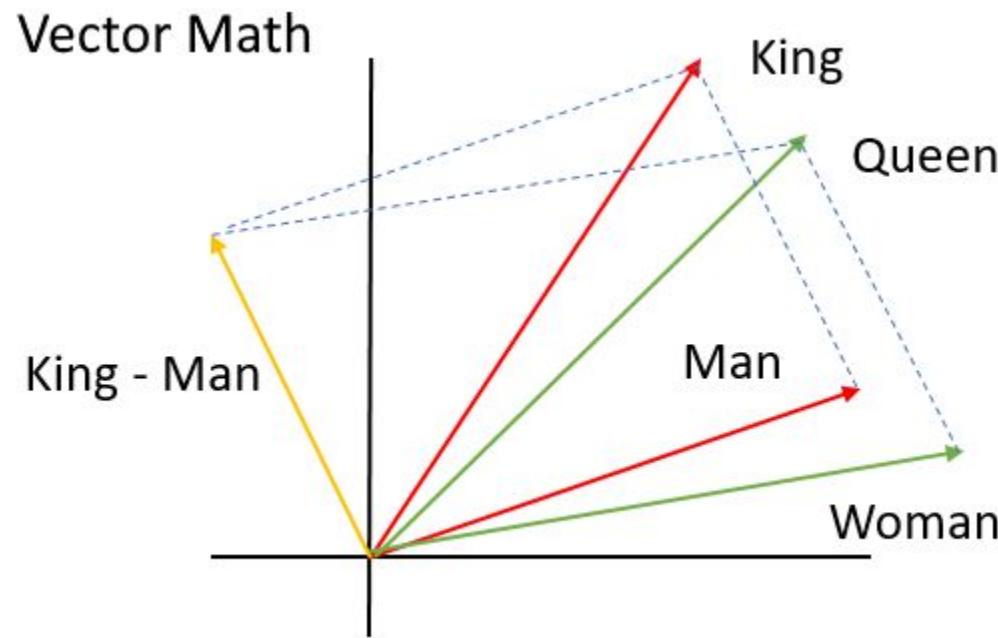
# Enter Word Embeddings - The Power of Numerical Words

$$\text{king} - \text{man} + \text{woman} \approx \text{queen}$$

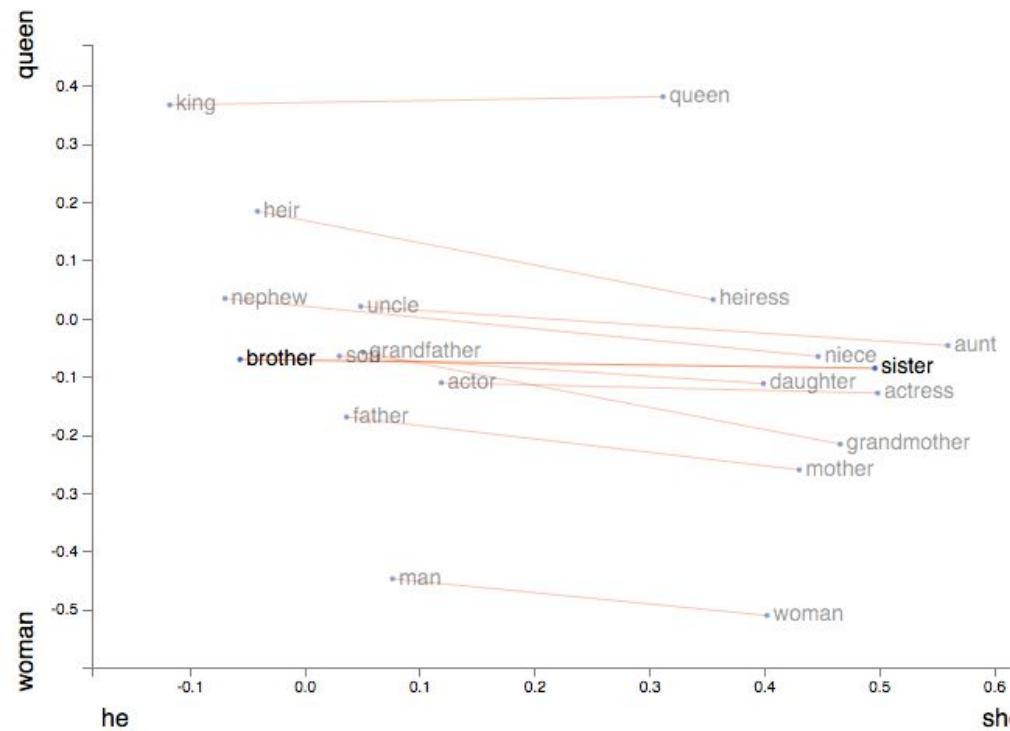


The resulting vector from "king-man+woman" doesn't exactly equal "queen", but "queen" is the closest word to it from the 400,000 word embeddings we have in this collection.

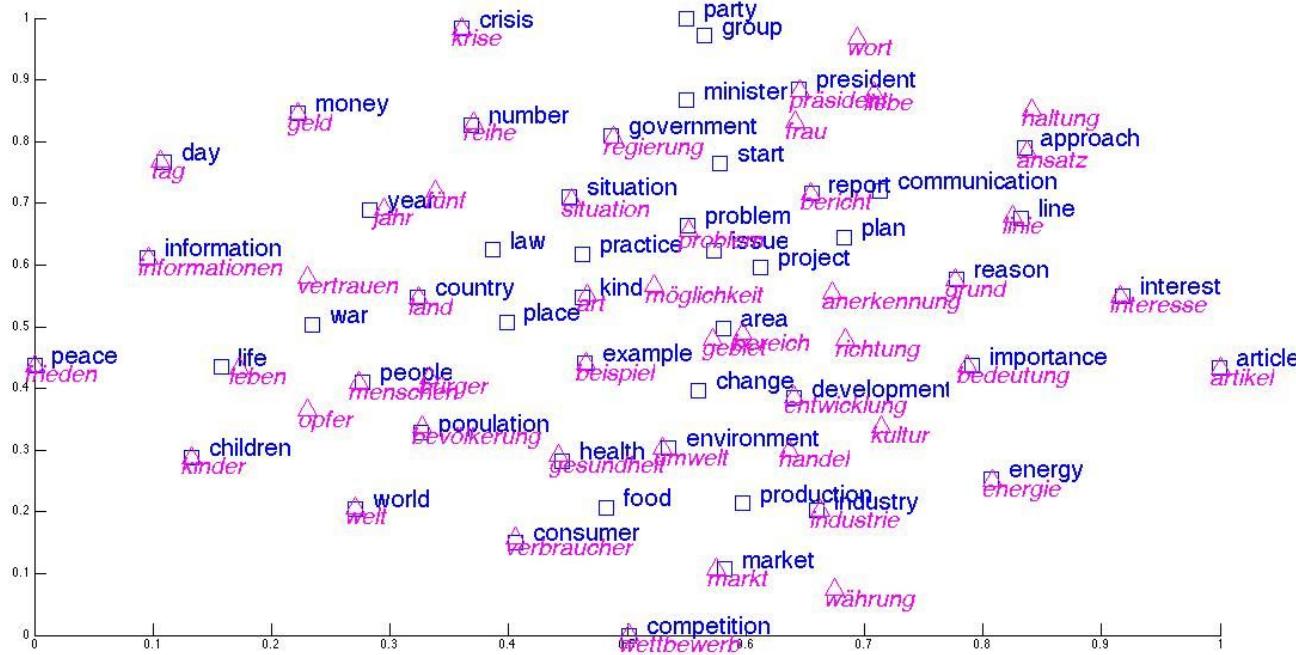
# Enter Word Embeddings - The Power of Numerical Words



