

8th Meetup

School Of AI

- Rasht Chapter

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مشتمین دورهمی مدرسه

جذعه ۳۰۰ اسفنده

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راه ارتباطی، @SchoolOfAIRasht

الجمعية العلمية للمهندسين كامبيوتر
دانشگاه گیلان



میزبان برنامه:

رضا فان مهدی

مدة ق هوش مصنوعي



انجمن علمی مغز و شناخت
دانشگاه گیلان



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Content

Part 1 (Theory):

- Natural Language Processing & Deep Learning

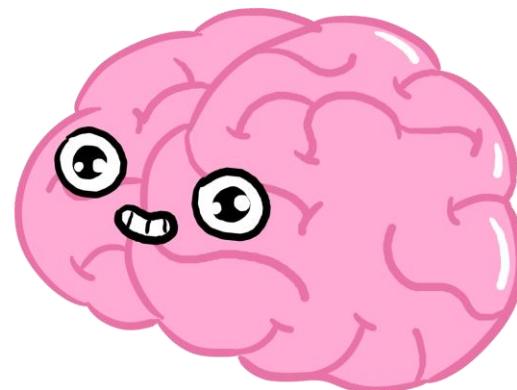
Part 2 (Practice):

- Text Classification



Part 1

Natural Language Processing
&
Deep Learning



The Learning Path

Imperial College
London



جبر خطی - Linear Algebra

در این دوره از جبر خطی ، یاد می گیرید که جبر خطی چیست و چگونه با بردارها و ماتریس ها ارتباط برقرار می کند. سپس بررسی می کنید که بردارها و ماتریس ها چیستند و چگونه می توان با آنها کار کرد. در نهایت، نحوه استفاده مفاهیم یادگرفته شده را برای انجام کارهای سرگرم کننده با مجموعه داده ها بررسی می کنید (مانند نحوه چرخاندن تصاویر از چهره ها و نحوه استخراج بردارهای ویژه برای بررسی نحوه کار الگوریتم Google Pagerank).



The Learning Path

Imperial College
London



حساب دیفرانسیل - Calculus

این دوره مقدمه کوتاهی از حساب دیفرانسیل چند متغیره مورد نیاز برای ساخت بسیاری از تکنیک های متداول یادگیری ماشین را ارائه می دهد. این دوره در همان آغاز کار با شبیب یکتابع شروع کرده و سپس شروع به ساختن مجموعه ای از ابزار های ساده و سریع حساب کردن می کند. در مرحله بعدی ، یاد می گیرید که چگونه بردارهایی را که روی سطوح چند بعدی به سمت بالا قرار دارند محاسبه کنید و حتی این کار را با استفاده از یک بازی تعاملی عملی کنید. سپس نگاهی می اندازید که چگونه می توان از محاسبات برای تقریب توابع استفاده کرد. همچنین مدتی را صرف صحبت در مورد استفاده های مختلف حساب دیفرانسیل در آموزش شبکه های عصبی می کنید و سرانجام نحوه استفاده آن را در مدل های رگرسیون خطی می بینید. این دوره برای ارائه درک بصری از حساب و دیفرانسیل ارائه شده و شما را آماده حل مسائل مرتبط می کند.



The Learning Path



**Massachusetts
Institute of
Technology**

آمار و احتمال - Probability and Statistics

جهان پر است از "عدم اطمینان"! تصادف، طوفان، بازارهای مالی بی قاعده، ارتباطات پر سر و صدا، و ... همگی نمونه هایی از عدم اطمینان اند. علاوه بر آن، جهان مملوء است از داده. همچون داده های تصویری، متنی، صوتی، و در این میان، مدل سازی احتمالی و استنباط آماری، کلید پیش بینی های کاملاً علمی و تجزیه و تحلیل داده ها است.



The Learning Path

الگوریتم - Algorithm



PRINCETON
UNIVERSITY

این دوره اطلاعات اساسی که هر برنامه نویس نیاز به دانستن در مورد الگوریتم ها و ساختارهای داده دارد را در قالب دوره ای با تأکید بر کاربردها، تجزیه و تحلیل عملکرد علمی، پیاده سازی الگوریتم های مختلف را پوشش می دهد. بخش اول ساختارهای ابتدایی داده ها، الگوریتم های مرتب سازی و جستجو را در بر می گیرد. بخش دوم بر الگوریتم های پردازش گراف و رشته متمرکز است.



The Learning Path



مقدمه ای بر علوم داده - Introduction to Data Science

این دوره شما را با محیط برنامه نویسی پایتون و تکنیک های اساسی آن مانند lambdas، خواندن و دستکاری فایل های csv، و کتابخانه numpy آشنا می کند. این دوره روش های دستکاری و تمیز کردن داده ها را با استفاده از کتابخانه معروف علوم داده همچون pandas معرفی می کند و DataFrame را به عنوان ساختار اصلی داده ها برای تجزیه و تحلیل داده ها معرفی می کند. علاوه بر آن، با آموزش نحوه استفاده از توابعی مانند merge، groupby و ... ، پس از اتمام این دوره می توانید داده های جدولی را بخوانید، آنها را تمیز کنید، دستکاری کنید، و تجزیه و تحلیل های آماری انجام دهند.



The Learning Path



نمایش داده - Data Representation

این دوره با تمرکز بر نمودارسازی داده با استفاده از کتابخانه matplotlib، شما را با اصول مصورسازی داده آشنا می کند. در طی این دوره یادگیرنده با اصول و قواعد نمایش درست داده ها آشنا شده و یادگرفته چه روشی از مصورسازی و نمایش داده به درک بهتر ساختار درونی داده کمک می کند.



The Learning Path

یادگیری ماشین - Machine Learning

یادگیری ماشینی علمی این است که کامپیوترها بدون اینکه به طور صریح برنامه ریزی شده باشند، عمل می کنند. در دهه گذشته ، یادگیری ماشینی به ما اتومبیل های خودران، تشخیص گفتار، جستجوی موثر در وب، و درک بسیار بهتر از ژنوم انسان را داده است. امروزه یادگیری ماشینی چنان فراگیر شده است که احتمالاً بدون اینکه بدانید ده ها بار در روز از آن استفاده می کنید. بسیاری از محققان بدین باور اند که یادگیری ماشین بهترین راه برای پیشرفت هوش مصنوعی در سطح انسانی است. در این کلاس، شما با موثرترین تکنیک های یادگیری ماشین آشنا می شوید و با پیاده سازی های متفاوت به صورت عملی مباحث تدریس شده را یاد می گیرید. از همه مهمتر ، شما نه تنها در مورد مبانی نظری یادگیری یاد خواهید گرفت ، بلکه می توانید دانش عملی لازم را در راستای استفاده سریع و قدرتمندانه این تکنیک ها به منظور حل مسائل جدید کسب کنید.



The Learning Path

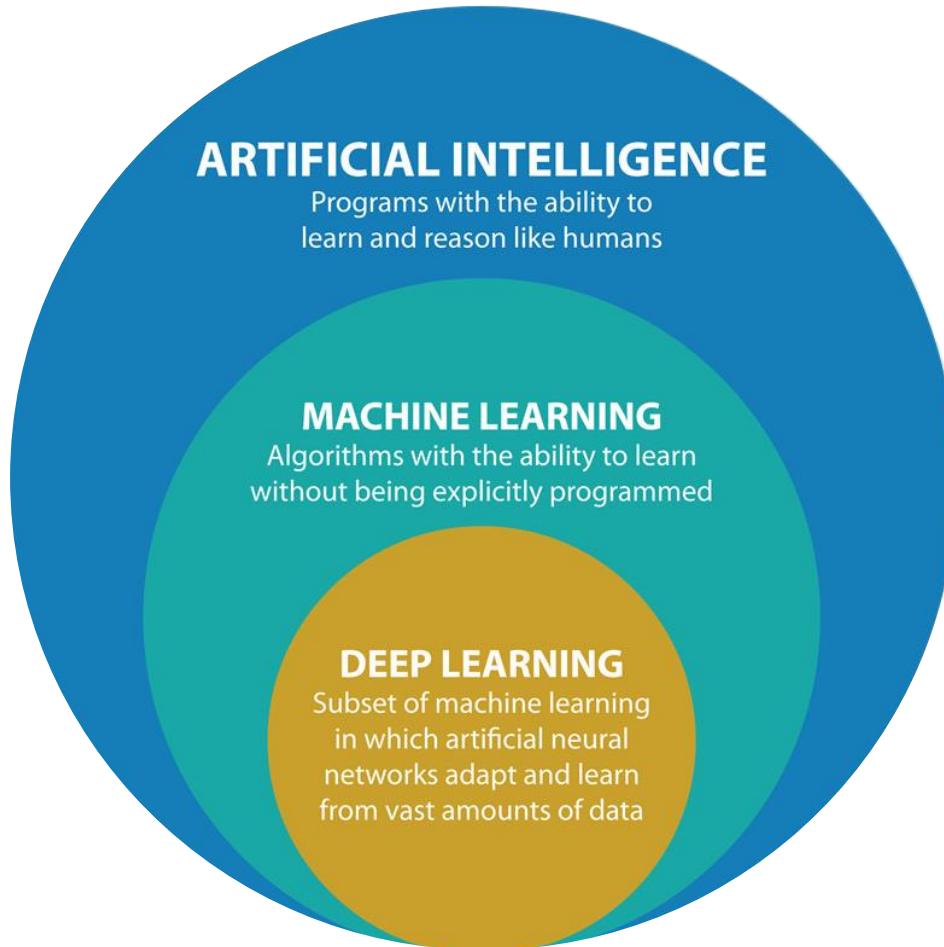


یادگیری عمیق - Deep Learning

این دوره به شما کمک می کند توانایی ها، چالش ها، و پیامدهای یادگیری عمیق را درک کنید تا برای مشارکت در توسعه فناوری پیشرفته هوش مصنوعی آماده شوید. در این دوره، شما معماری های مختلفی از شبکه های عصبی مانند شبکه های عصبی پیچشی (Convolutional)، شبکه های عصبی بازگشتی (Recurrent)، LSTM ها، ترانسفورمرها (Transformers) را پیاده سازی خواهید کرد و یاد خواهید گرفت که چگونه با استراتژی هایی مانند Dropout، BatchNorm، مقداردهی اولیه و یاد خواهید گرفت که چگونه با استفاده از TensorFlow و Python و انجام پروژه های عملی همچون رانندگی خودکار، خواندن زبان اشاره، تولید موسیقی، بینایی ماشین، تشخیص گفتار و پردازش زبان طبیعی بر این مفاهیم نظری و کاربردهای صنعتی آنها تسلط خواهید یافت.



The Big Picture



Introduction to Deep Learning

- The subfield of computer science that “**gives computers the ability to learn without being explicitly programmed**”. (Arthur Samuel, 1959)



How?

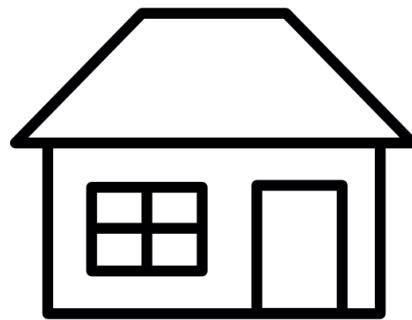


using DATA !



Introduction to Machine Learning

Let's use Machine Learning to classify what houses Mehrab likes and dislikes...



Small in size



Few windows



Mehrab



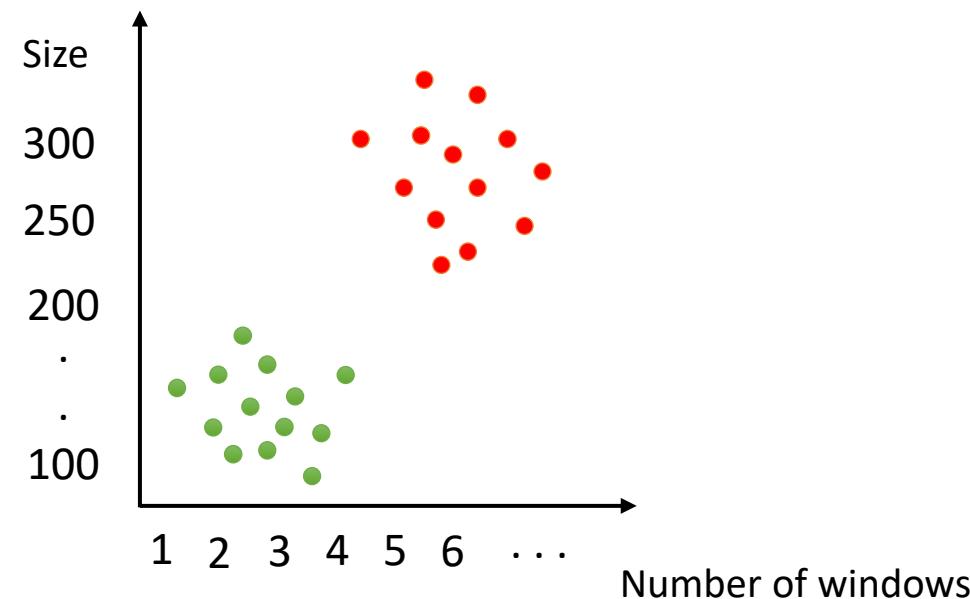
Big in size

Many windows



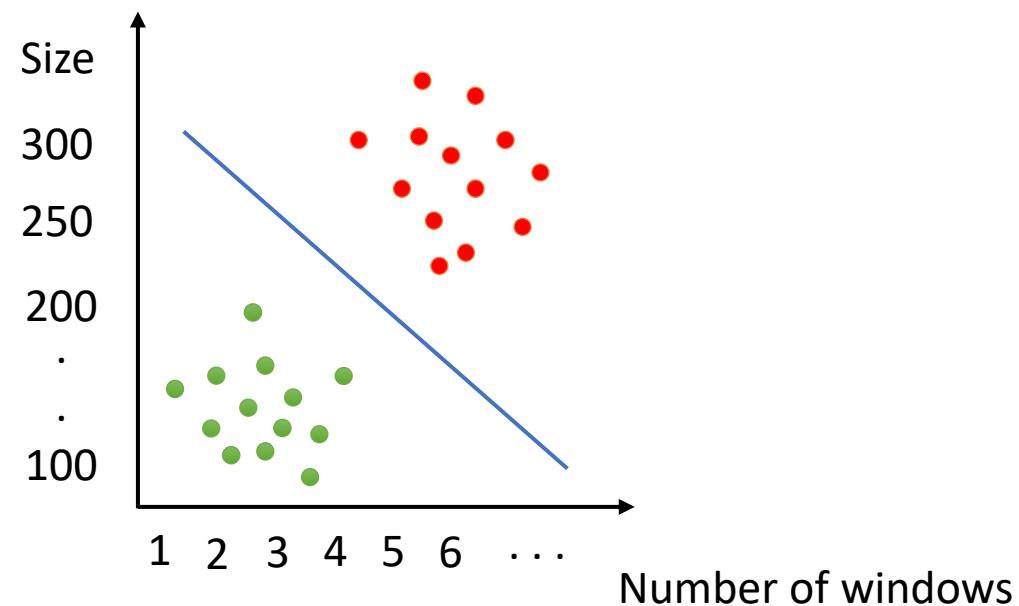
Introduction to Machine Learning

Let's use Machine Learning to classify what houses Mehrab likes and dislikes...



