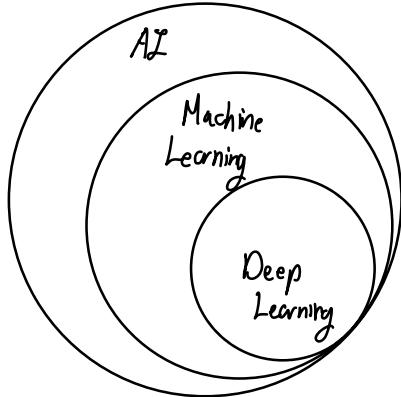


Machine Learning - turning data into numbers and finding patterns
in those numbers
code & math



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

Machine Learning algorithm : Inputs + (features) + (labels) designed outputs \Rightarrow Rules.
↓
Supervised learning figures out

2. 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 of 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. ↳ 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.

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

2. Images (burger, cats)

algorithm: Gradient boosted machine

3. Audio

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

("shallow algorithms")

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 1 ~ 4.