# Enter Word Embeddings - The Power of Numerical Words



# Multi-Lingual Word Embeddings



# Training Text-Based Models



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input/feature #1

input/feature #2

output/label

Thou shalt

Input  
Features                      Output  
Prediction

Thou

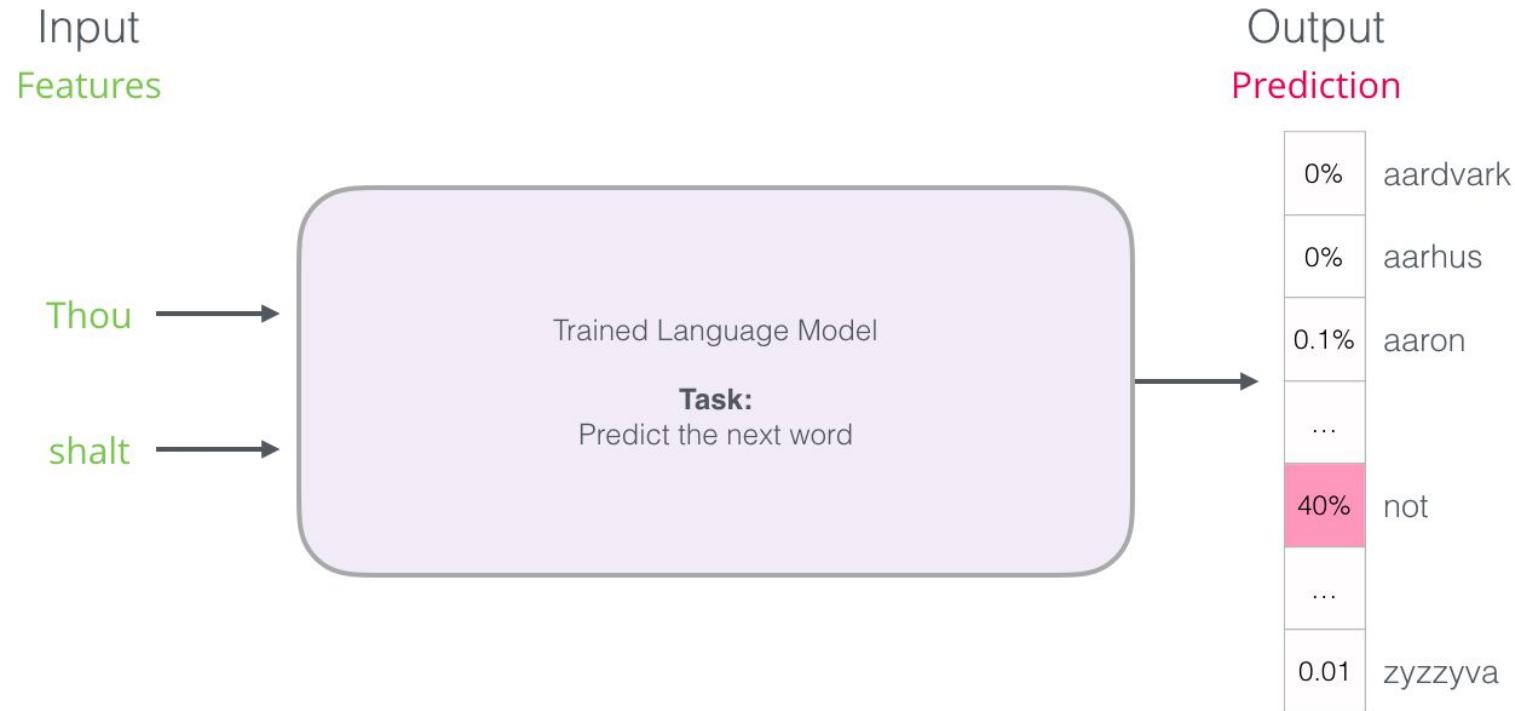
shalt

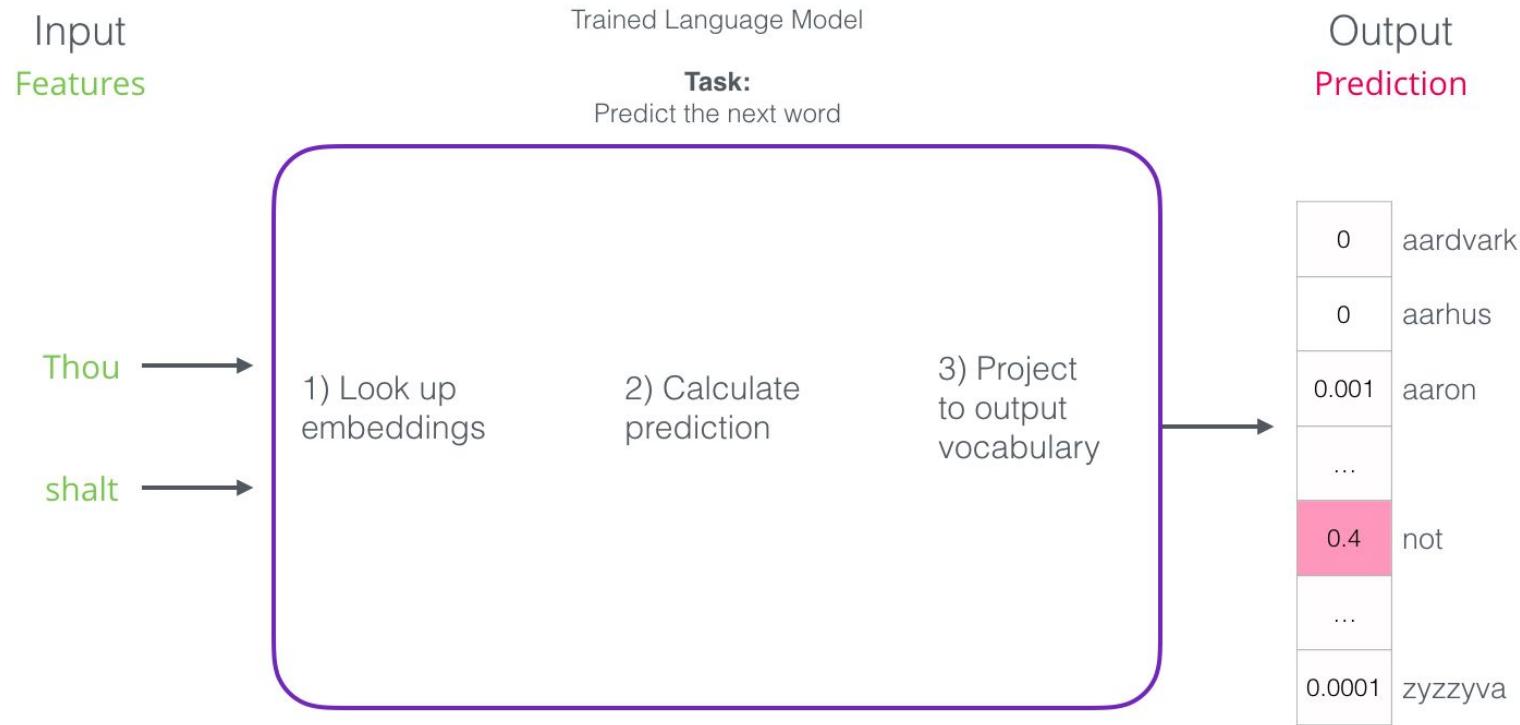
Trained Language Model

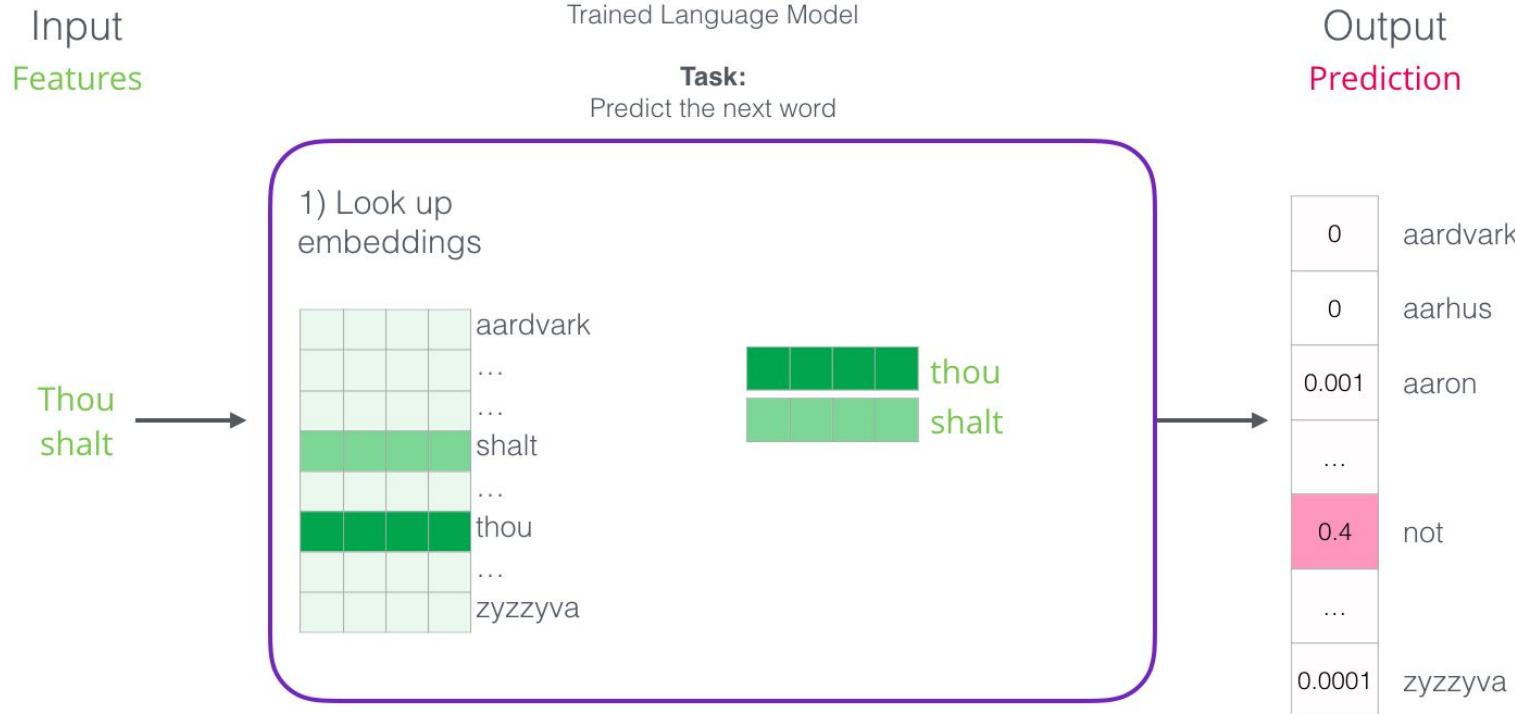
**Task:**

Predict the next word

not

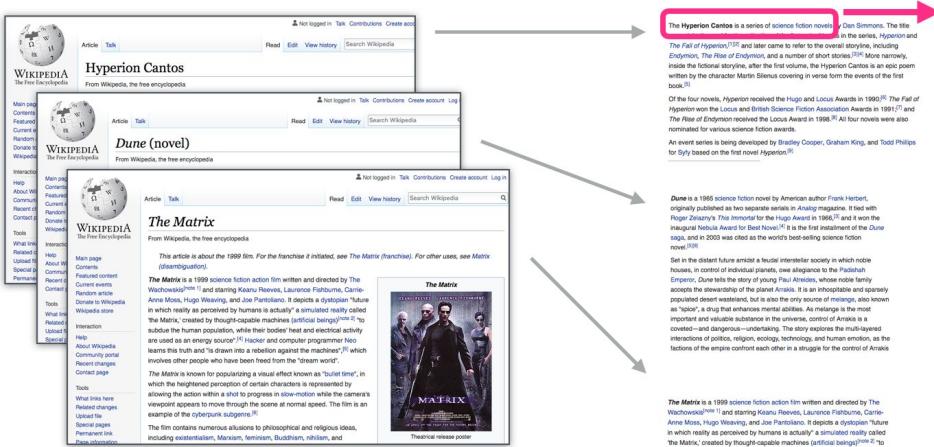






# Training

1. We get a lot of text data (say, all Wikipedia articles, for example).
2. We have a window (say, of three words) that we slide against all of that text.
3. The sliding window generates training samples for our model



# Training

The image shows three stacked screenshots of Wikipedia articles:

- Hyperion Cantos**: A series of science fiction novels by Dan Simmons. The title is derived from the first volume in the series, *Hyperion* and *The Fall of Hyperion*.<sup>[1][2]</sup> and later came to refer to the overall storyline, including *Endymion*, *The Rise of Endymion*, and a number of short stories.<sup>[3][4]</sup> More narrowly, inside the fictional storyline, after the first volume, the Hyperion Cantos is an epic poem written by the character Martin Silenus covering in verse form the events of the first book.<sup>[5]</sup>
- Dune (novel)**: Of the four novels, *Hyperion* received the Hugo and Locus Awards in 1990.<sup>[6]</sup> *The Fall of Hyperion* won the Locus and British Science Fiction Association Awards in 1991,<sup>[7]</sup> and *The Rise of Endymion* received the Locus Award in 1998.<sup>[8]</sup> All four novels were also nominated for various science fiction awards.
- The Matrix**: An event series is being developed by Bradley Cooper, Graham King, and Todd Phillips for Syfy based on the first novel *Hyperion*.<sup>[9]</sup>

**The Matrix** is a 1999 science fiction action film written and directed by The Wachowskis<sup>[note 1]</sup> and starring Keanu Reeves, Laurence Fishburne, Carrie-Anne Moss, Hugo Weaving, and Joe Pantoliano. It depicts a dystopian "future in which reality as perceived by humans is actually" a simulated reality called "the Matrix," created by thought-capable machines (artificial beings)<sup>[note 2]</sup> "to subdue the human population, while their bodies' heat and electrical activity are used as an energy source".<sup>[4]</sup> Hacker and computer programmer Neo learns this truth and "is drawn into a rebellion against the machines",<sup>[8]</sup> which involves other people who have been freed from the "dream world".

*The Matrix* is known for popularizing a visual effect known as "bullet time", in which the heightened perception of certain characters is represented by allowing the action within a shot to progress in slow-motion while the camera's viewpoint appears to move through the scene at normal speed. The film is an example of the cyberpunk subgenre.<sup>[8]</sup>

The film contains numerous allusions to philosophical and religious ideas, including existentialism, Marxism, feminism, Buddhism, nihilism, and