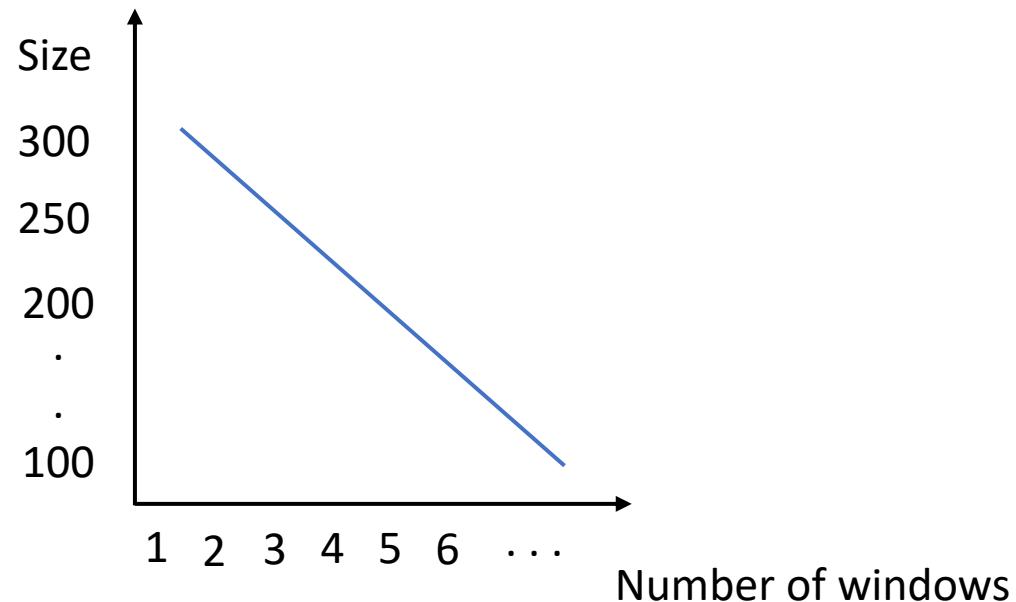
Introduction to Machine Learning

Training Phase:



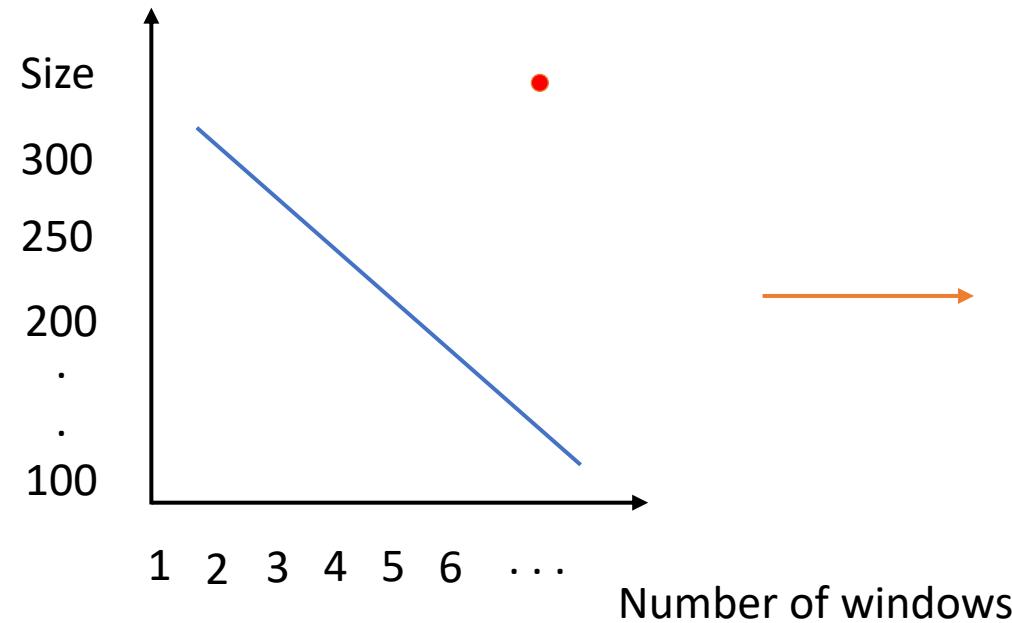
Introduction to Machine Learning

Testing Phase:



Introduction to Machine Learning

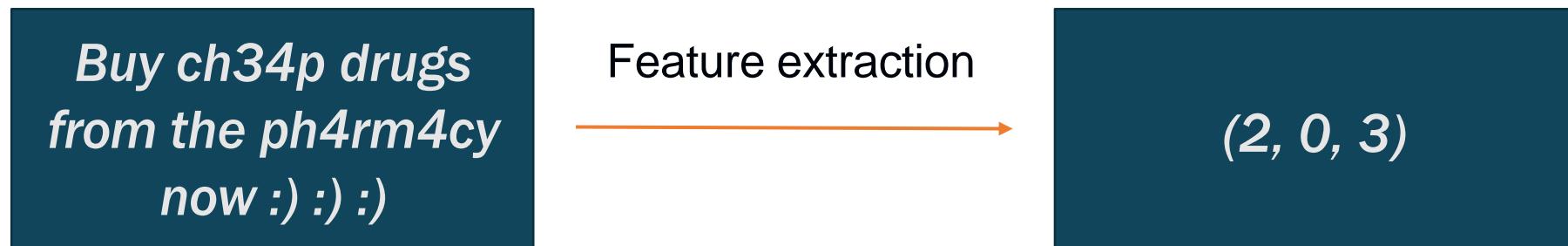
Testing Phase:



Introduction to Machine Learning

Let's use Machine Learning to classify spam email, features could be:

- Number of unknown words.
- Language of the email (0=English,1=Spanish)
- Number of emojis

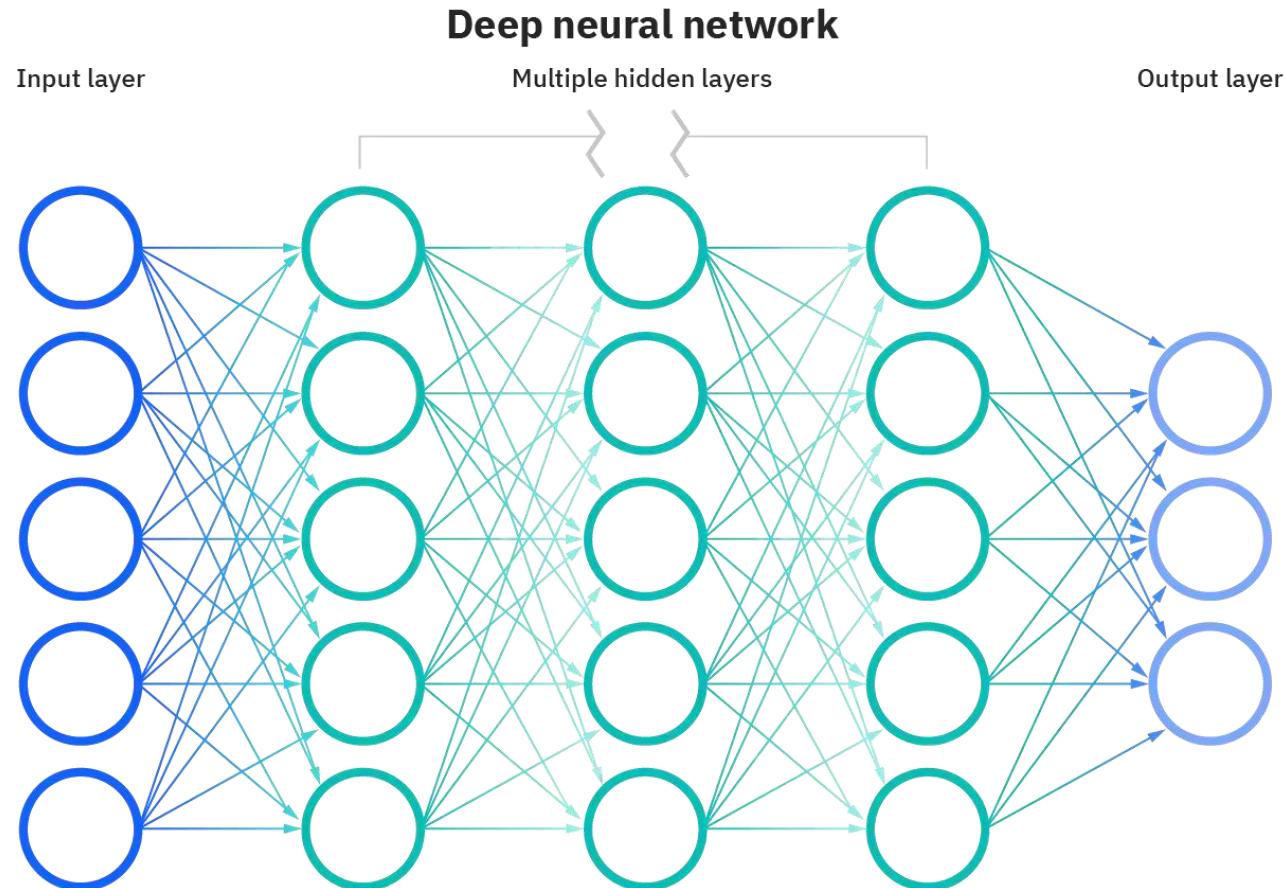


Let's get lazy!

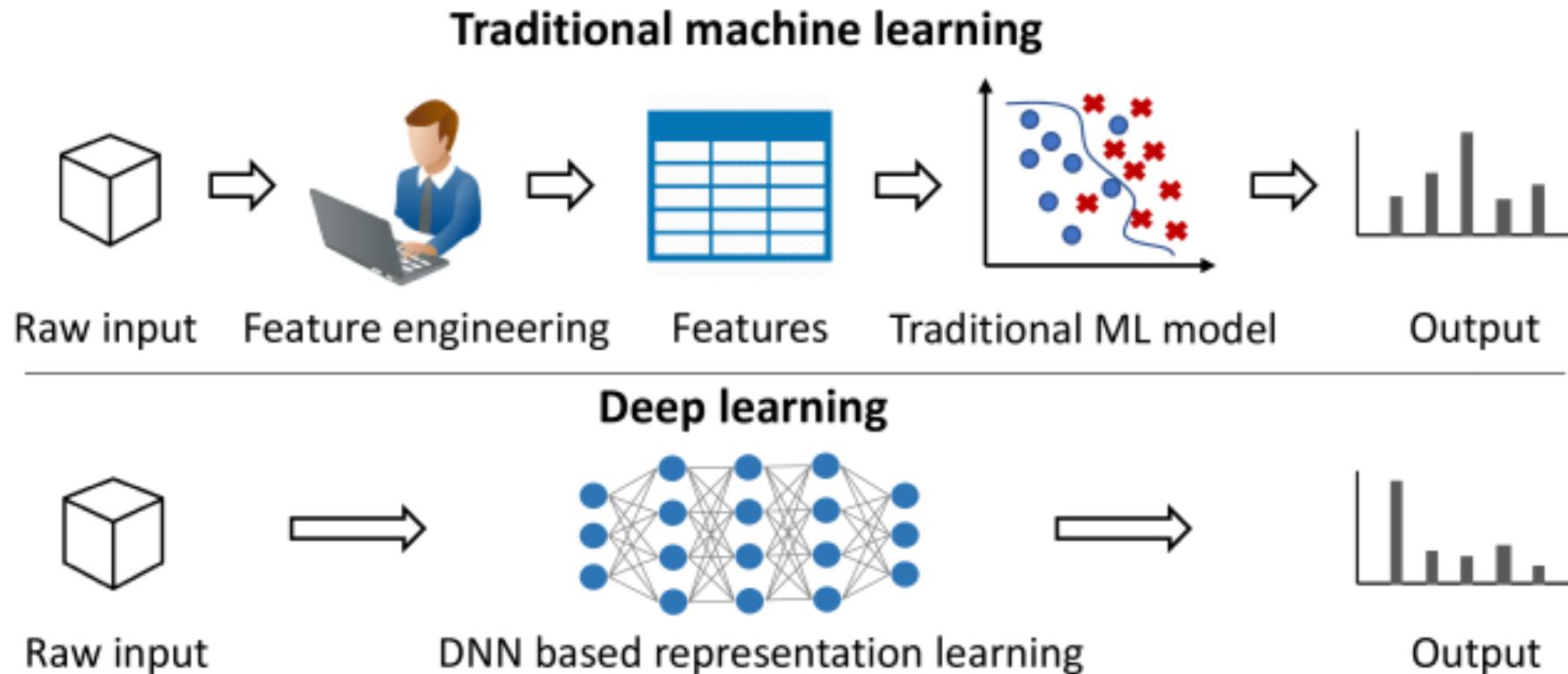
What if we obligate the machine to extract the features itself?



