

EI320A(3) 深度學習使用 Python

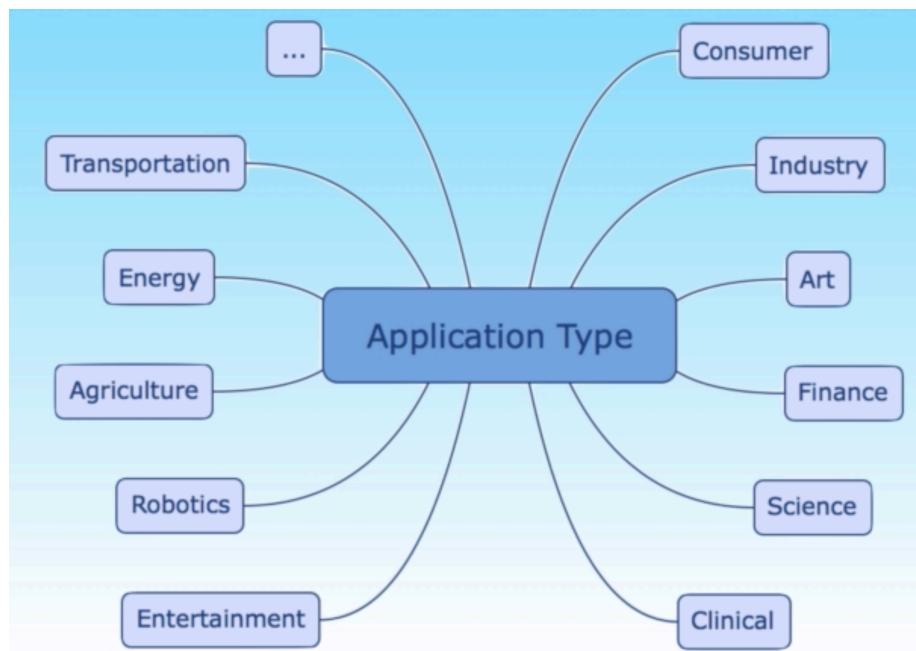
Instructors

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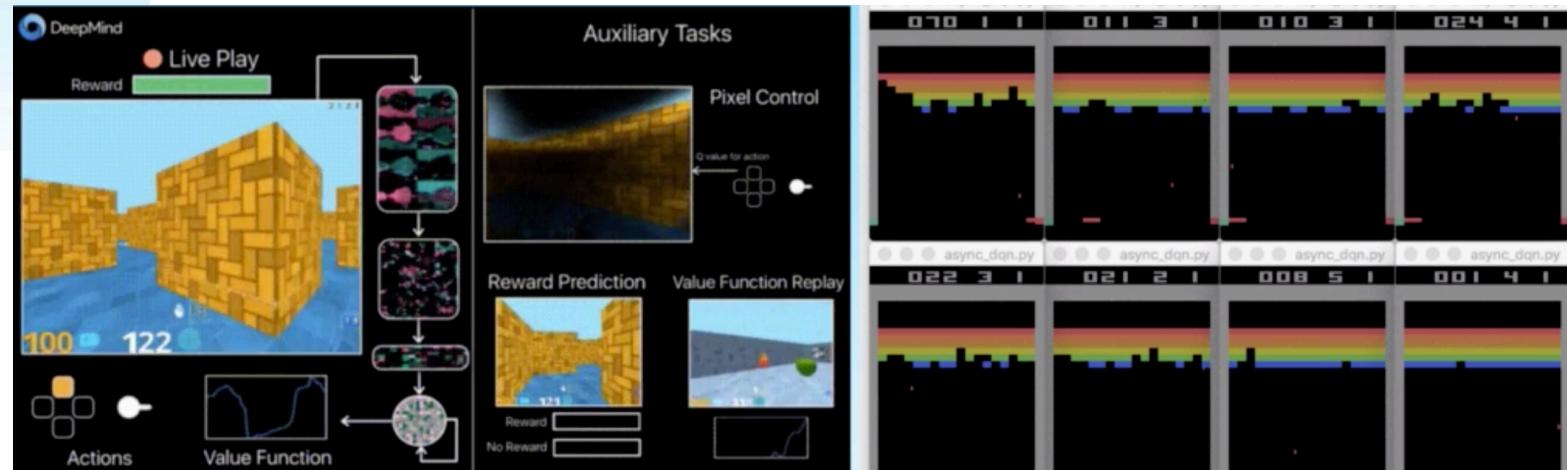
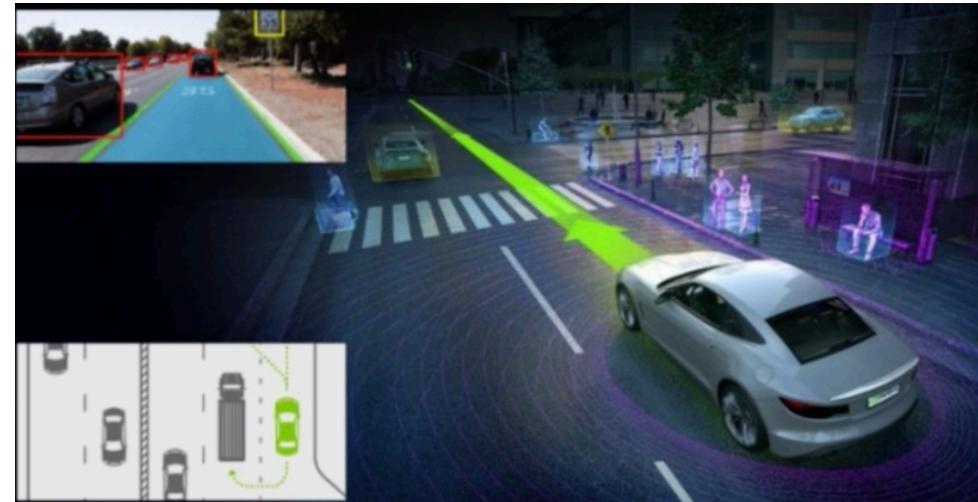
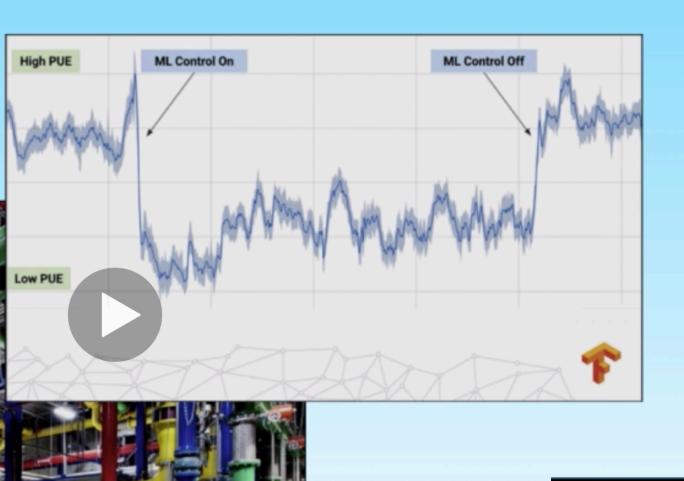
Real World Applications of ML & DL

1. Deep Learning > Machine Learning
2. Deep Learning is here to stay
3. Many Practical applications



Real World Applications of ML & DL

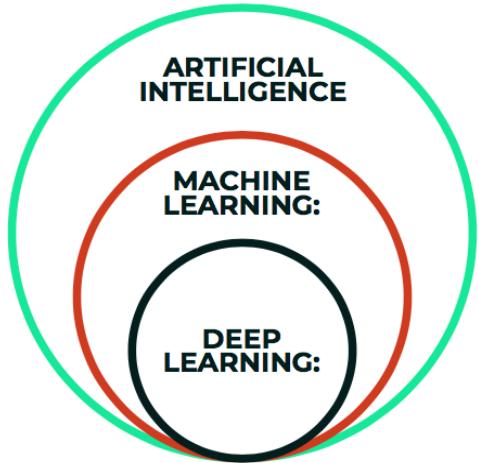
Datacenters



Real World Applications of ML & DL

- Fraud detection.
- Web search results.
- Real-time ads on web pages
- Credit scoring.
- Prediction of equipment failures.
- New pricing models.
- Network intrusion detection.
- Recommendation Engines
- Customer Segmentation
- Text Sentiment Analysis
- Customer Churn
- Pattern and image recognition.
- Email spam filtering.

AI vs. ML vs. DL



ARTIFICIAL INTELLIGENCE

Science that empowers computers to mimic human intelligence such as decision making, text processing, and visual perception. Ai is a broader field (i.e.: the big umbrella) that contains several subfield such as machine learning, robotics, and computer vision.