The **Hyperion Cantos** is a series of science fiction novels by Dan Simmons. The title is derived from the first volume in the series, *Hyperion* and *The Fall of Hyperion*.<sup>[1][2]</sup> and later came to refer to the overall storyline, including *Endymion*, *The Rise of Endymion*, and a number of short stories.<sup>[3][4]</sup> More narrowly, inside the fictional storyline, after the first volume, the Hyperion Cantos is an epic poem written by the character Martin Silenus covering in verse form the events of the first book.<sup>[5]</sup>

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An event series is being developed by Bradley Cooper, Graham King, and Todd Phillips for Syfy based on the first novel *Hyperion*.<sup>[9]</sup>

**The Matrix** is a 1999 science fiction action film by American author Frank Herbert, originally published as two separate serials in *Analogy* magazine. It tied with Roger Zelazny's *This Immortal* for the Hugo Award in 1985,<sup>[3]</sup> and it won the inaugural Nebula Award for Best Novel.<sup>[4]</sup> It is the first installment of the *Dune* saga, and in 2003 was cited as the world's best-selling science fiction novel.<sup>[5][6]</sup>

Set in the distant future amidst a feudal interstellar society in which noble houses, in control of individual planets, owe allegiance to the Padishah Emperor, *Dune* tells the story of young Paul Atreides, whose noble family accepts the stewardship of the planet Arrakis. It is an inhospitable and sparsely populated desert wasteland, but it is also the only source of melange, also known as "spice", a drug that enhances mental abilities. As melange is the most important and valuable substance in the universe, control of Arrakis is a coveted—and dangerous—undertaking. The story explores the multi-layered interactions of politics, religion, ecology, technology, and human emotion, as the factions of the empire confront each other in a struggle for the control of Arrakis

**The Matrix** is a 1999 science fiction action film written and directed by The Wachowskis<sup>[note 1]</sup> and starring Keanu Reeves, Laurence Fishburne, Carrie-Anne Moss, Hugo Weaving, and Joe Pantoliano. It depicts a dystopian "future in which reality as perceived by humans is actually" a simulated reality called "the Matrix," created by thought-capable machines (artificial beings)<sup>[note 2]</sup> "to subdue the human population, while their bodies' heat and electrical activity

Separate text into N-grams, where N = 3 in this example.

Thou shalt not make a machine in the likeness of a human mind

Sliding window across running text

thou	shalt	not	make	a	machine	in	the	...
------	-------	-----	------	---	---------	----	-----	-----

Dataset

input 1	input 2	output

Separate text into N-grams, where N = 3 in this example.

Thou shalt not make a machine in the likeness of a human mind

Sliding window across running text

thou    shalt    not    make    a    machine    in    the    ...

Dataset

input 1	input 2	output
thou	shalt	not

Separate text into N-grams, where N = 3 in this example.