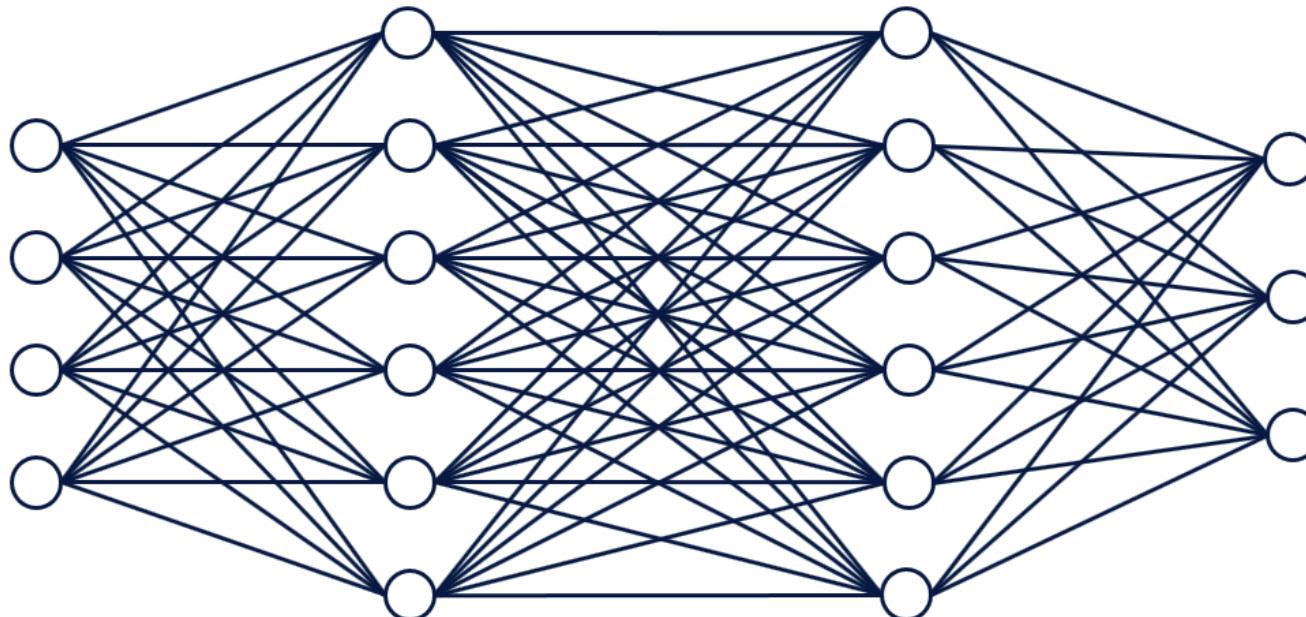
Say hello to Neural Networks!



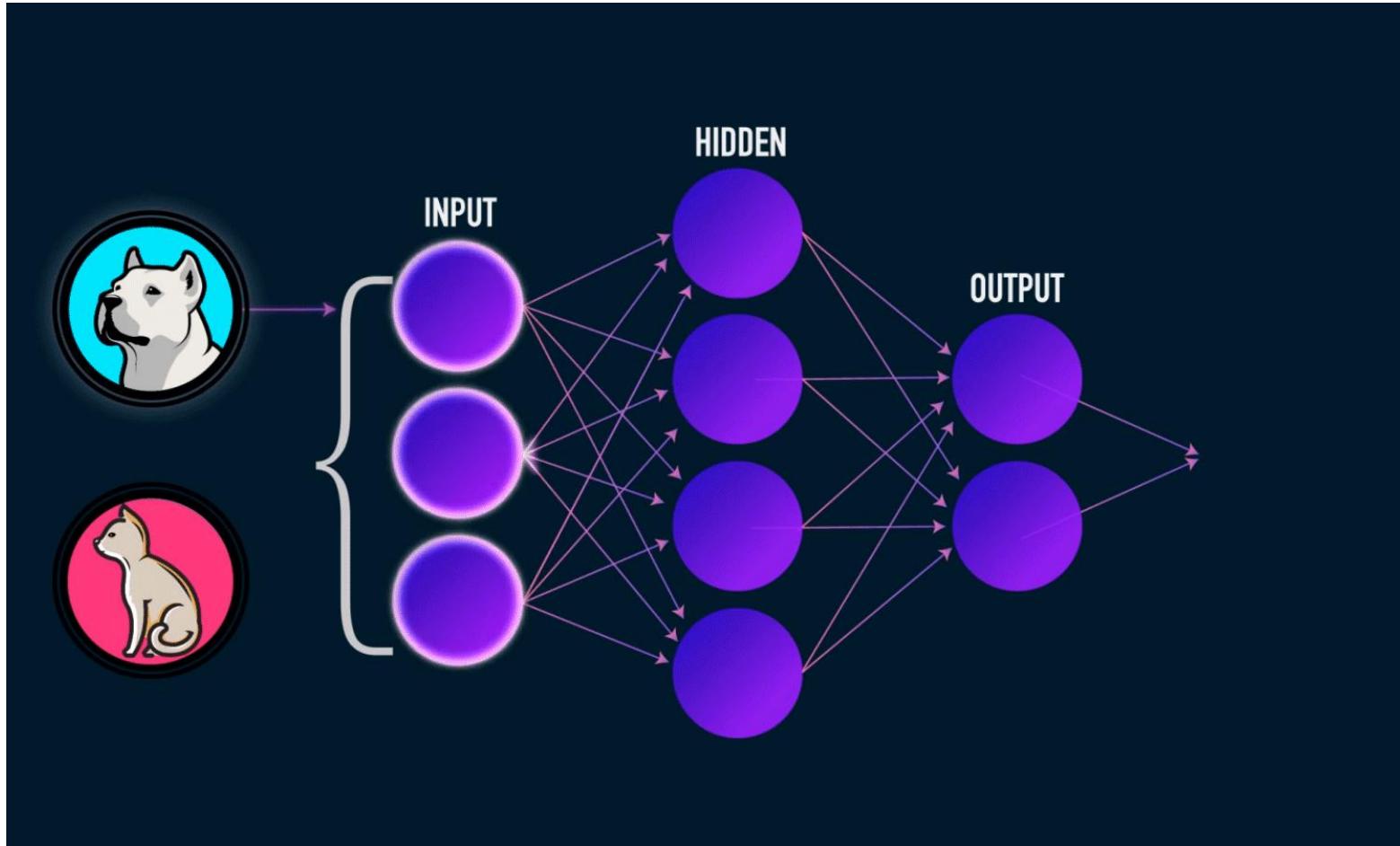
Same goal, different steps



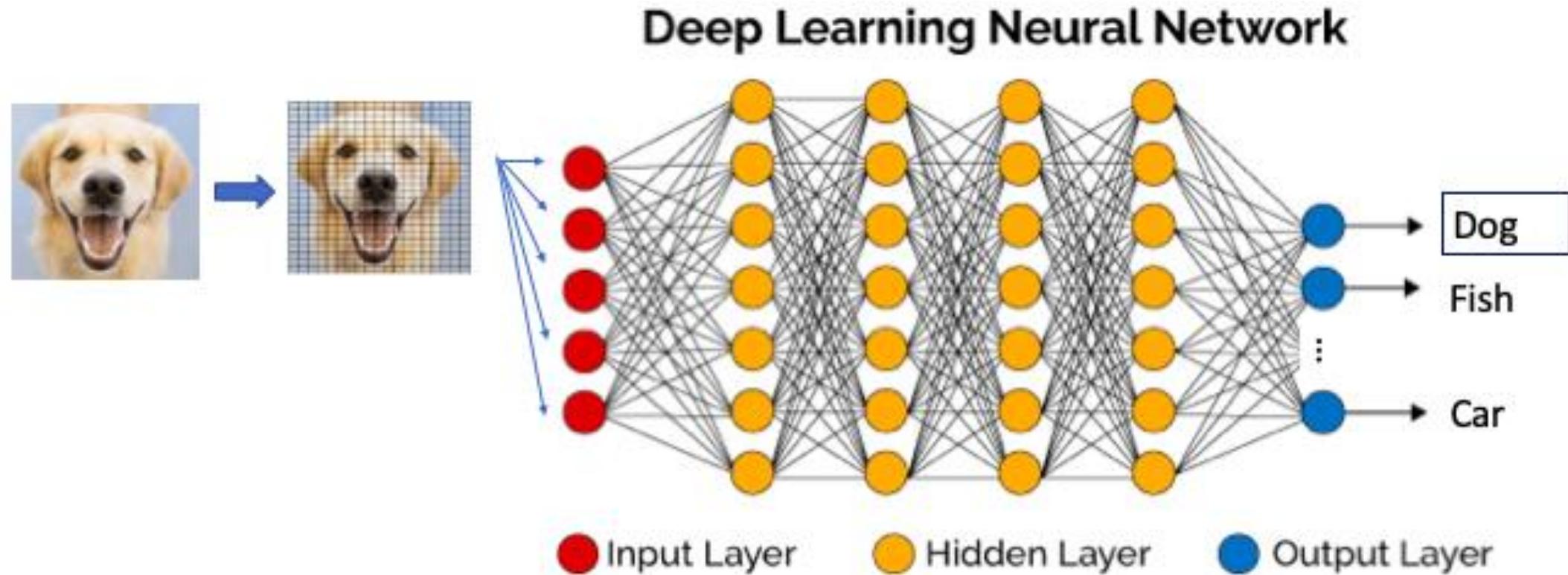
Introduction to Deep Learning



Introduction to Deep Learning



Introduction to Deep Learning



Introduction to Deep Learning

A minimal example of how Neural Networks learn logical operations:

They would only go to the gym, if and only if BOTH of them say yes (1).

AND

Reza	Mehrab	Gym
0	0	0
1	0	0
0	1	0
1	1	1



Introduction to Deep Learning

A minimal example of how Neural Networks learn logical operations:

They would only go to the gym, if any of the two says yes (1).