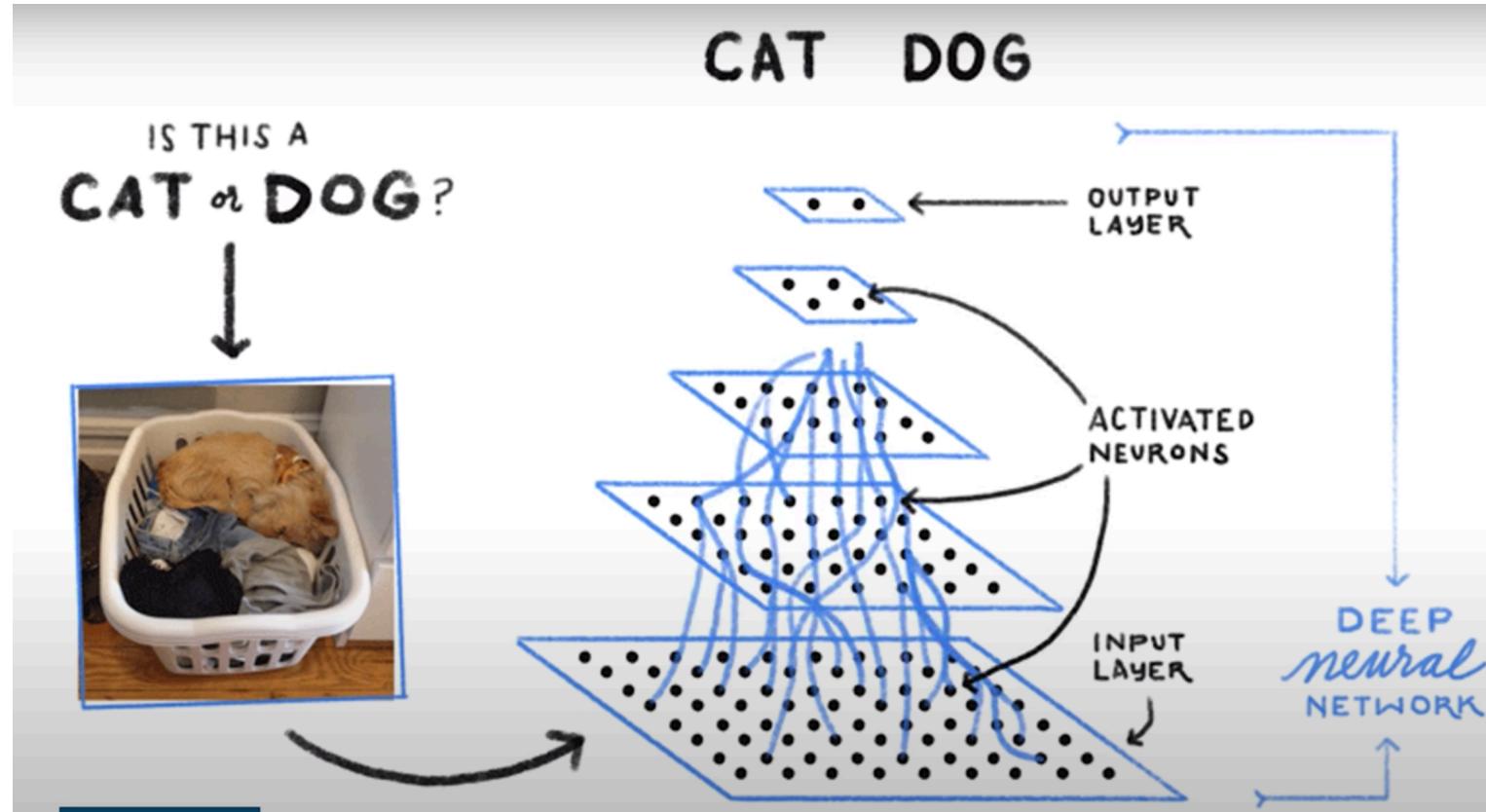
MACHINE LEARNING:

Machine Learning is a subfield of Artificial Intelligence that enables machines to improve at a given task with experience. It is important to note that all machine learning techniques are classified as Artificial Intelligence ones. However, not all Artificial Intelligence could count as Machine Learning since some basic Rule-based engines could be classified as AI but they do not learn from experience therefore they do not belong to the machine learning category.