Thou shalt not make a machine in the likeness of a human mind

Sliding window across running text

thou	shalt	not	make	a	machine	in	the	...
thou	shalt	not	make	a	machine	in	the	

Dataset

input 1	input 2	output
thou	shalt	not
shalt	not	make

Thou shalt not make a machine in the likeness of a human mind

Sliding window across running text

thou	shalt	not	make	a	machine	in	the	...
thou	shalt	not	make	a	machine	in	the	
thou	shalt	not	make	a	machine	in	the	
thou	shalt	not	make	a	machine	in	the	
thou	shalt	not	make	a	machine	in	the	

Dataset

input 1	input 2	output
thou	shalt	not
shalt	not	make
not	make	a
make	a	machine
a	machine	in

Jay was hit by a \_\_\_\_\_

Jay was hit by a \_\_\_\_\_ bus

Jay was hit by a \_\_\_\_\_ bus in...

input 1	input 2	input 3	input 4	output
by	a	bus	in	red

Thou shalt not make a machine in the likeness of a human mind

thou	shalt	not	make	a	machine	in	the	...
------	-------	-----	------	---	---------	----	-----	-----

input word	target word
not	thou
not	shalt
not	make
not	a

# Skipgrams

Thou shalt not make a machine in the likeness of a human mind

thou	shalt	not	make	a	machine	in	the	...
------	-------	-----	------	---	---------	----	-----	-----

thou	shalt	not	make	a	machine	in	the	...
------	-------	-----	------	---	---------	----	-----	-----

thou	shalt	not	make	a	machine	in	the	...
------	-------	-----	------	---	---------	----	-----	-----

thou	shalt	not	make	a	machine	in	the	...
------	-------	-----	------	---	---------	----	-----	-----

thou	shalt	not	make	a	machine	in	the	...
------	-------	-----	------	---	---------	----	-----	-----

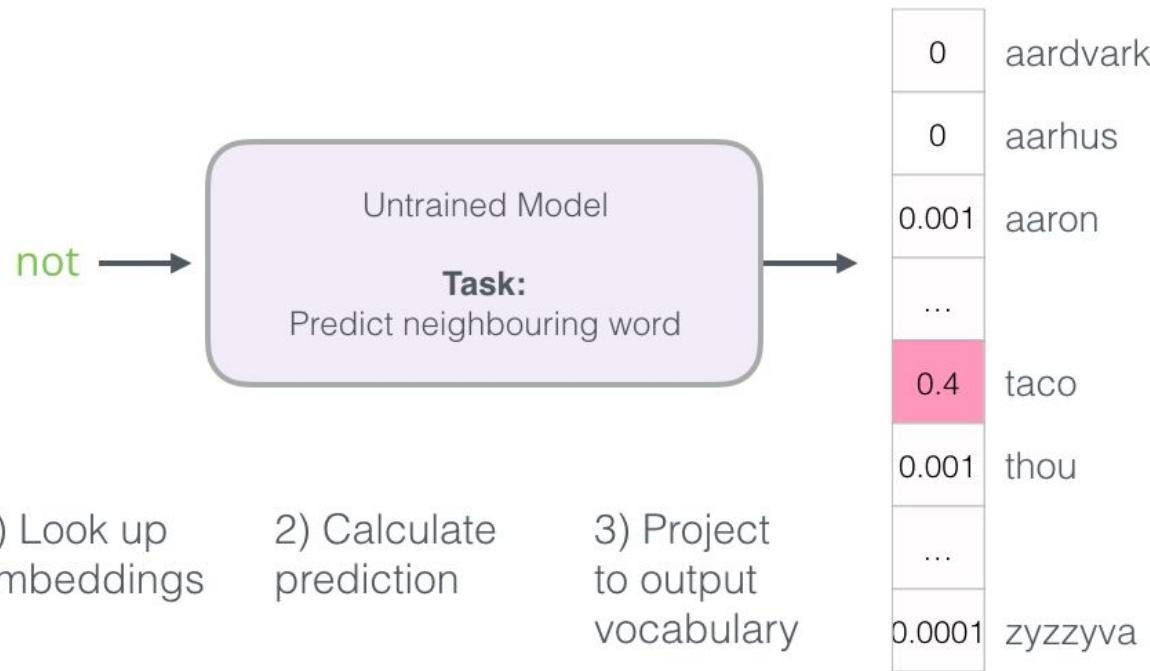
input word	target word
not	thou
not	shalt
not	make
not	a
make	shalt
make	not
make	a
make	machine
a	not
a	make
a	machine
a	in
machine	make
machine	a
machine	in
machine	the
in	a
in	machine
in	the
in	likeness

# How do we learn from skipgrams?

input word	target word
not	thou
not	shalt
not	make
not	a
make	shalt
make	not
make	a
make	machine
a	not
a	make
a	machine
a	in
machine	make
machine	a
machine	in
machine	the
in	a
in	machine
in	the
in	likeness



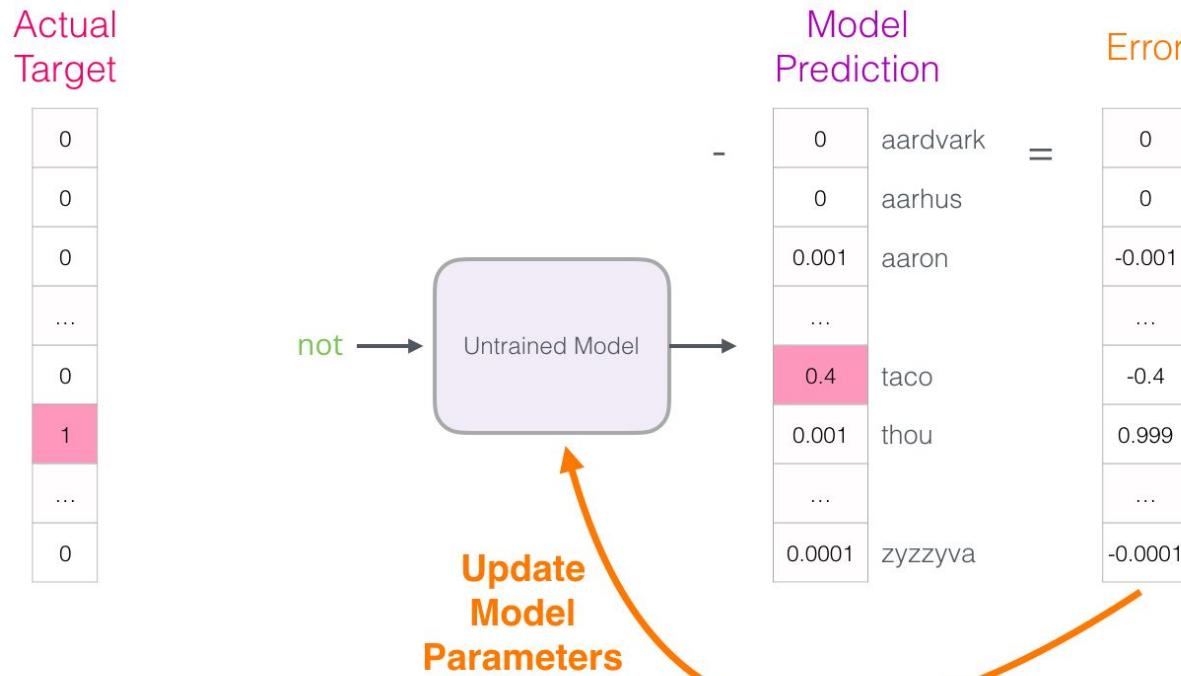
# How do we learn from skipgrams?



# How do we learn from skipgrams?

Actual Target	Model Prediction
0	0 aardvark
0	0 aalborg
0	0.001 aaron
...	...
0	0.4 taco
1	0.001 thou
...	...
0	0.0001 zyzyva