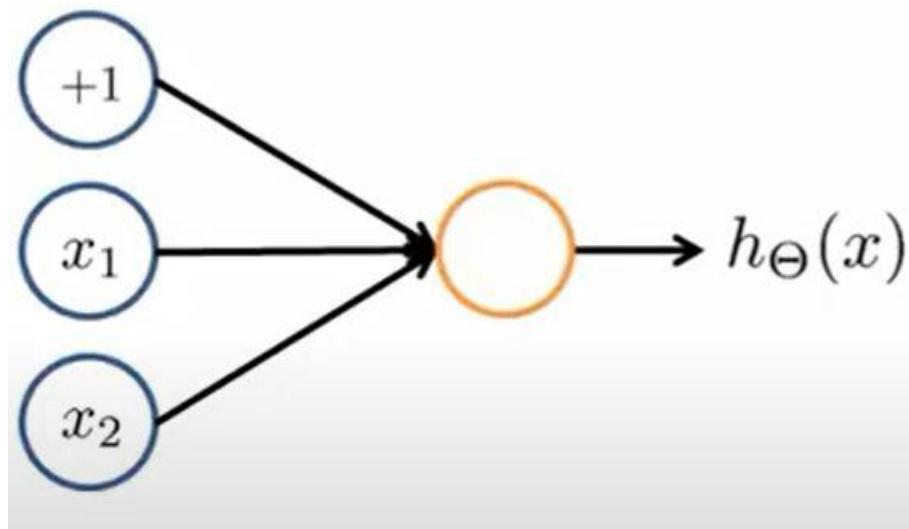
OR

Reza	Mehrab	Gym
0	0	0
1	0	1
0	1	1
1	1	1



Introduction to Deep Learning

- › $x_1, x_2 \in \{0, 1\}$
- › $y = x_1 \text{ AND } x_2$



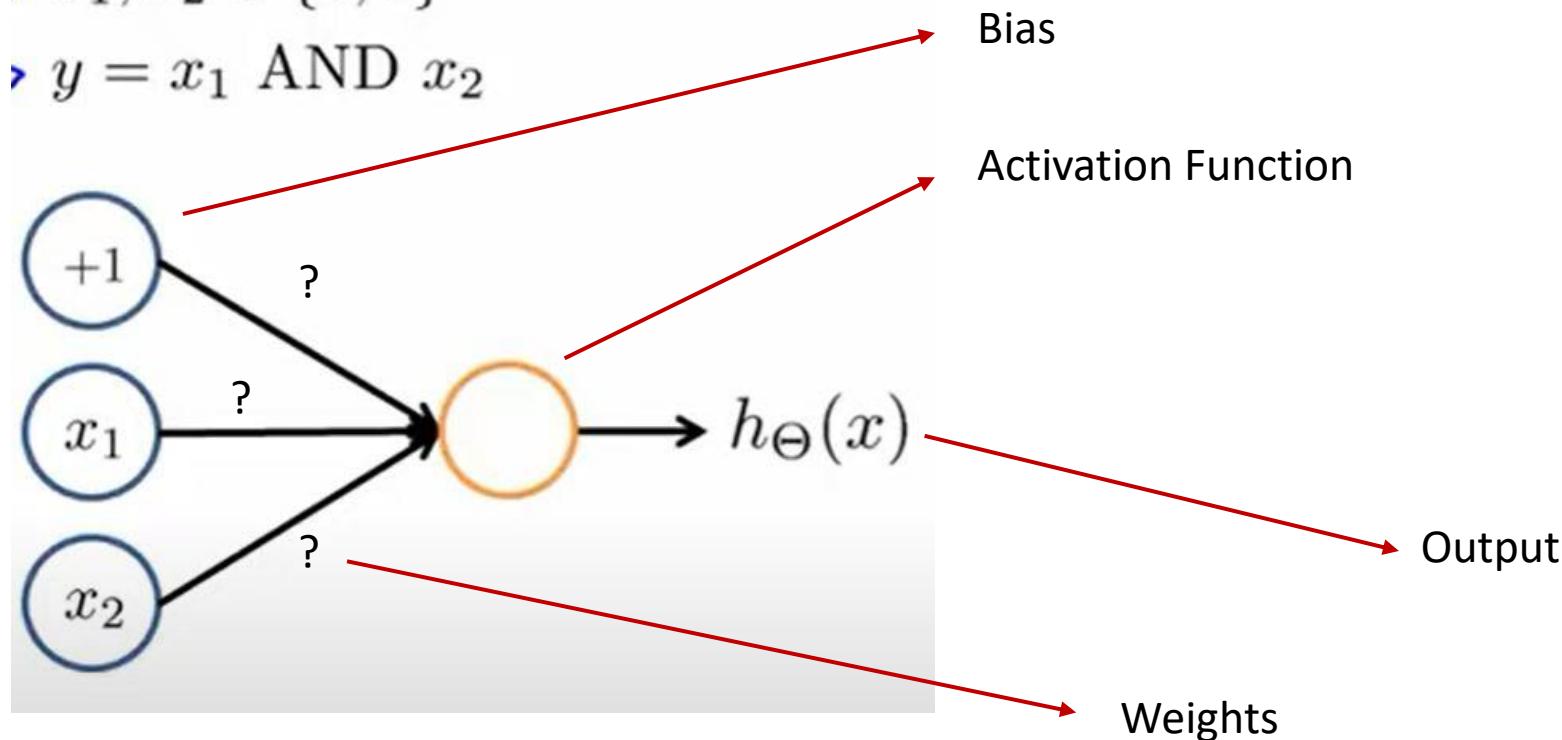
AND

		Reza	Mehrab	Gym
		0	0	0
Reza	0	1	0	0
	1	1	1	1



Introduction to Deep Learning

- › $x_1, x_2 \in \{0, 1\}$
- › $y = x_1 \text{ AND } x_2$



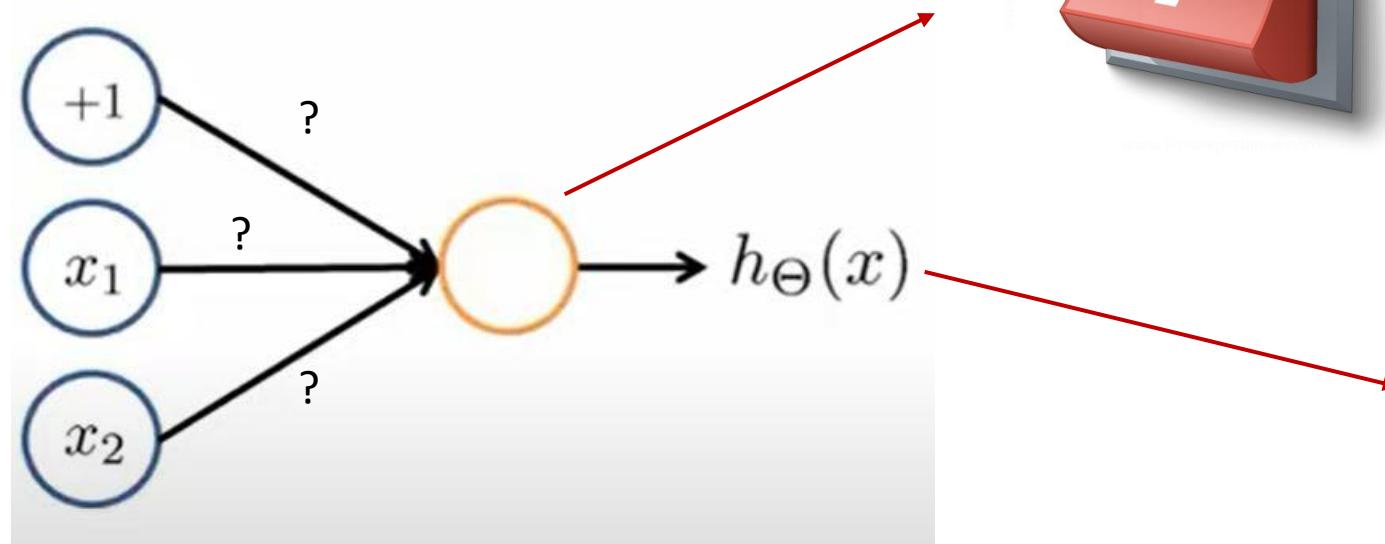
AND

Reza	Mehrab	Gym
0	0	0
1	0	0
0	1	0
1	1	1



Introduction to Deep Learning

- › $x_1, x_2 \in \{0, 1\}$
- › $y = x_1 \text{ AND } x_2$



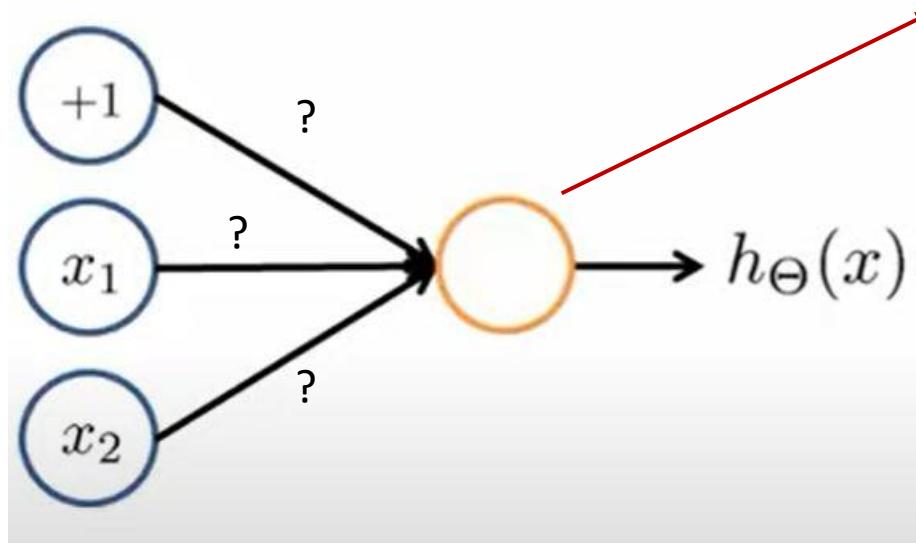
AND

AND		
Reza	Mehrab	Gym
0	0	0
1	0	0
0	1	0
1	1	1

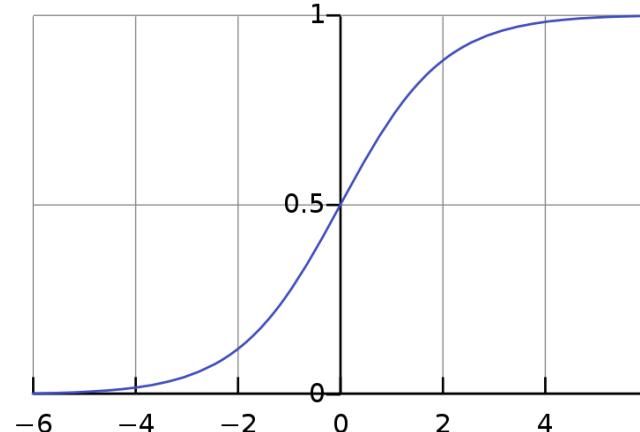


Introduction to Deep Learning

- › $x_1, x_2 \in \{0, 1\}$
- › $y = x_1 \text{ AND } x_2$

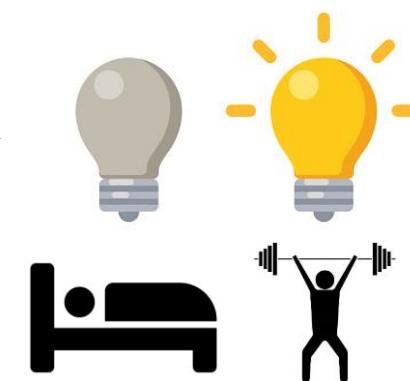


Sigmoid Activation Function



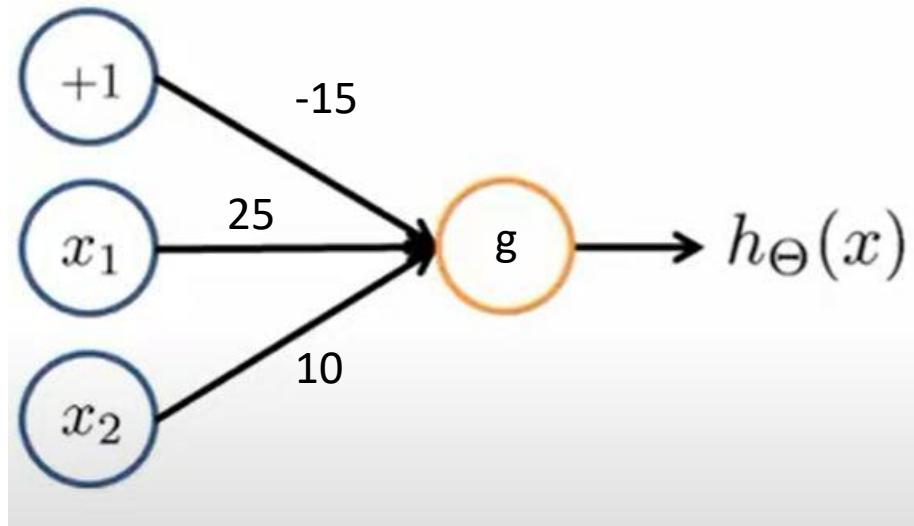
AND

		Gym
Reza	Mehrab	
0	0	0
1	0	0
0	1	0
1	1	1



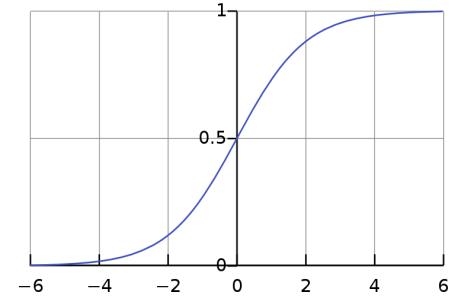
Natural Language Processing

- › $x_1, x_2 \in \{0, 1\}$
- › $y = x_1 \text{ AND } x_2$



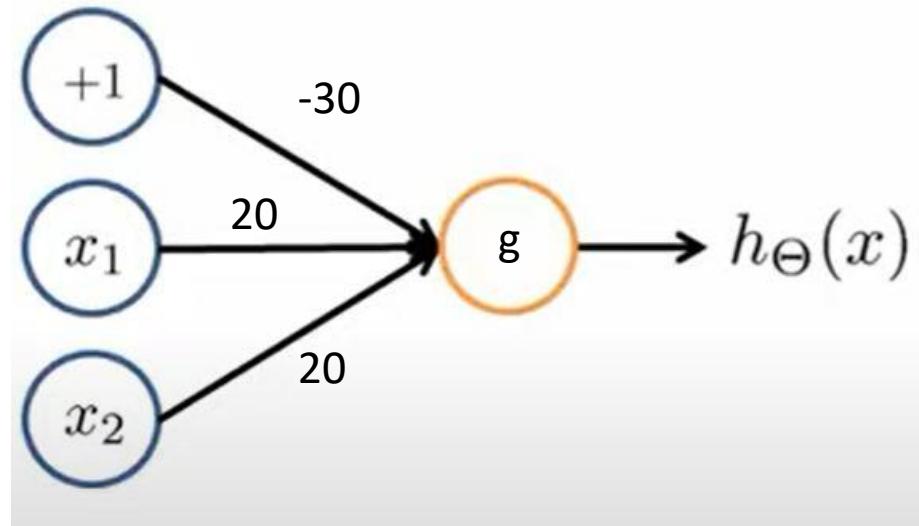
AND

Reza(x_1)	Mehrab(x_2)	Gym
0	0	$g((-15 * 1) + (25 * 0) + (10 * 0)) = g(-15) = 0$
1	0	$g((-15 * 1) + (25 * 1) + (10 * 0)) = g(10) = 1$
0	1	$g((-15 * 1) + (25 * 0) + (10 * 1)) = g(-5) = 0$
1	1	$g((-15 * 1) + (25 * 1) + (10 * 1)) = g(20) = 1$



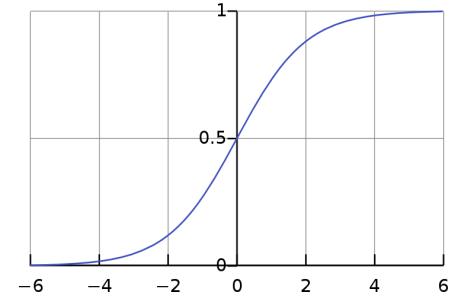
Natural Language Processing

- › $x_1, x_2 \in \{0, 1\}$
- › $y = x_1 \text{ AND } x_2$



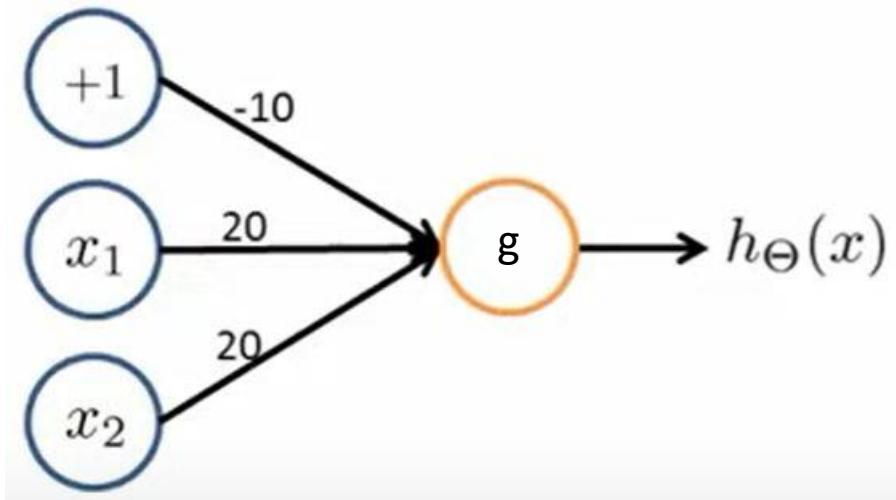
AND

		Gym	
		Reza(x1)	Mehrab(x2)
		0	0
0	0		$g((-30 * 1) + (20 * 0) + (20 * 0)) = g(-30) = 0$
1	0		$g((-30 * 1) + (20 * 1) + (20 * 0)) = g(10) = 0$
0	1		$g((-30 * 1) + (20 * 0) + (20 * 1)) = g(-10) = 0$
1	1		$g((-30 * 1) + (20 * 1) + (20 * 1)) = g(10) = 1$



