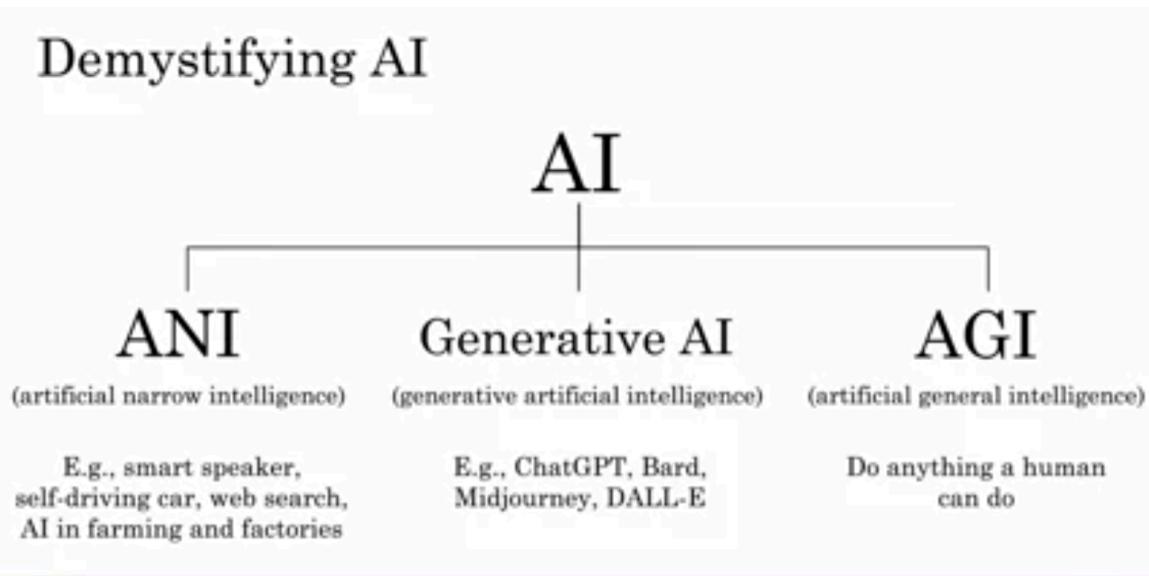


Maths for AI

<https://www.coursera.org/specializations/mathematics-for-machine-learning-and-data-science#courses>

Below course from AI for everyone by Andrew NG



Supervise Learning

Input (A)	Output (B)	Application
email	spam? (0/1)	spam filtering
audio	text transcripts	speech recognition
English	Chinese	machine translation
ad, user info	click? (0/1)	online advertising
image, radar info	position of other cars	Self-driving car
image of phone	defect? (0/1)	visual inspection

How large language models (LLMs) work

LLMs are built by using supervised learning (A→B) to repeatedly predict the next word.

When we train a very large AI system on a lot of data (hundreds of billions of words), we get a Large Language Model like ChatGPT.

What is Data / data set

Example of a table of data (dataset)

size of house (square feet)	# of bedrooms	price (1000\$)
523	1	115
645	1	150
708	2	210
1034	3	280
2290	4	355
2545	4	440

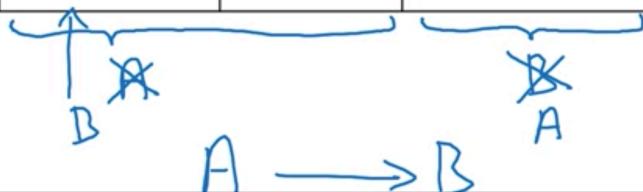


image	label
	cat
	not cat
	cat
	not cat

So you might collect a data set where the input A is set of different images and

Acquiring data

- Manual labeling



- From observing behaviors

user ID	time	price (\$)	purchased
4783	Jan 21 08:15.20	7.95	yes
3893	March 3 11:30.15	10.00	yes
8384	June 11 14:15.05	9.50	no
0931	Aug 2 20:30.55	12.90	yes

machine	temperature (°C)	pressure (psi)	machine fault
17987	60	7.65	N
34672	100	25.50	N
08542	140	75.50	Y
98536	165	125.00	Y

- Download from websites / partnerships

images, audio, text
unstructured

Generative AI(chatbot) used unstructured data.

Data in form of excel sheet called structure data.

size of house (square feet)	# of bedrooms	price (1000\$)
523	1	115
645	1	0.001
708	unknown	210
1034	3	unknown
unknown	4	355
2545	unknown	440

structured

Supervised data work very well for both structure & unstructured data.