“Machine Learning is a subset of AI technique which use statistical methods to enable machines to improve with experience”



“Deep learning is a particular kind of machine learning that is inspired by the functionality of our brain cells called neurons which led to the concept of artificial neural network”

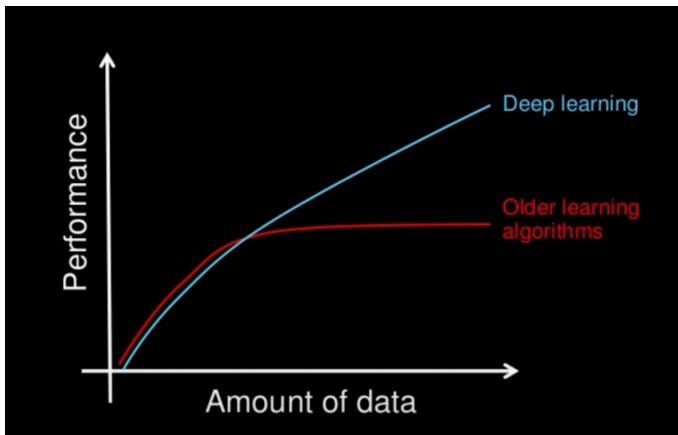


Machine Learning: Automated Analytical models

Neural Networks: A type of machine Learning architecture modeled after biological neurons.

Deep Learning: A neural network with more than one layer.