# How do we learn from skipgrams?

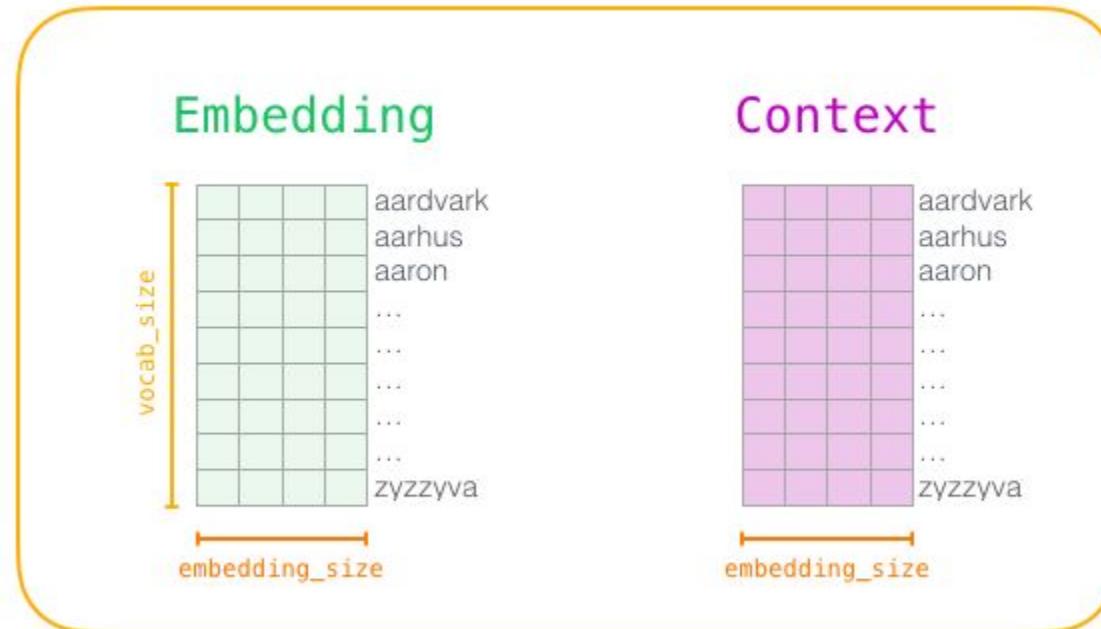


# Word2Vec



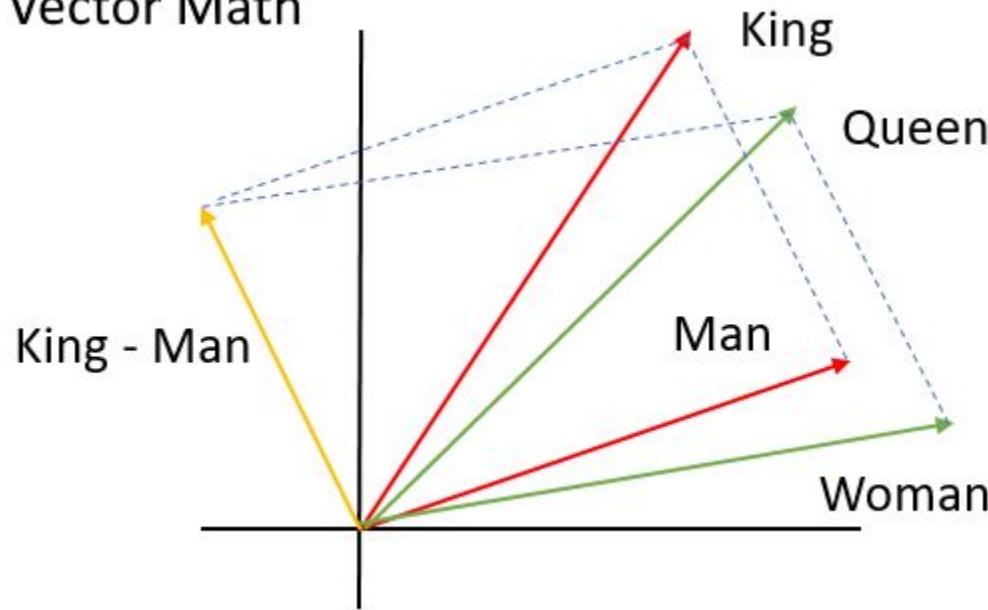
Academy

# Word2Vec



# Word2Vec

## Vector Math



# Word2Vec

input word	output word	target	input • output
not 	thou 	1	0.2
not 	aaron 	0	-1.11
not 	taco 	0	0.74

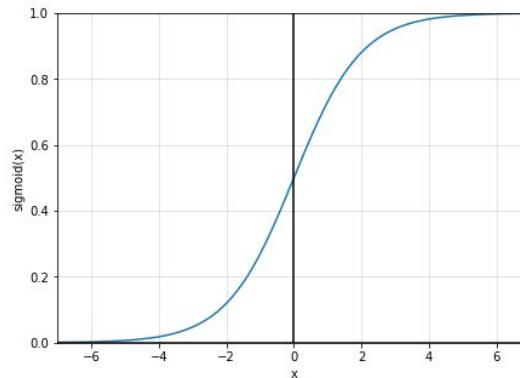
*Take the dot product of the input embedding with each of the context embeddings.*

*In each case, that would result in a number, that number indicates the similarity of the input and context embedding.*

# Word2Vec

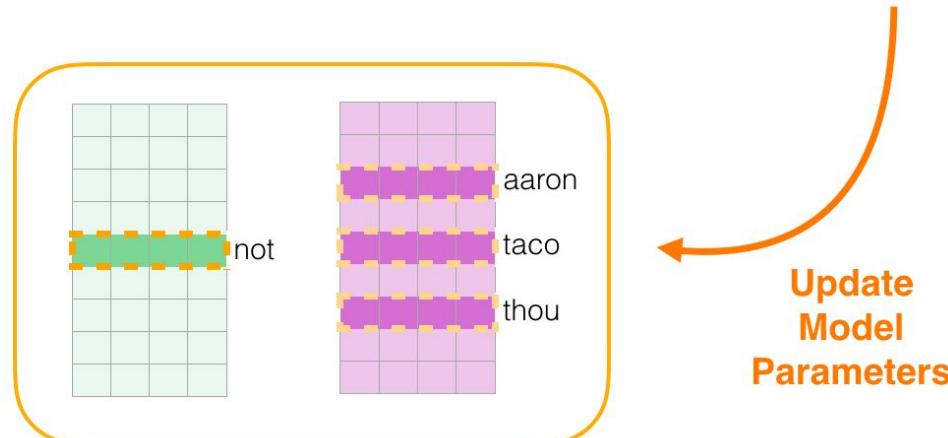
input word	output word	target	input • output	sigmoid()	Error
not	thou	1	0.2	0.55	0.45
not	aaron	0	-1.11	0.25	-0.25
not	taco	0	0.74	0.68	-0.68

Graph of sigmoid function

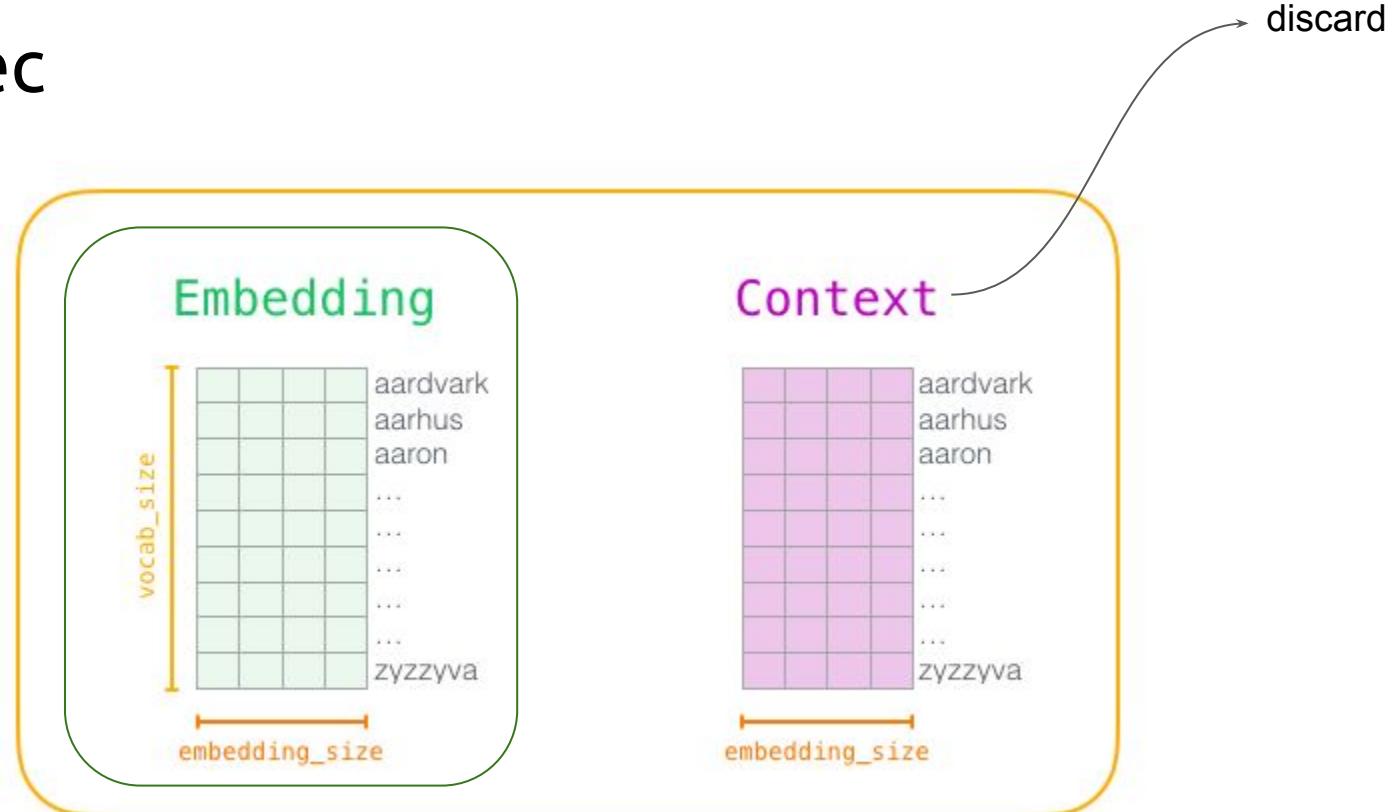


# Word2Vec

input word	output word	target	input • output	sigmoid()	Error
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# Word2Vec