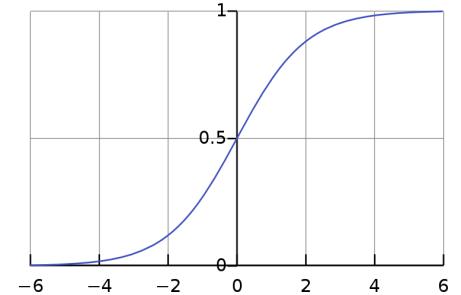
Natural Language Processing

- › $x_1, x_2 \in \{0, 1\}$
- › $y = x_1 \text{ OR } x_2$

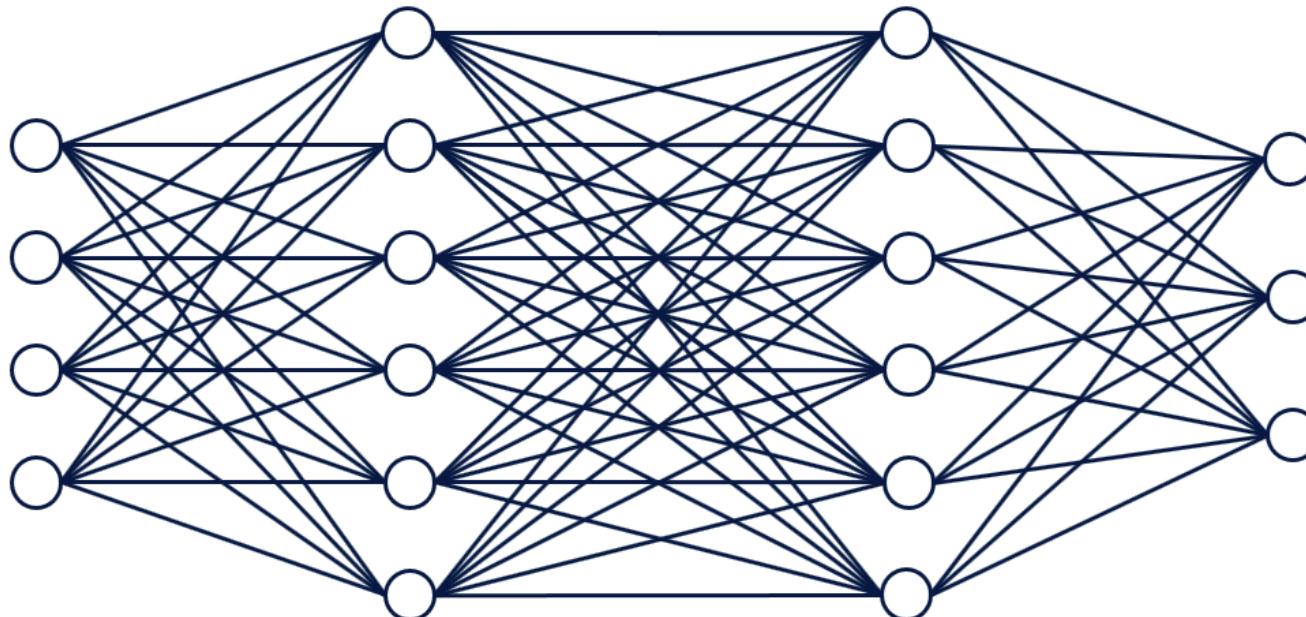


OR

		Gym	
		Reza(x1)	Mehrab(x2)
		0	0
0	0	0	$g((-10 * 1) + (20 * 0) + (20 * 0)) = g(-10) = 0$
1	0	0	$g((-10 * 1) + (20 * 1) + (20 * 0)) = g(10) = 1$
0	1	1	$g((-10 * 1) + (20 * 0) + (20 * 1)) = g(10) = 1$
1	1	1	$g((-10 * 1) + (20 * 1) + (20 * 1)) = g(30) = 1$

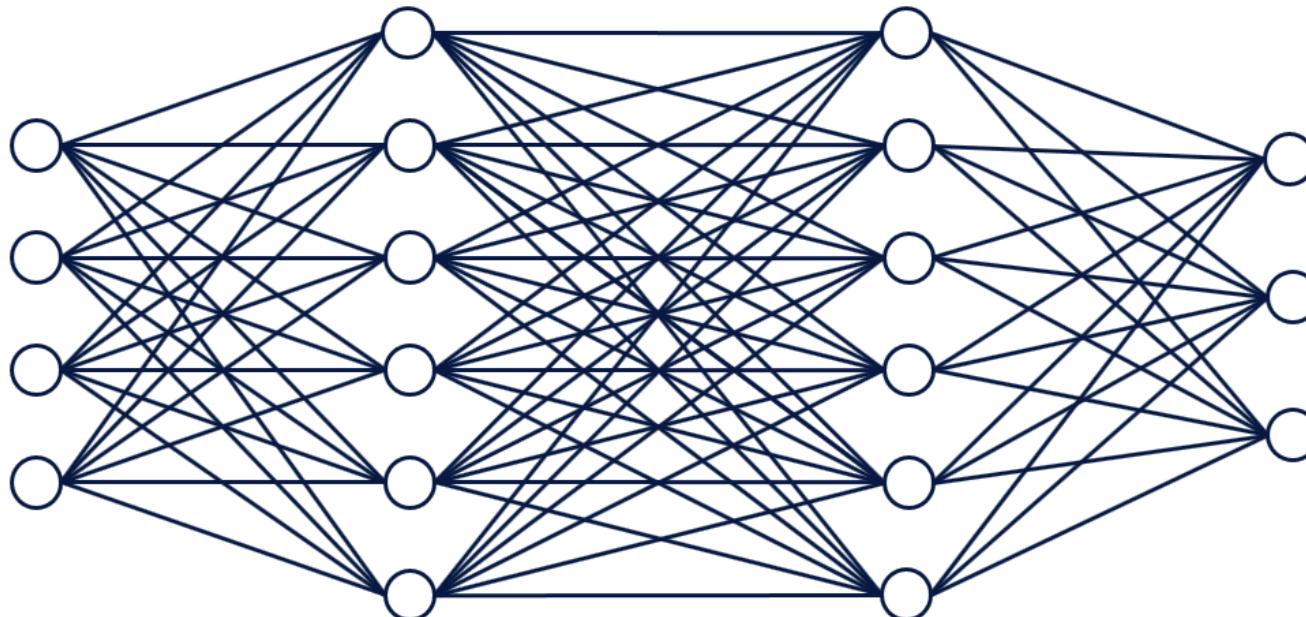


Introduction to Deep Learning



Let's talk about Natural Language Processing!

lets
talk
about
nlp



Text representation

- The most important thing is to represent words, correctly!
- Machines only understand numerical values!
- For example: How can we represent the word **cat**?



Text representation

$$\begin{array}{c} \text{c} \quad \text{a} \quad \text{t} \\ \downarrow \quad \downarrow \quad \downarrow \\ \text{cat} \longrightarrow 3 + 1 + 20 \longrightarrow = 24 \end{array}$$



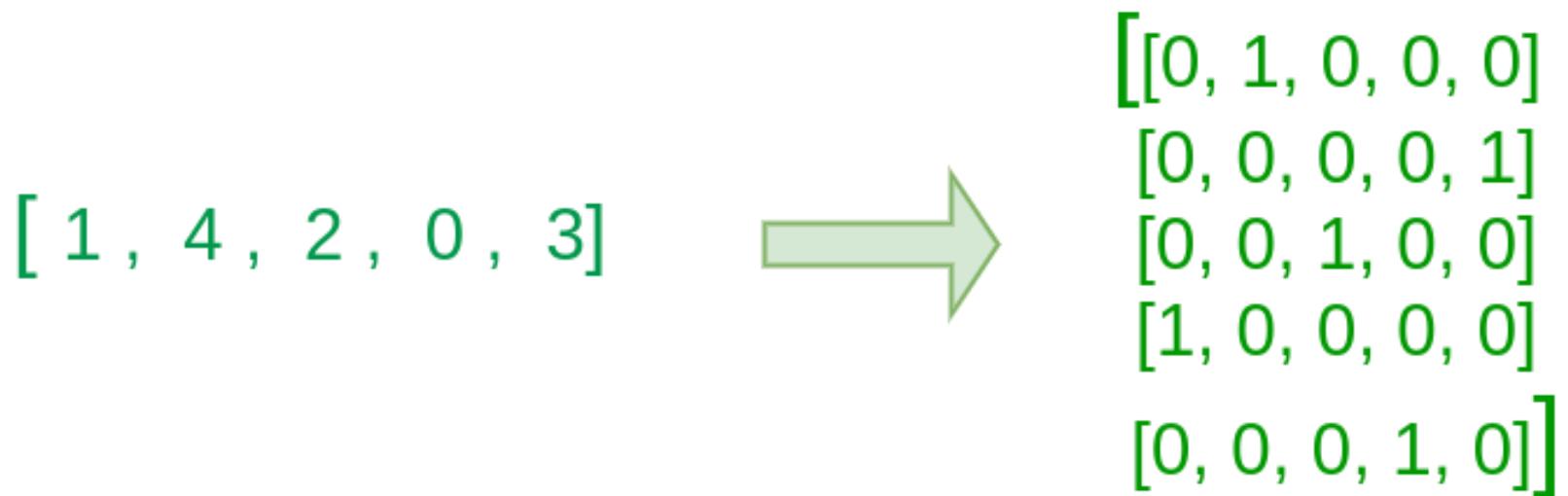
Text representation

$$\begin{array}{rcl} & \begin{matrix} c & a & t \end{matrix} \\ \text{cat} \longrightarrow & 3 + 1 + 20 & \longrightarrow = 24 \end{array}$$

$$\begin{array}{rcl} & \begin{matrix} a & c & t \end{matrix} \\ \text{act} \longrightarrow & 1 + 3 + 20 & \longrightarrow = 24 \end{array}$$