Machine learning vs. data science

Machine learning

“Field of study that gives computers the ability to learn without being explicitly programmed.”

software

-Arthur Samuel (1959)

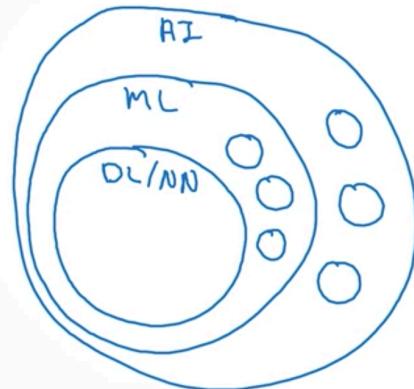
Data science

Science of extracting knowledge and insights from data.

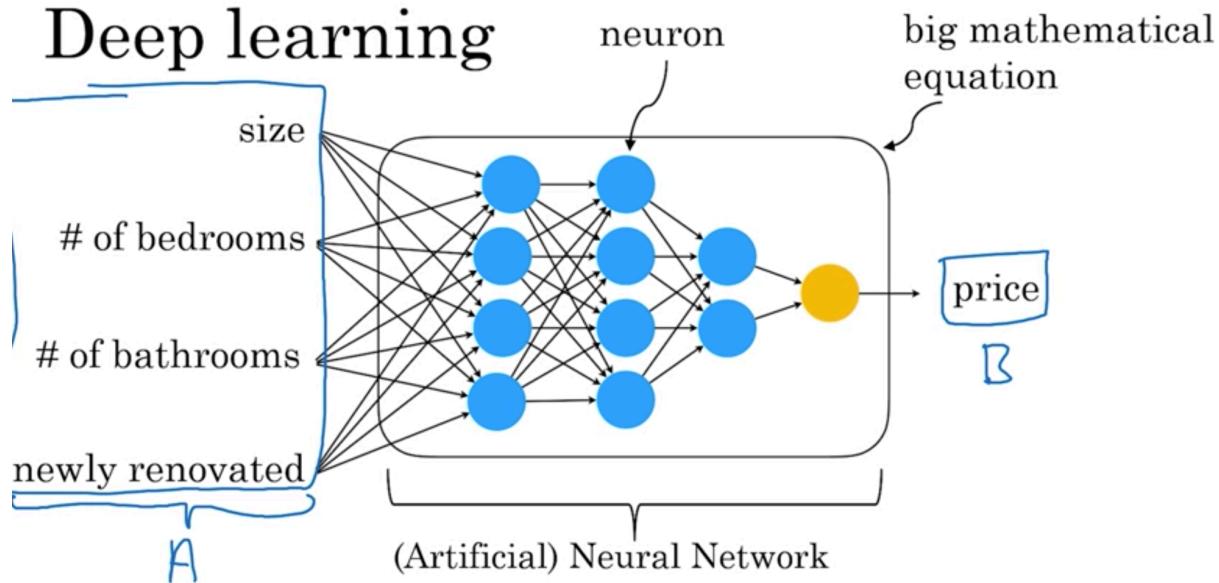
slide deck

AI has many tools

- Machine learning and data science
- Deep learning / neural network
- Other buzzwords: Generative AI, unsupervised learning, reinforcement learning, graphical models, planning, knowledge graph, ...



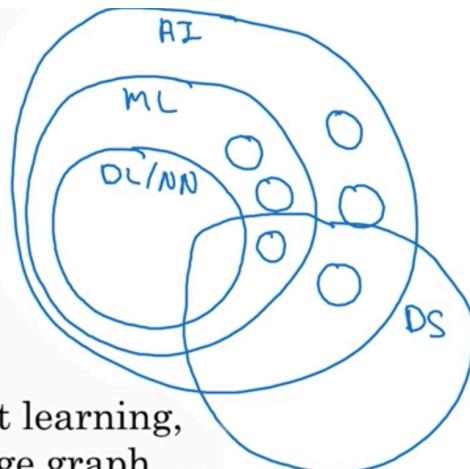
Deep learning



Deep learning is same as neural network.

AI has many tools

- Machine learning and data science
- Deep learning / neural network
- Other buzzwords: Generative AI, unsupervised learning, reinforcement learning, graphical models, planning, knowledge graph, ...



Demand prediction