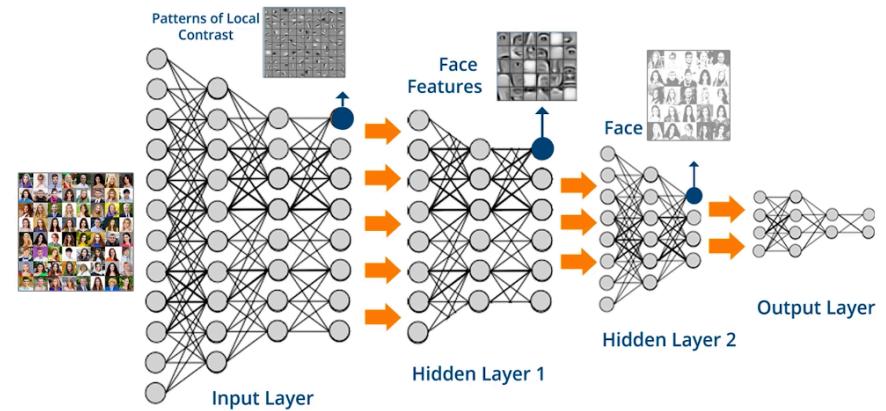
Differences between ML and DL



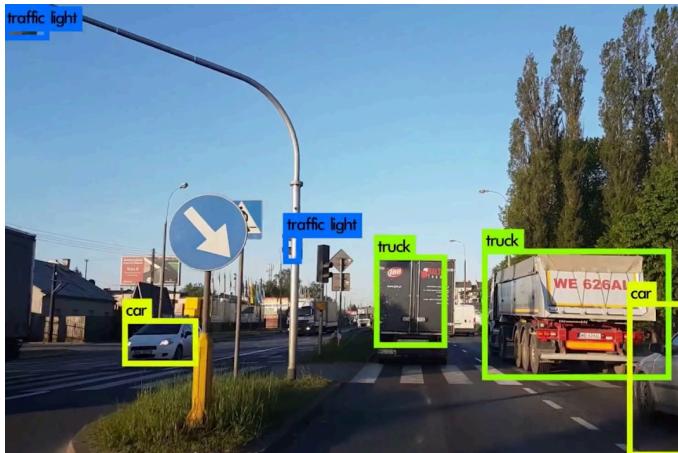
1. Data Dependency



2. HW Dependency



3. Feature Engineering



4. Problem Solving Approach



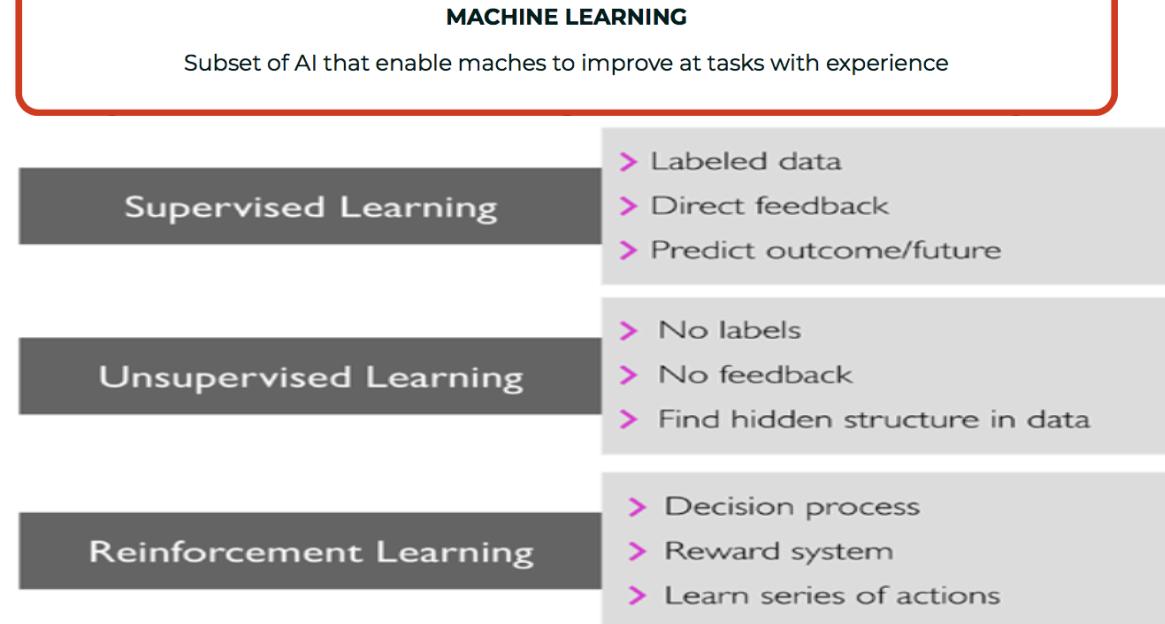
5. Execution Time



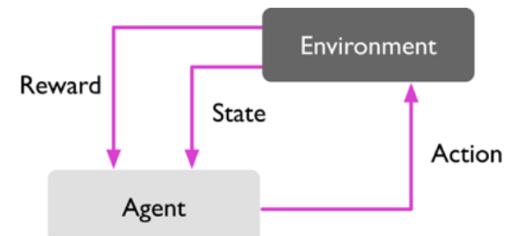
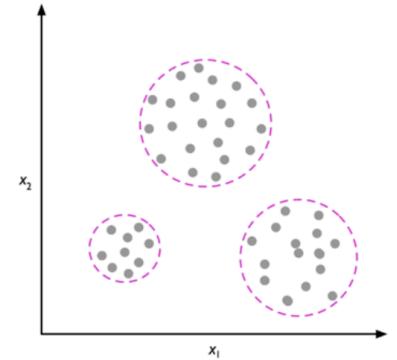
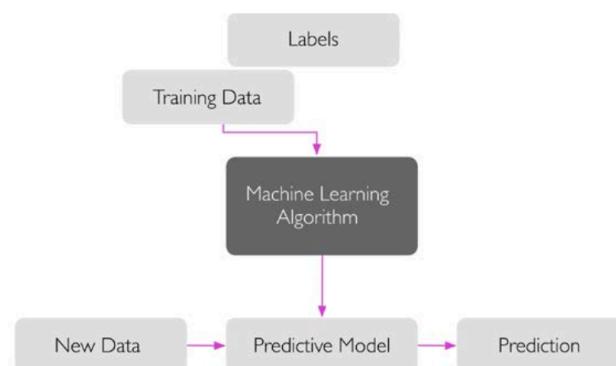
6. Interpretability

ARTIFICIAL INTELLIGENCE
Science that enables computers to mimic human intelligence.
Subfields: Machine Learning, robotics, and computer vision

The three different types of machine learning

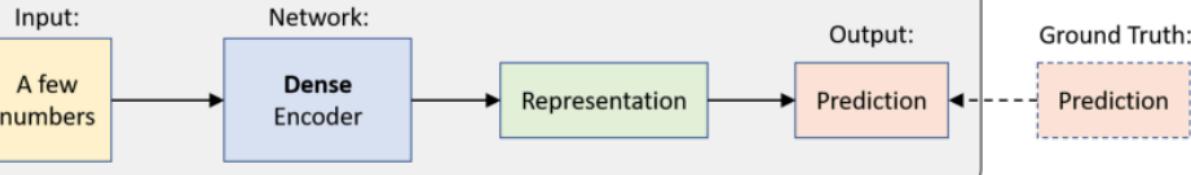


- Machine learning uses algorithms to parse data, learn from that data, and make informed decisions based on what it has learned
- Deep learning structures algorithms in layers to create an artificial “neural network” that can learn and make intelligent decisions on its own
- Deep learning is a subfield of machine learning. While both fall under the broad category of artificial intelligence, deep learning is usually what’s behind the most human-like artificial intelligence