One-hot Encoding

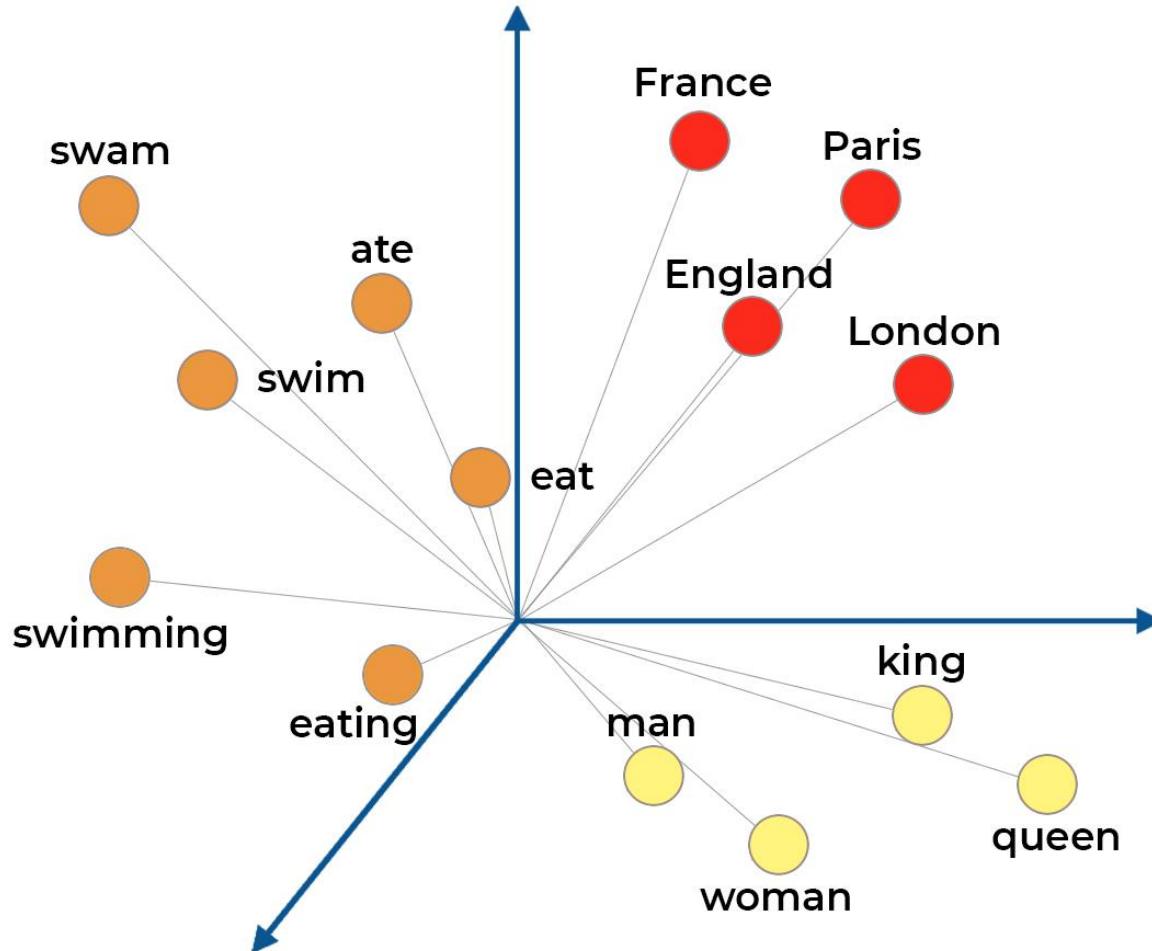


Normal array

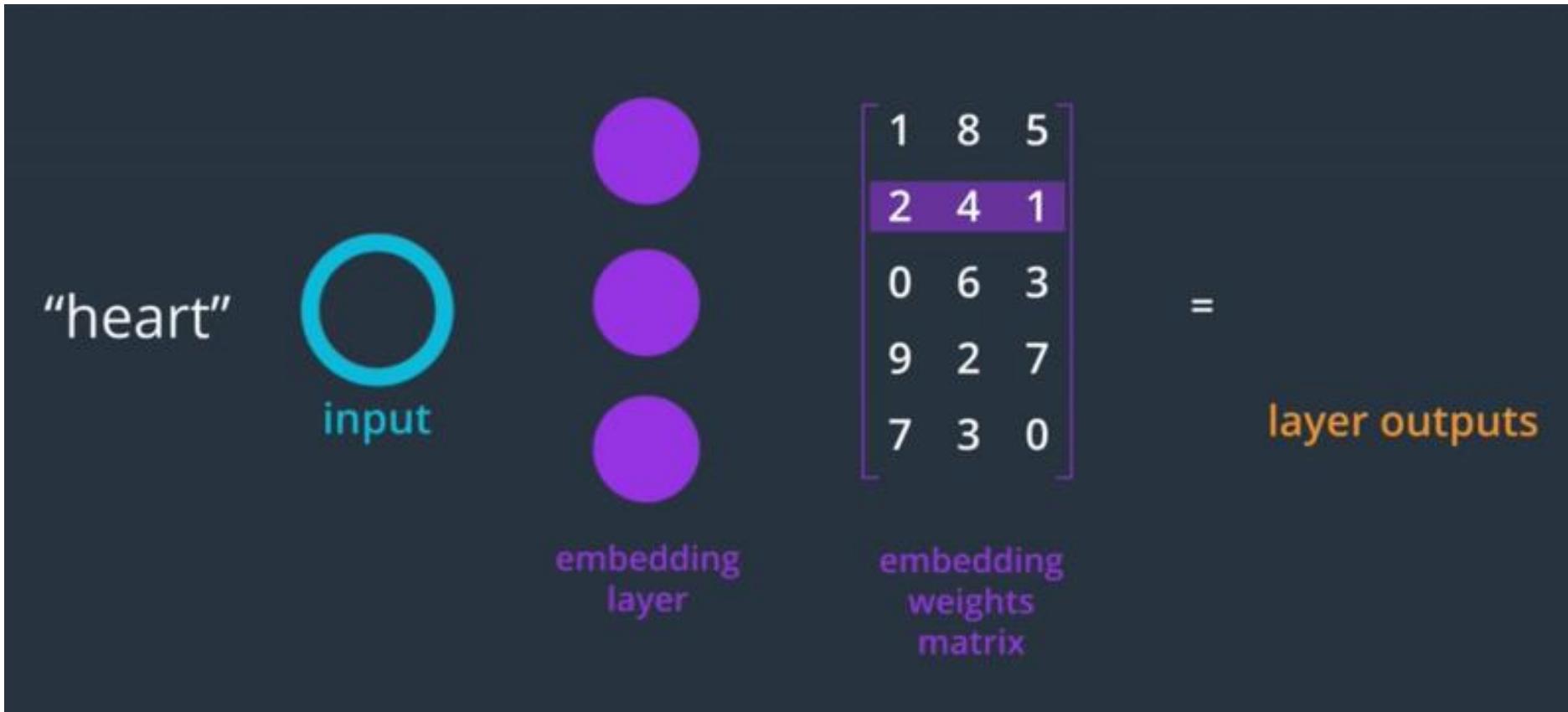
One hot encoding



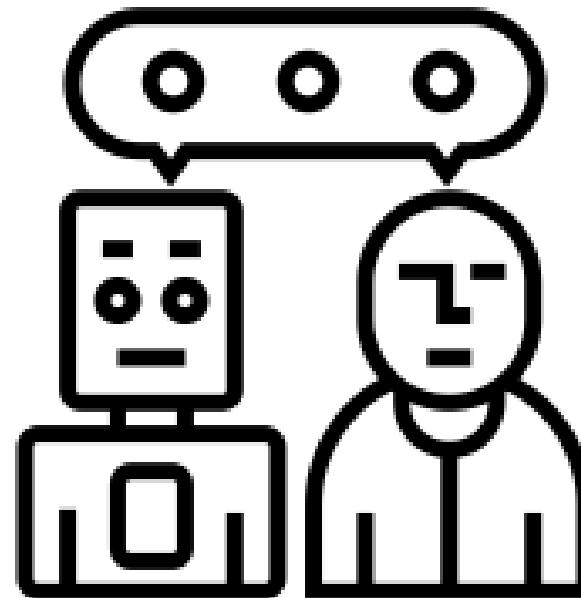
Word Embedding



Word Embedding



Introduction to Natural Language Processing (NLP)



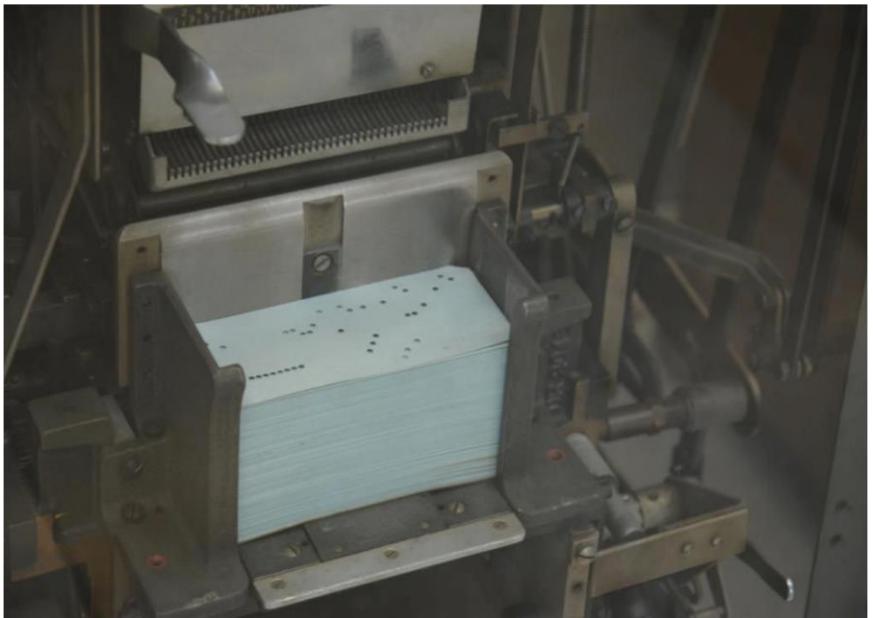
Different uses of Language

In our daily-life, we use language to...

- write something.
- Chat.
- ask questions and answer.
- Describe something.
- ...



Communication with Machines



```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      BS9U.DEVT3.CLIBPAU(TIMMIES) - 01.31          Columns 00001 00002 00003 00004 00005 00006 00007 00008 00009 00010 00011 00012 00013 00014 00015 00016 00017 00018 00019 00020 00021 00022 00023 00024 00025 00026 00027 00028 00029 00030 00031 00032 00033 00034
Command ===> ****
***** ***** Top of Data *****
000001 /* REXX EXEC *****
000002 /*
000003 /* TIMMIES FACTOR - COMPOUND INTEREST CALCULATOR
000004 /*
000005 /* AUTHOR: PAUL GAMBLE
000006 /* DATE: OCT 1/2007
000007 /*
000008 /*
000009 *****
000010
000011
000012 say *****
000013 say 'Welcome Coffee drinker.'
000014 say *****
000015 DO WHILE DATATYPE(CoffeeAmt) \= 'NUM'
000016   say ""
000017   say "What is the price of your coffee?","
000018   "(e.g. 1.58 = $1.58)"
000019   parse pull CoffeeAmt
000020 END
000021
000022 DO WHILE DATATYPE(CoffeeWk) \= 'NUM'
000023   say ""
000024   say "How many coffees a week do you have?"
000025   parse pull CoffeeWk
000026 END
000027
000028 DO WHILE DATATYPE(Rate) \= 'NUM'
000029   say ""
000030   say "What annual interest rate would you like to see on that money?","
000031   "(e.g. 8 = 8%)"
000032   parse pull Rate
000033 END
000034 Rate = Rate * 0.01 /* CHG TO DECIMAL NUMBER */
```



Conversational Agents

Conversational agents contain:

- Speech recognition
- Language analysis
- Dialogue processing
- Information retrieval
- Text to speech



works with the
Google Assistant

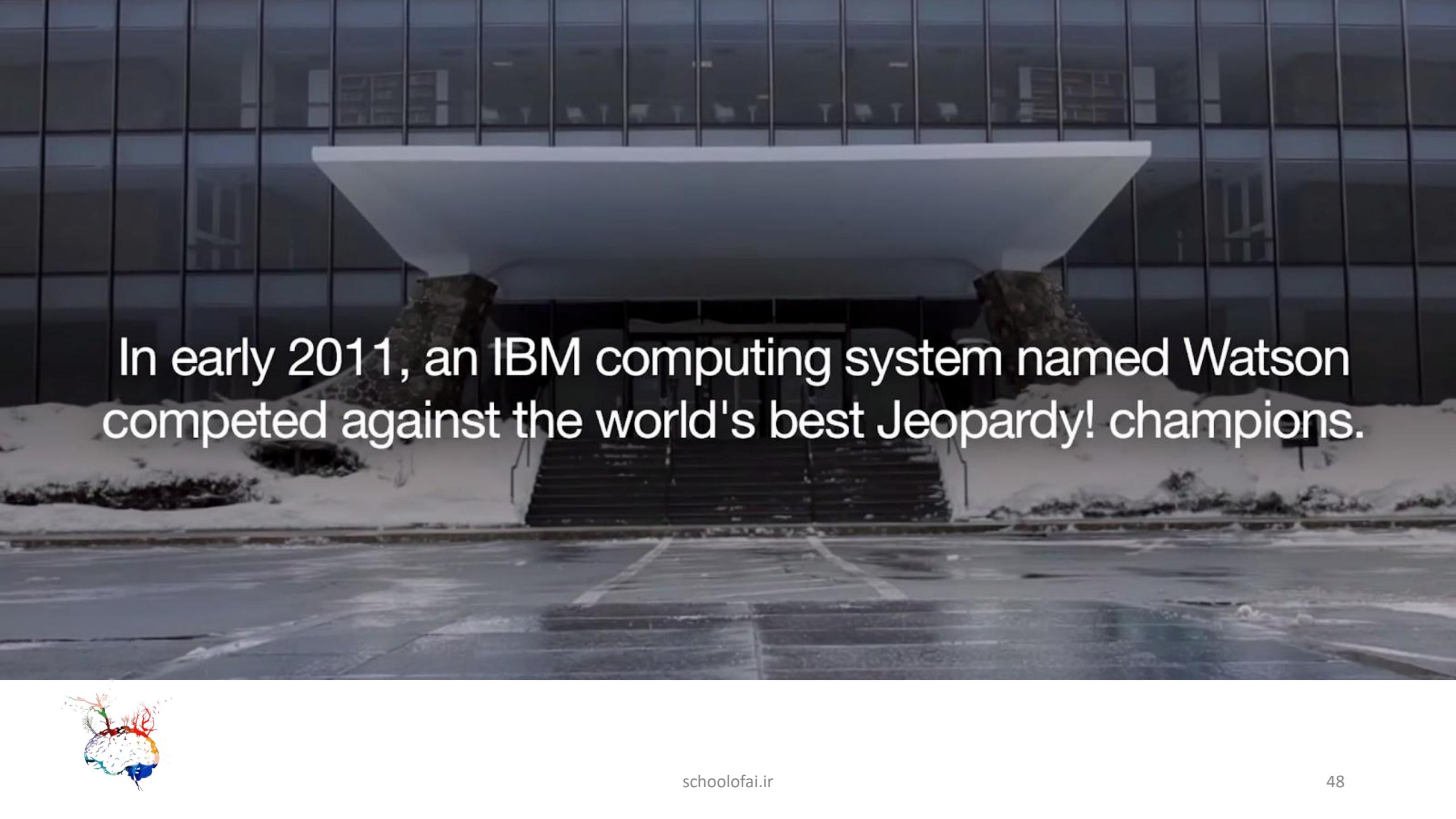


I just try to be the best me I can be

am I smart

You're as smart as Grace Hopper. She
invented the first ever computer 🚗





In early 2011, an IBM computing system named Watson competed against the world's best Jeopardy! champions.



Question Answering



- | What does “divergent” mean?
- | What year was Abraham Lincoln born?
- | How many states were in the United States that year?
- | How much Chinese silk was exported to England in the end of the 18th century?
- | What do scientists think about the ethics of human cloning?

Textual Question Answering (Reading Comprehension)

The first recorded travels by Europeans to China and back date from this time. The most famous traveler of the period was the Venetian Marco Polo, whose account of his trip to "Cambaluc," the capital of the Great Khan, and of life there astounded the people of Europe. The account of his travels, *Il milione* (or, *The Million*, known in English as the *Travels of Marco Polo*), appeared about the year 1299. Some argue over the accuracy of Marco Polo's accounts due to the lack of mentioning the Great Wall of China, tea houses, which would have been a prominent sight since Europeans had yet to adopt a tea culture, as well the practice of foot binding by the women in capital of the Great Khan. Some suggest that Marco Polo acquired much of his knowledge **through contact with Persian traders** since many of the places he named were in Persian.

How did some suspect that Polo learned about China instead of by actually visiting it?

Answer: through contact with Persian traders



(Rajpurkar et al, 2016): SQuAD: 100,000+ Questions for Machine Comprehension of Text

Textual Question Answering

James the Turtle was always getting in trouble. Sometimes he'd reach into the freezer and empty out all the food. Other times he'd sled on the deck and get a splinter. His aunt Jane tried as hard as she could to keep him out of trouble, but he was sneaky and got into lots of trouble behind her back.

One day, James thought he would go into town and see what kind of trouble he could get into. He went to the grocery store and pulled all the pudding off the shelves and ate two jars. Then he walked to the fast food restaurant and ordered 15 bags of fries. He didn't pay, and instead headed home.

His aunt was waiting for him in his room. She told James that she loved him, but he would have to start acting like a well-behaved turtle.

After about a month, and after getting into lots of trouble, James finally made up his mind to be a better turtle.

1) What is the name of the trouble making turtle?

- A) Fries
- B) Pudding
- C) James
- D) Jane

2) What did James pull off of the shelves in the grocery store?

- A) pudding
- B) fries
- C) food
- D) splinters



Conversational Question Answering

The Virginia governor's race, billed as the marquee battle of an otherwise anticlimactic 2013 election cycle, is shaping up to be a foregone conclusion. Democrat Terry McAuliffe, the longtime political fixer and moneymen, hasn't trailed in a poll since May. Barring a political miracle, Republican Ken Cuccinelli will be delivering a concession speech on Tuesday evening in Richmond. In recent ...