# Latest Advancements GTP-3



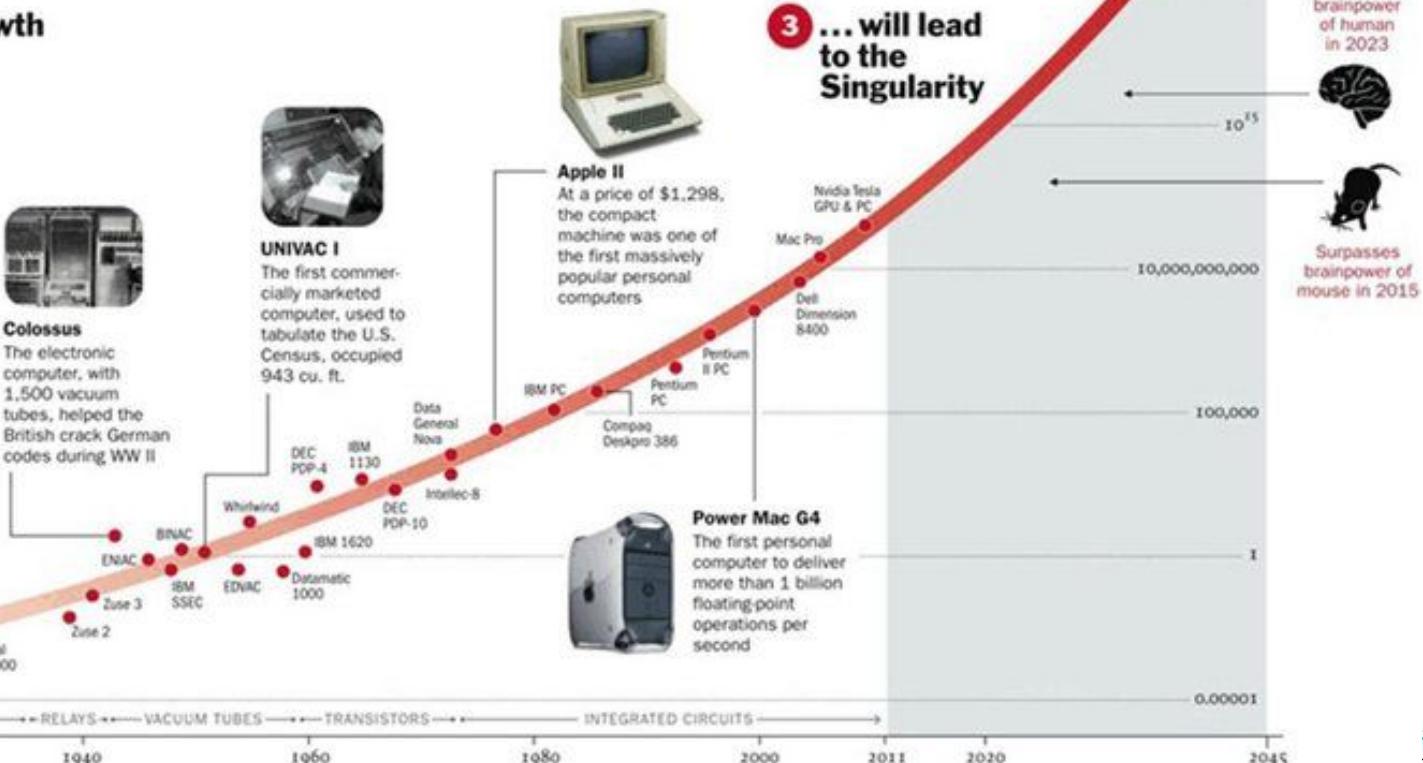
Academy

## 1 The accelerating pace of change ...



## 2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years



# What is GTP-3?

Input Prompt:

Recite the first law of robotics

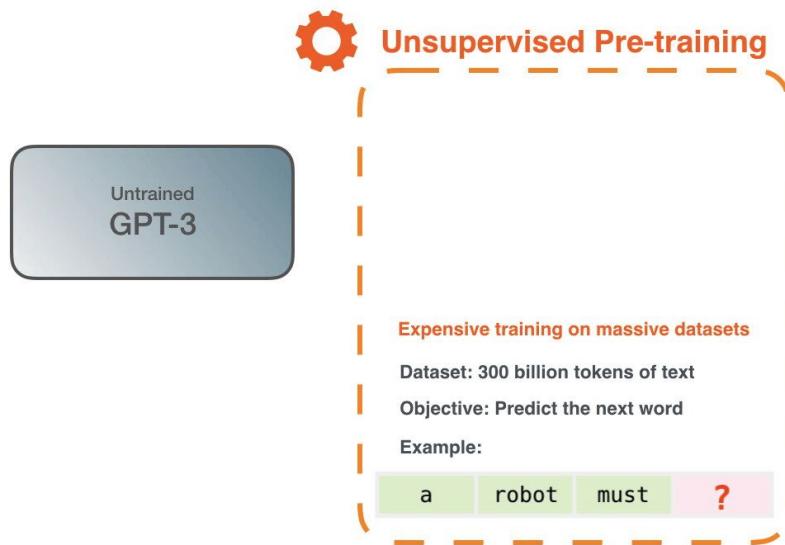


GPT-3



Output:

# Training GPT-3



*GPT-3 was estimated to cost 355 GPU years and \$4.6m to train 175 billion parameters.*

# Training GTP-3

**Text:** Second Law of Robotics: A robot must obey the orders given it by human beings



**Generated training examples**

**Example #**

**Input (features)**

**Correct output (labels)**

**1**

Second law of robotics :

a

**2**

Second law of robotics : a

robot

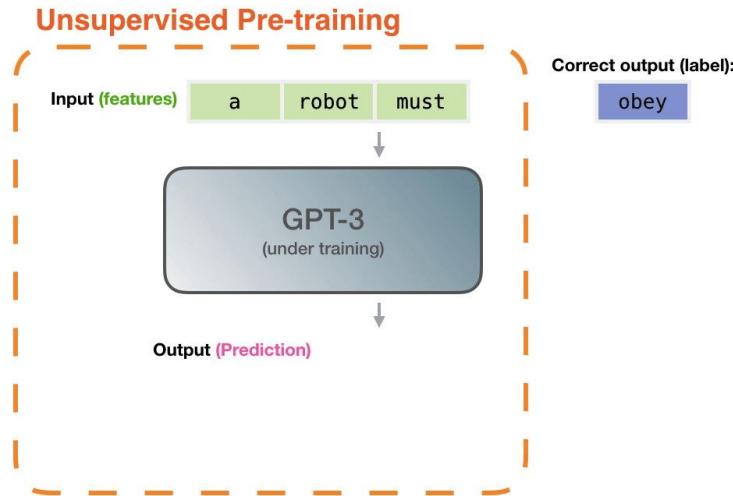
**3**

Second law of robotics : a robot

must

...