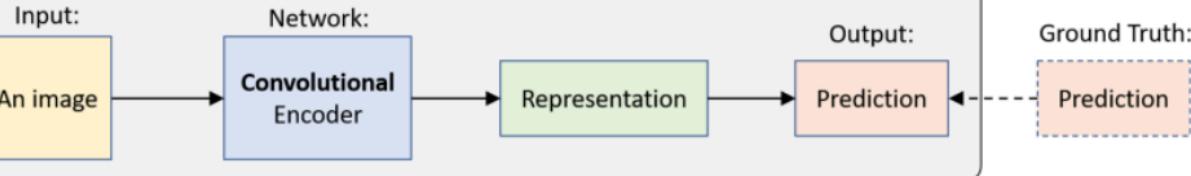


Supervised Learning

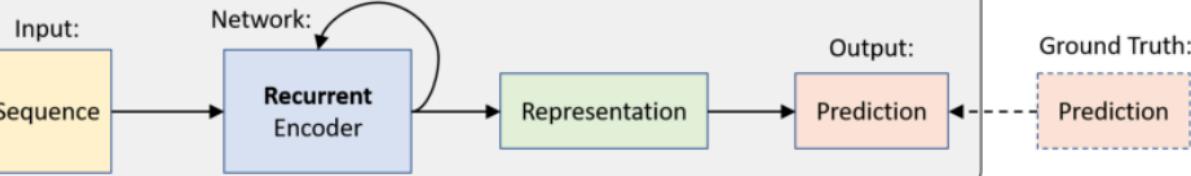
1. Feed Forward Neural Networks



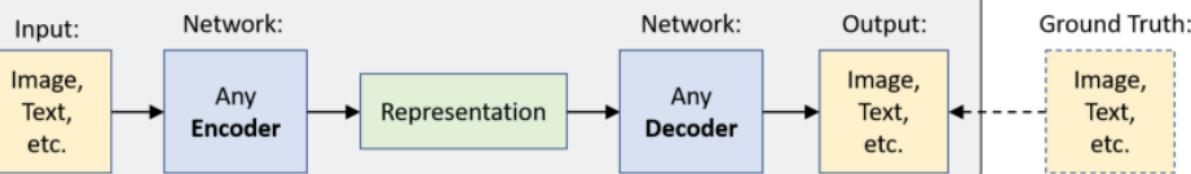
2. Convolutional Neural Networks



3. Recurrent Neural Networks

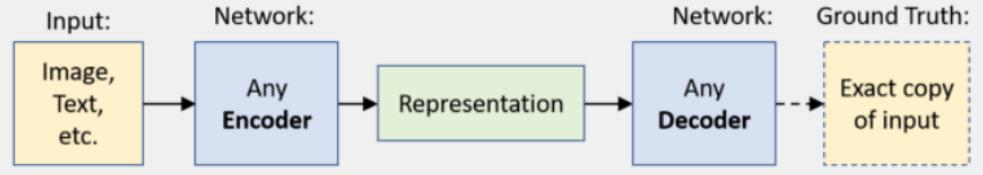


4. Encoder-Decoder Architectures

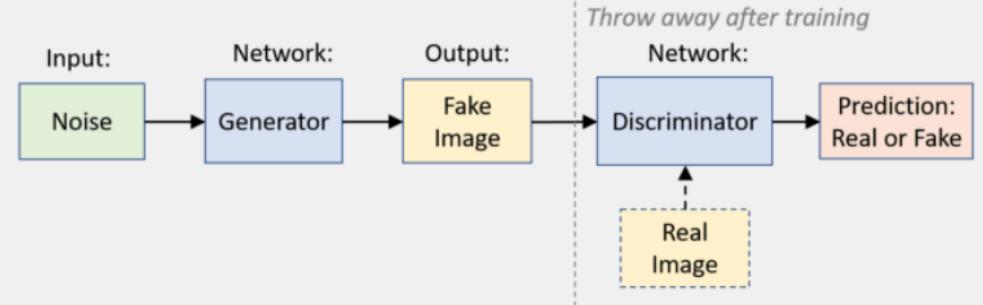


Unsupervised Learning

5. Autoencoder



6. Generative Adversarial Networks

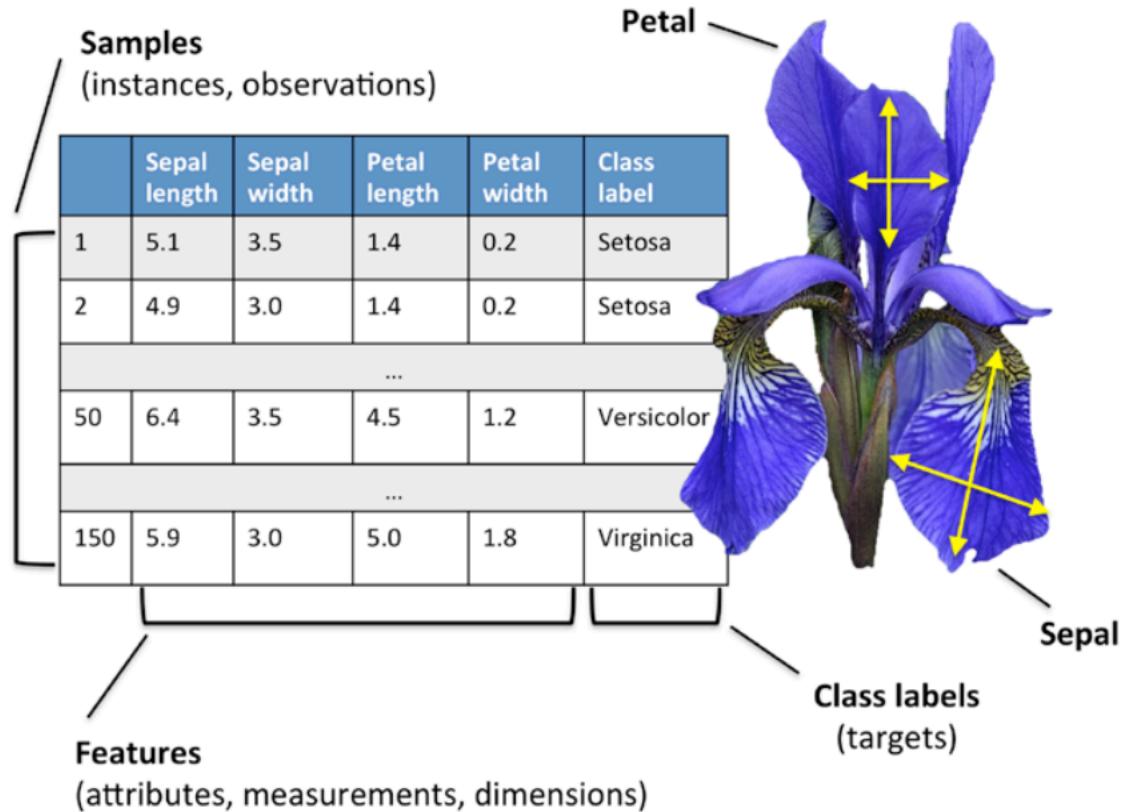


Reinforcement Learning

7. Networks for Actions, Values, Policies, and Models



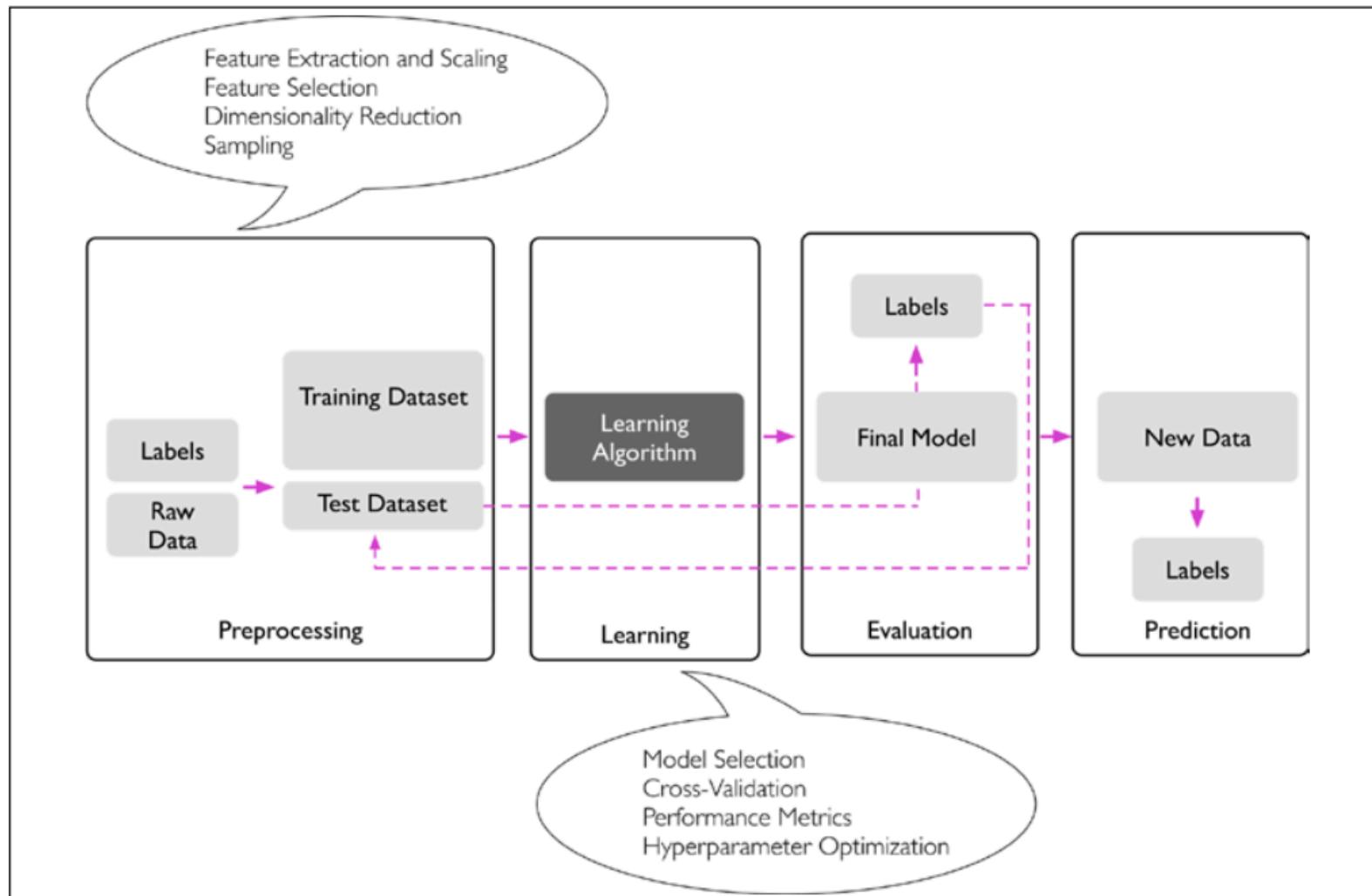
ML Terminology



Machine learning is a vast field and also very interdisciplinary as it brings together many scientists from other areas of research. As it happens, many terms and concepts have been rediscovered or redefined and may already be familiar to you but appear under different names. For your convenience, in the following list, you can find a selection of commonly used terms and their synonyms that you may find useful when reading this book and machine learning literature in general:

