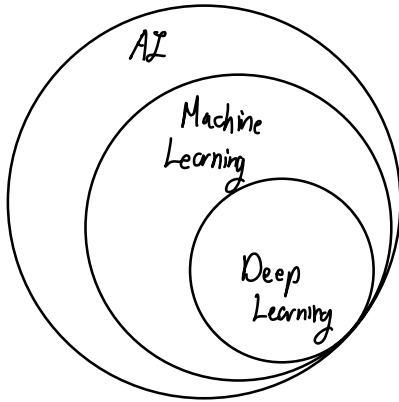


Machine Learning - turning data into numbers and ~~finding patterns~~
in those numbers ↑
code & math



Traditional Programming : Inputs (Chicken, Vegetables) + Rules (cutting veg, seasoning)

↓
Roasted Chicken

Machine Learning algorithm : ^(features) Inputs + ^(labels) designed outputs \Rightarrow Rules.
└──────────────────┘ figures out
supervised learning

1. Why ML/DL ?

- writing all the rules may be too much job.
- can you think of all the rules? (Too many, you may not know all).

* Google number 1 rule of ML Handbook:

"If you can build a simple rule-based system that does not require machine learning, do that"

2. What deep Learning is good for?

1. Problems with long lists of rules.

- when the traditional approach fails, ML/DL may help.

2. Continually changing environments

- deep learning can adapt (learn) to new scenarios.

3. Discovering insights within large collections of data.

- imagine trying to hand-craft rules for what 1000 different kinds of food look like. (Too many!)

3. What deep learning is NOT good for?

1. When you need explainability. \rightarrow reasoning millions of numbers? X.

- the patterns learned by a deep learning model are typically uninterpretable by a human.

2. When the traditional approach is a better option.

- if you can accomplish what you need with a simple rule-based system

3. When errors are unacceptable.

- since the outputs of deep learning model aren't always predictable.

4. Not enough data.

- DL models usually require a fairly large amount of data to produce great results.

4. ML vs DL.

Structured data

vs.

Unstructured data

(ML): 1. table of numbers.
(rows & columns)

2. dmlc XGBoost.

algorithm: Gradient boosted machine

ex.) • Gradient boosted models.
• Random forest
• Naive Bayes
• many more...

("shallow algorithms")

(DL): 1. Natural language.
(texts on Wikipedia)

2. Images (burger, cats)

3. Audio

Algorithm: neural network.

ex.) • Neural network,
• Fully connected neural network.
• CNN
• Recurrent neural network.
• Transformers.
• many more...

5. What are neural networks?

Read Deep Learning Chapter 2~4.