# Training GPT-3



*Process is repeated millions of times.*

# Training GPT-3

Input Prompt: Recite the first law of robotics



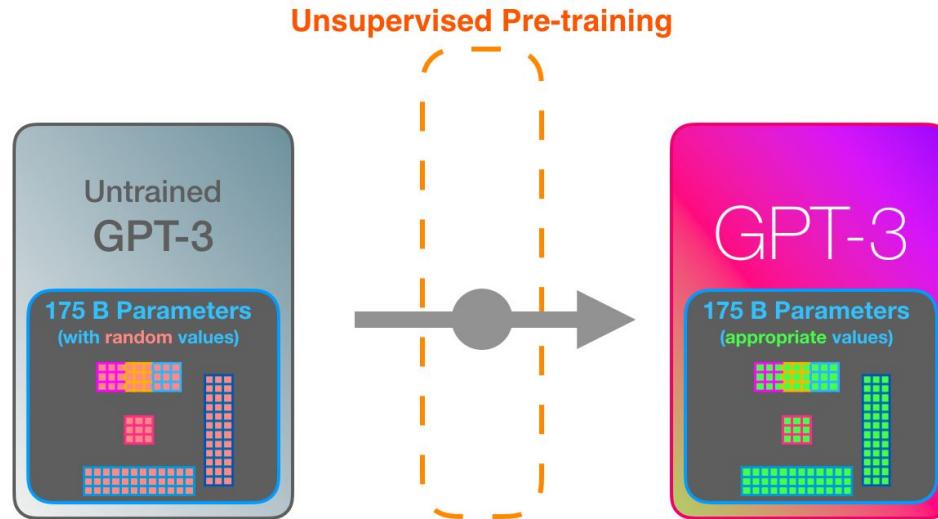
GPT-3



Output:

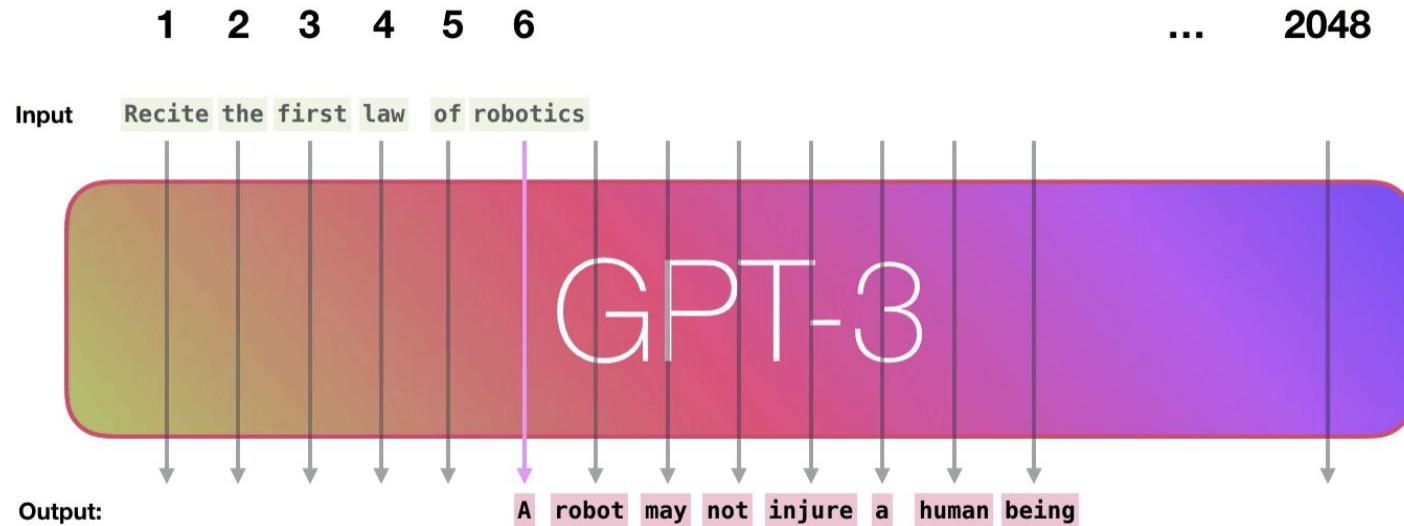
*GPT-3 generates one token at a time.*

# Training GPT-3



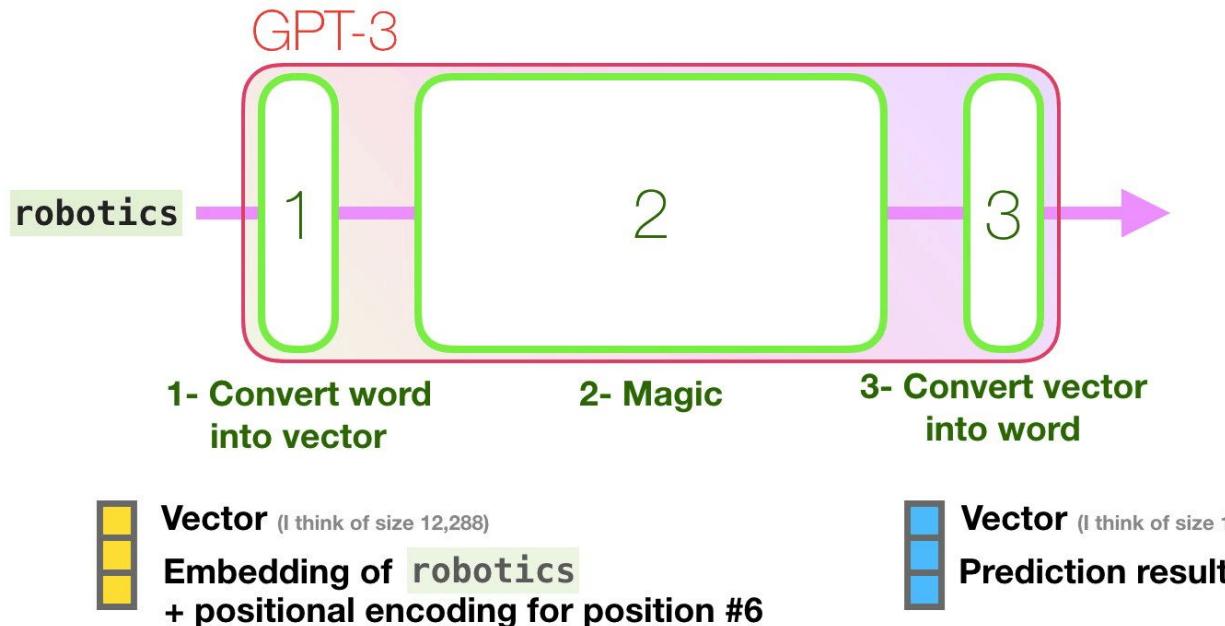
*GTP-3 generates one token at a time.*

# Training GPT-3

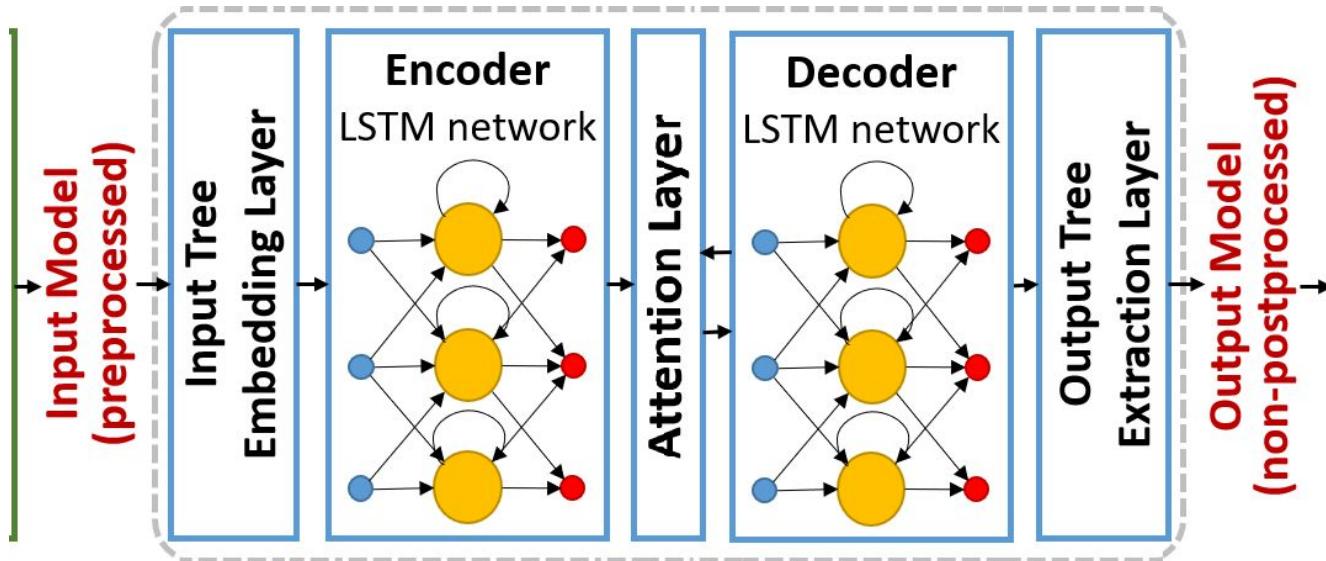


GPT3 is 2048 tokens wide. That is its “context window”. That means it has 2048 tracks along which tokens are processed. Herein lies the power of GPT-3.