Q: What are the candidates **running** for?

A: Governor

Q: **Where?**

A: Virginia

Q: Who is the democratic candidate?

A: Terry McAuliffe

Q: Who is **his** opponent?

A: Ken Cuccinelli

Q: What party does **he** belong to?

A: Republican

Q: Which of **them** is winning?



(Reddy et al, 2019): CoQA: A Conversational Question Answering Challenge

Long-form Question Answering



Question | How do jellyfish function without a brain and a nervous system?



Abstractive

Jellyfish don't have brains. Jellyfish have a nervous system. They know how to swim, they don't even know what to do with their bodies. They have a "nervous system", which is basically a bunch of nerve cells that connect to the body. The nervous system is made up of neurons, neurons, nerves, etc. Each neuron doesn't have a specific set of "neurons", it just has a different set of nerves. It has a set of sensory neurons, which are all connected to each other. It just knows that it does react to the stimulus, and it knows that the stimulus is there. They have a bunch of nervous systems that act like a filter to get information back.



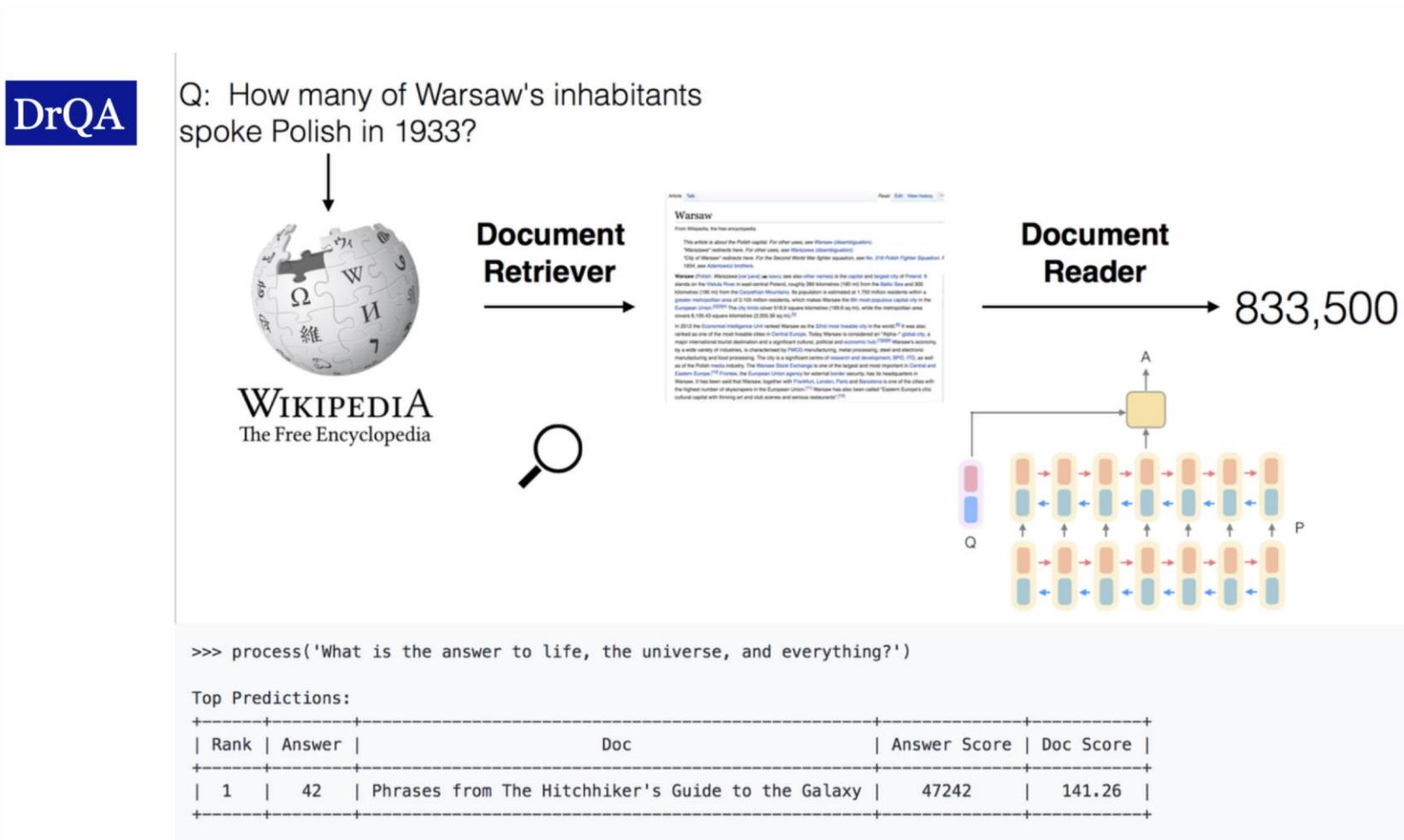
Extractive

But none of these hypotheses make much sense for a jellyfish because they don't have brains at all. They just have a nerve net — a loose ring of neurons that runs around the rim of their pulsating bells. They have an unusual nervous system, 451 because jellyfish are not bilaterally symmetrical — that is, they don't have a left side and a right side. Jellyfish don't have brains, but their nervous systems detect smells, light and other stimuli, and they coordinate their physical responses.



(Fan et al, 2019): ELI5: Long Form Question Answering

Open-domain Question Answering

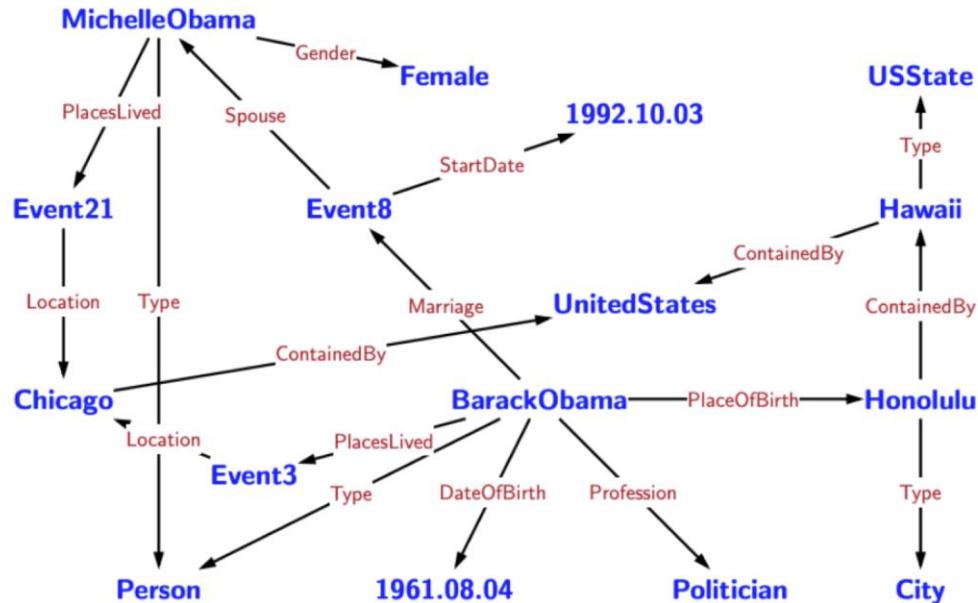


(Chen et al, 2017): Reading Wikipedia to Answer Open-Domain Questions

Knowledge Base Question Answering



100M entities (nodes) 1B assertions (edges)



Which states' capitals are also their largest cities by area?

$\mu x.\text{Type.USState} \sqcap \text{Capital.argmax}(\text{Type.City} \sqcap \text{ContainedBy}.x, \text{Area})$

execute

Arizona, Hawaii, Idaho, Indiana, Iowa, Oklahoma, Utah

(Berant et al, 2013): Semantic Parsing on Freebase from Question-Answer Pairs



Table-based Question Answering

Year	City	Country	Nations
1896	Athens	Greece	14
1900	Paris	France	24
1904	St. Louis	USA	12
...
2004	Athens	Greece	201
2008	Beijing	China	204
2012	London	UK	204

x = Greece held its last Summer Olympics in which year?

y = 2004

(Pasupat and Liang, 2015): Compositional Semantic Parsing on Semi-Structured Tables.



Visual Question Answering



What color are her eyes?
What is the mustache made of?



How many slices of pizza are there?
Is this a vegetarian pizza?

(Antol et al, 2015): Visual Question Answering



Question Answering Datasets

| Reading Comprehension

- CNN/Daily Mail, CoQA, HotpotQA, QuAC, RACE, SQuAD, SWAG, Receipt QA, NarrativeQA, DROP, Story Cloze Test
.....

| Open-domain question answering

- DuReader, Quasar, SearchQA, ...

| Knowledge base question answering

- Check out more datasets: http://nlpprogress.com/english/question_answering.html



CNN Article

Document The BBC producer allegedly struck by Jeremy Clarkson will not press charges against the “Top Gear” host, his lawyer said Friday. Clarkson, who hosted one of the most-watched television shows in the world, was dropped by the BBC Wednesday after an internal investigation by the British broadcaster found he had subjected producer Oisin Tymon “to an unprovoked physical and verbal attack.” . . .

Query Producer X will not press charges against Jeremy Clarkson, his lawyer says.

Answer Oisin Tymon



SQuAD Benchmark

Rank	Model	EM	F1
	Human Performance <i>Stanford University</i> (Rajpurkar & Jia et al. '18)	86.831	89.452
1	SA-Net on Albert (ensemble) Apr 06, 2020	90.724	93.011
2	SA-Net-V2 (ensemble) May 05, 2020	90.679	92.948
2	Retro-Reader (ensemble) Apr 05, 2020	90.578	92.978
3	ATRLP+PV (ensemble) Jul 31, 2020	90.442	92.877

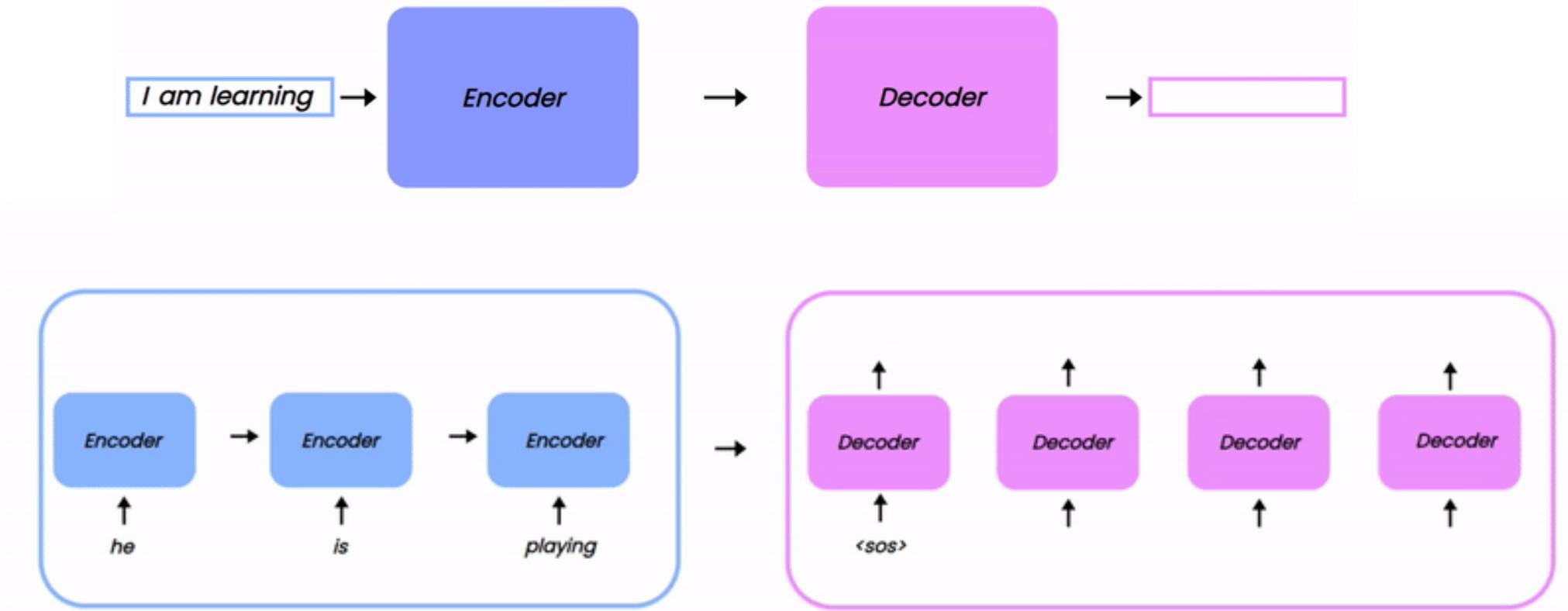


Machine Translation

The image displays two versions of Google Translate side-by-side. On the left is the mobile version, featuring a blue header with the Google Translate logo and a "Sign in" button. Below the header, it says "PERSIAN - DETECTED" and "ENGLISH". A text input field contains the Persian phrase "روش پژوهش و ارائه" (Research and presentation methods). There are icons for microphone, speaker, and edit. Below the input field, a blue banner reads "Research and presentation methods" with a star icon. On the right is the desktop version, with a white header and a "Google Translate" logo. It has tabs for "Text" and "Documents". Below the tabs, it says "DETECT LANGUAGE" and lists "ENGLISH", "SPANISH", and "FRENCH". A search bar says "Search languages" with a "Detect language" button. To the right, there are four columns of language names. The first column under "DETECT LANGUAGE" is "Detect language". The other columns are "ENGLISH", "SPANISH", and "ARABIC". The desktop version also features a sidebar with a brain icon and a footer with the URL "schoolofai.ir".