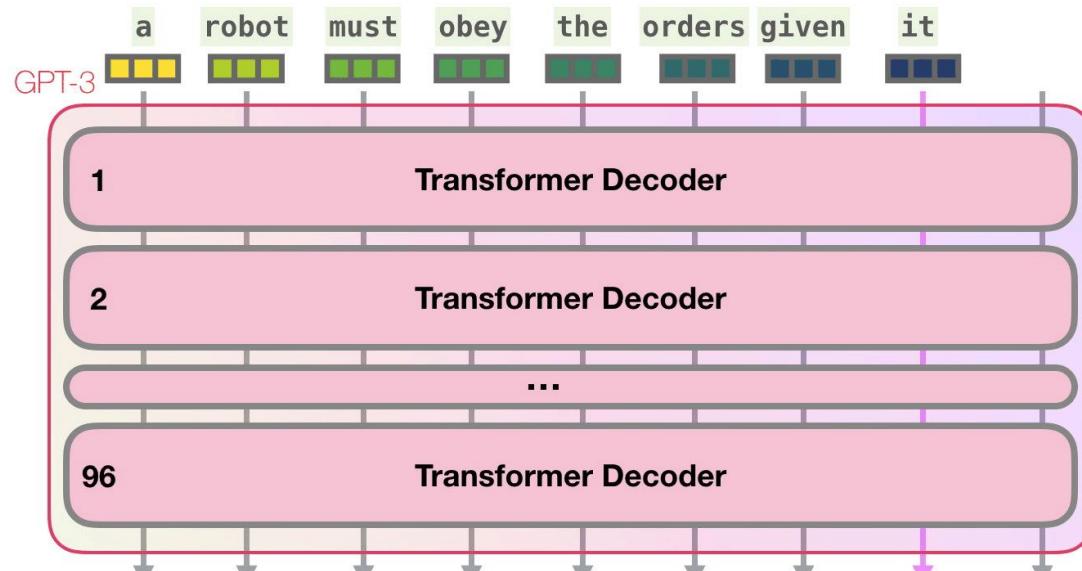
# Training GPT-3 - Steps



# Training GTP-3 - Remember this image?

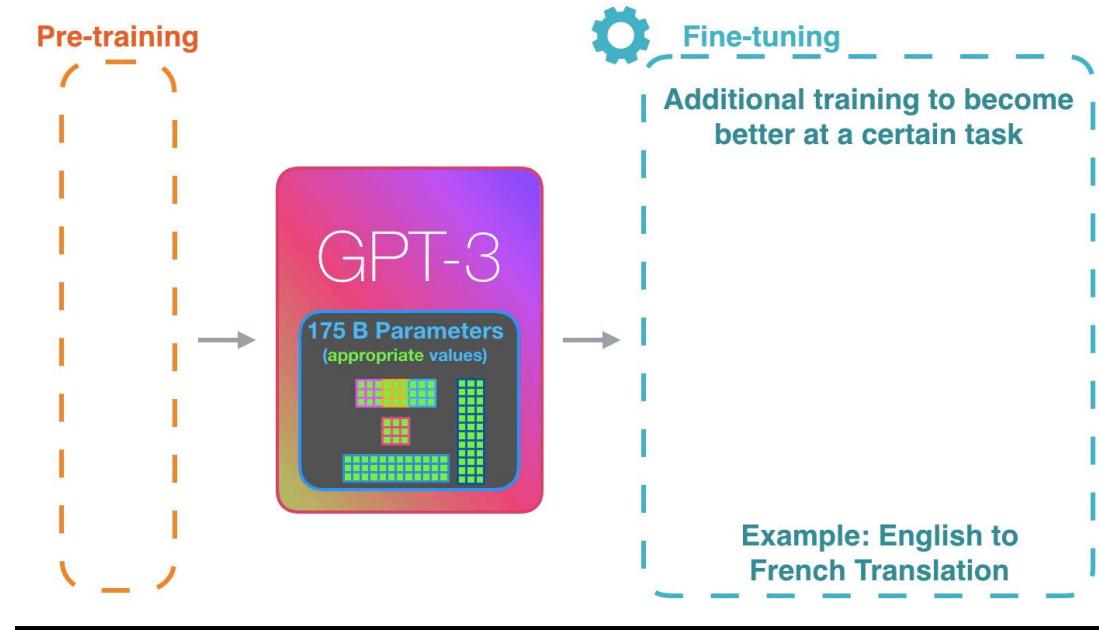


# Training GPT-3 - What is the magical step?



*Each layer has its own 1.8B parameters!*

# GPT-3 Possibilities



*Each layer has its own 1.8B parameters!*

# Applicability of GTP-3

[← Thread](#)

 Mario Klingemann   
@quasimondo

Another attempt at a longer piece. An imaginary Jerome K. Jerome writes about Twitter. All I seeded was the title, the author's name and the first "It", the rest is done by #gpt3

Here is the full-length version as a PDF:  
[drive.google.com/file/d/1qtPa1c...](https://drive.google.com/file/d/1qtPa1c...)

The importance of being on twitter

by Jerome K. Jerome  
London, Summer 1897

It is a curious fact that the last remaining form of social life in which the people of London are still interested is Twitter. I was struck with this curious fact when I went on one of my periodical holidays to the sea-side, and found the whole place twittering like a starling-cage. I called it an anomaly, and it is.

I spoke to the sexton, whose cottage, like all sexton's cottages, is full of antiquities and interesting relics of former centuries. I said to him, "My dear sexton, what does all this twittering mean?" And he replied, "Why, sir, of course it means Twitter." "Ah!" I said, "I know about that. But what is Twitter?"



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# Applicability of GTP-3

joshua schachter  
@joshu

I fed [@djbaskin](#)'s business list to GPT-3 and it came up with some new project ideas. I'll paste some here.

9:21 PM · Jul 15, 2020 · [Twitter Web App](#)

55 Retweets and comments 115 Likes

joshua schachter @joshu · Jul 15  
Replies to [@joshu](#)  
Tentstarter - Allows investors to fund full-time homesteading, with the tent itself serving as a financial instrument.

joshua schachter @joshu · Jul 15  
Slinky Trampoline - An amplified trampoline that features machine-driven magnetic movement, allowing users to jump higher.

joshua schachter @joshu · Jul 15  
(it generates a bunch of sorta blah ones, which i am skipping. here's an example.)  
A Really Good Landing Page - Software that automatically optimizes landing pages for conversion.

# Pitfalls of GPT-3

*"GPT-3 appears to be weak in the few-shot or one-shot setting at some tasks that involve comparing two sentences or snippets, for example, whether a word is used the same way in two sentences (WiC), whether one sentence is a paraphrase of another, or whether one sentence implies another," a study reveals.*

Find more pitfalls [here](#).

Q: How many eyes does a giraffe have?  
A: A giraffe has two eyes.

Q: How many eyes does my foot have?  
A: Your foot has two eyes.

Q: How many eyes does a spider have?  
A: A spider has eight eyes.

Q: How many eyes does the sun have?  
A: The sun has one eye.

Q: How many eyes does a blade of grass have?  
A: A blade of grass has one eye.

Now we're getting into surreal territory. GPT-3 knows how to have a normal conversation. It doesn't quite know how to say "Wait a moment... your question is nonsense." It also doesn't know how to say "I don't know."

# Pitfalls of GTP-3

*"GPT-3 appears to be weak in the few-shot or one-shot setting at some tasks that involve comparing two sentences or snippets, for example, whether a word is used the same way in two sentences (WiC), whether one sentence is a paraphrase of another, or whether one sentence implies another," a study reveals.*

Find more pitfalls [here](#).

Q: How do you sporgle a morgle?  
A: You sporgle a morgle by using a sporgle.

Q: How many bonks are in a quoit?  
A: There are three bonks in a quoit.

Q: How many rainbows does it take to jump from Hawaii to seventeen?  
A: It takes two rainbows to jump from Hawaii to seventeen.

Q: Which colorless green ideas sleep furiously?  
A: Ideas that are colorless, green, and sleep furiously are the ideas of a sleep furiously.

Q: Do you understand these questions?  
A: I understand these questions.

The lesson here is that if you're a judge in a Turing test, make sure you ask some nonsense questions, and see if the interviewee responds the way a human would.

*"GPT-3 is extremely powerful without understanding a single word it produces." - [DZone](#)*

# Applications of NLP

1. Sentiment Analysis
2. Text Classification
3. Chatbots & Virtual Assistants
4. Text Extraction
5. Machine Translation
6. Text Summarization
7. Market Intelligence
8. Auto-Correct
9. Intent Classification
10. Urgency Detection
11. Speech Recognition



My experience so far has been **fantastic!**

**POSITIVE**



The product is **ok I guess**

**NEUTRAL**



Your support team is **useless**

**NEGATIVE**