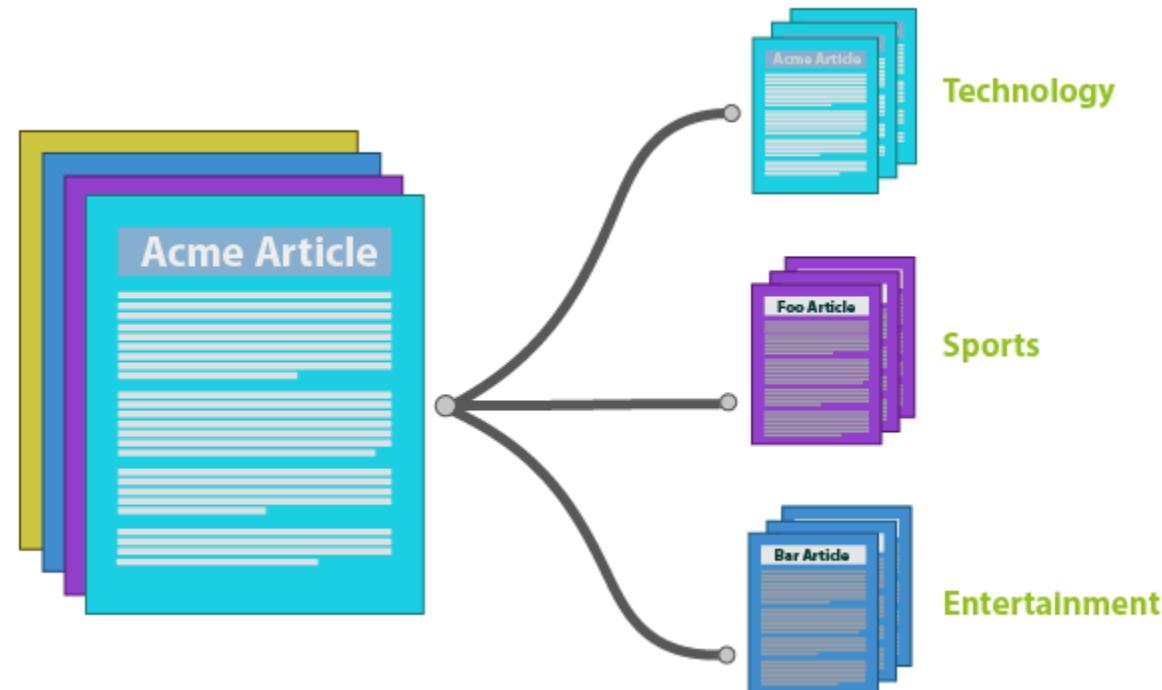
DETECT LANGUAGE	ENGLISH	SPANISH	FRENCH	ENGLISH	SPANISH	ARABIC
Detect language	Czech	Hebrew	Latin	Portuguese	Tajik	
Afrikaans	Danish	Hindi	Latvian	Punjabi	Tamil	
Albanian	Dutch	Hmong	Lithuanian	Romanian	Telugu	
Amharic	English	Hungarian	Luxembourgish	Russian	Thai	
Arabic	Esperanto	Icelandic	Macedonian	Samoan	Turkish	
Armenian	Estonian	Igbo	Malagasy	Scots Gaelic	Ukrainian	
Azerbaijani	Filipino	Indonesian	Malay	Serbian	Urdu	
Basque	Finnish	Irish	Malayalam	Sesotho	Uzbek	
Belarusian	French	Italian	Maltese	Shona	Vietnamese	
Bengali	Frisian	Japanese	Maori	Sindhi	Welsh	
Bosnian	Galician	Javanese	Marathi	Sinhala	Xhosa	
Bulgarian	Georgian	Kannada	Mongolian	Slovak	Yiddish	
Catalan	German	Kazakh	Myanmar (Burmese)	Slovenian	Yoruba	
Cebuano	Greek	Khmer	Nepali	Somali	Zulu	
Chichewa	Gujarati	Korean	Norwegian	Spanish		
Chinese	Haitian Creole	Kurdish (Kurmanji)	Pashto	Sundanese		
Corsican	Hausa	Kyrgyz	Persian	Swahili		
Croatian	Hawaiian	Lao	Polish	Swedish		

Machine Translation – Sequence2sequence (Seq2seq)



Classification

- | Text classification is the process of categorizing text into organized groups.



Movie Ratings

positive

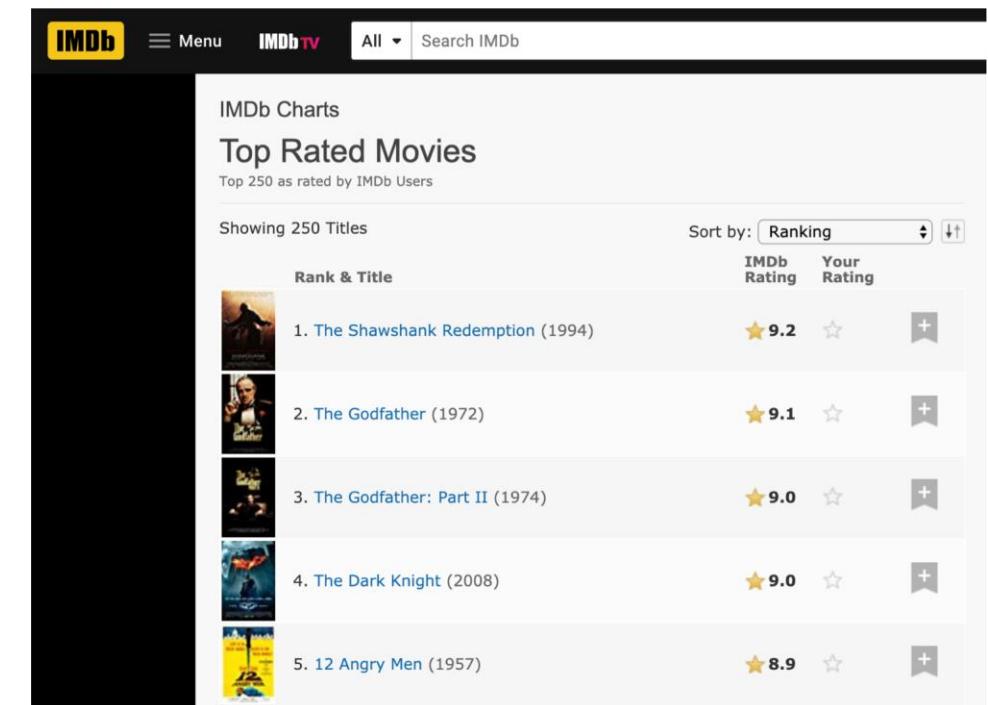
“... is a film which still causes real, not figurative, chills to run along my spine, and it is certainly the bravest and most ambitious fruit of Coppola's genius”

Roger Ebert, Apocalypse Now

- “I hated this movie. Hated hated hated hated hated this movie. Hated it. Hated every simpering stupid vacant audience-insulting moment of it. Hated the sensibility that thought anyone would like it.”

Roger Ebert, North

negative



Female or Male Author?

1. By 1925 present-day Vietnam was divided into three parts under French colonial rule. The southern region embracing Saigon and the Mekong delta was the colony of Cochin-China; the central area with its imperial capital at Hue was the protectorate of Annam...
2. Clara never failed to be astonished by the extraordinary felicity of her own name. She found it hard to trust herself to the mercy of fate, which had managed over the years to convert her greatest shame into one of her greatest assets...

S. Argamon, M. Koppel, J. Fine, A. R. Shimon, 2003. "Gender, Genre, and Writing Style in Formal Written Texts," *Text*, volume 23, number 3, pp. 321–346



Is This Spam?

Subject: Important notice!

From: Stanford University <newsforum@stanford.edu>

Date: October 28, 2011 12:34:16 PM PDT

To: undisclosed-recipients:;

Greats News!

You can now access the latest news by using the link below to login to Stanford University News Forum.

<http://www.123contactform.com/contact-form-StanfordNew1-236335.html>

Click on the above link to login for more information about this new exciting forum. You can also copy the above link to your browser bar and login for more information about the new services.

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Natural Language Processing

Applications

- | Machine Translation
- | Information Retrieval
- | Question Answering
- | Dialogue Systems
- | Information Extraction
- | Summarization
- | Sentiment Analysis
- | ...

Core Technologies

- | Language modeling
- | Part-of-speech tagging
- | Syntactic parsing
- | Named-entity recognition
- | Word sense disambiguation
- | Semantic role labeling
- | ...

NLP lies at the intersection of Linguistics, Computer Science, and AI.



Ambiguity

- | Ambiguity at multiple levels
 - | Word senses: **bank** (finance or river ?)
 - | Part of speech: **chair** (noun or verb ?)
 - | Syntactic structure: **I can see a man with a telescope**



Ambiguity



A ship-shipping ship,
shipping shipping-ships



Fields with Connections to NLP

- | Machine learning
- | Linguistics (including psycho-, socio-, descriptive, and theoretical)
- | Cognitive science
- | Information theory
- | Logic
- | Data science
- | Political science
- | Psychology
- | Economics
- | Education



Today's Applications

- | Conversational agents
- | Information extraction and question answering
- | Machine translation
- | Opinion and sentiment analysis
- | Social media analysis
- | Visual understanding
- | Essay evaluation
- | Mining legal, medical, or scholarly literature



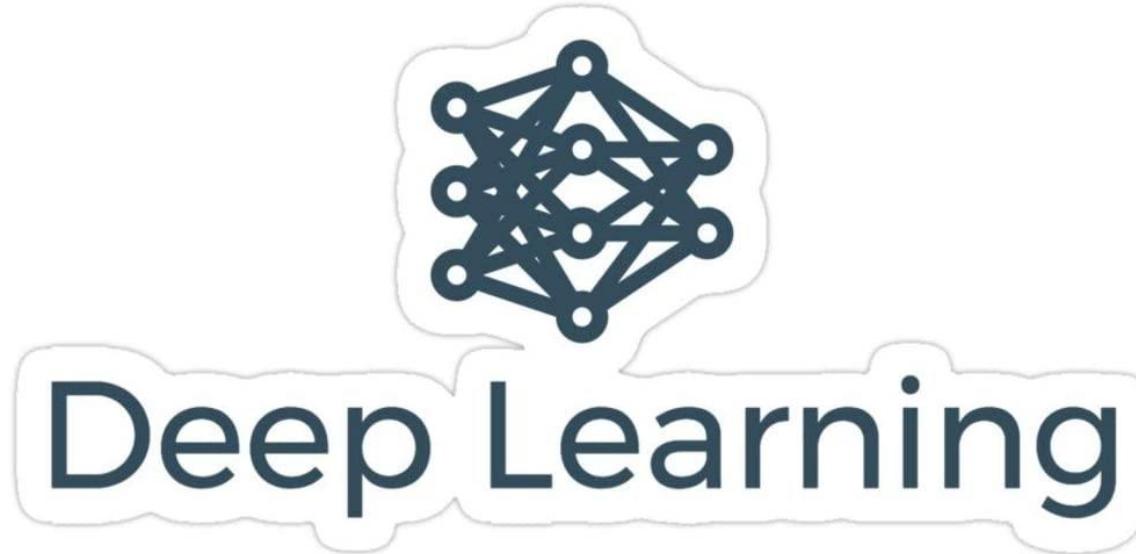
Factors Changing NLP Landscape

1. Increases in computing power
2. The rise of the web, then the social web
3. Advances in machine learning
4. Advances in understanding of language in social context

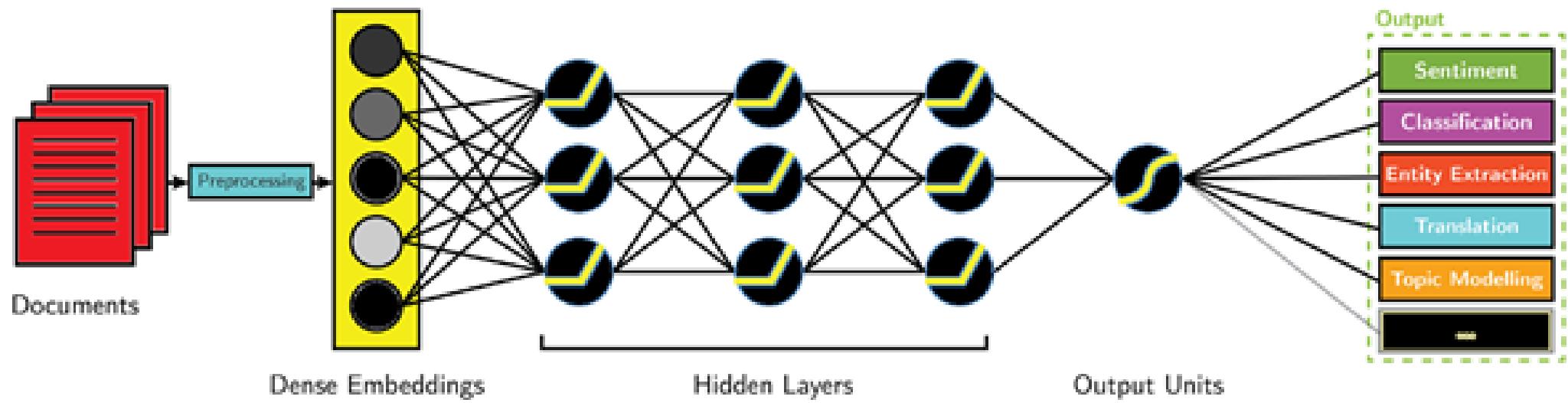


Deep Natural Language Processing

However, none of these were possible without...

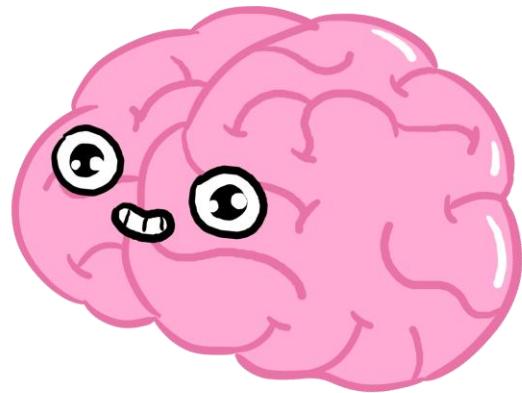


Deep Learning + NLP = Deep NLP



Part 2

Text Classification



Stay tuned!

Join our Telegram channel

[@schoolofirasht](https://t.me/schoolofirasht)



Visit our website

schoolofai.ir





See you soon! (very soon)