- Training example: A row in a table representing the dataset and synonymous with an observation, record, instance, or sample (in most contexts, sample refers to a collection of training examples).
- Training: Model fitting, for parametric models similar to parameter estimation.
- Feature, abbrev. x : A column in a data table or data (design) matrix. Synonymous with predictor, variable, input, attribute, or covariate.
- Target, abbrev. y : Synonymous with outcome, output, response variable, dependent variable, (class) label, and ground truth.
- Loss function: Often used synonymously with a *cost* function. Sometimes the loss function is also called an *error* function. In some literature, the term "loss" refers to the loss measured for a single data point, and the cost is a measurement that computes the loss (average or summed) over the entire dataset.

A Roadmap for building ML Systems



Course Syllabus

Evaluation Criteria

Tasks	Percentage
In Class Hands-on	60
Project Proposal Presentation	10
Project Final Presentation	30
Bonus (In Class Participation)	5
Total	110/100

Week	Date	Content	Note	Total
1	2/26	Welcome to the course	Download & Install Anaconda Homework (1)	1
2	3/5	Crash Course of Python, Numpy, Pandas, and Matplotlib	In class hands-on (4)	5
3	3/12	Get to know about Data <u>ML:Classification Models</u>	In class hands-on (5)	10
4	3/19	<u>ML:Regression Models</u>	In class hands-on (5)	15
5	3/26	<u>ML:Clustering /Apriori Models</u>	In class hands-on (5)	20
6	4/2	Holiday		
7	4/9	Introduction to Deep Learning (ANN)	In class hands-on (5)	25
8	4/16	Convolutional Neural Network (CNN)	In class hands-on (5)	30
9	4/23	Convolutional Neural Network (CNN)	In class hands-on (5)	35
10	4/30	Recurrent Neural Network (RNN)	In class hands-on (5)	40
11	5/7	Recurrent Neural Network (RNN)	In class hands-on (5)	45
12	5/14	Project Proposal Presentation	Proposal Presentation (10)	55
13	5/21	Time series with DNN, CNN, RNN	In class hands-on (5)	60
14	5/28	Attention Neural Network	In class hands-on (5)	65
15	6/4	Generative Adversarial Network (GAN)	In class hands-on (5)	70
16	6/11	Reinforcement Learning (RL)	In class hands-on (5)	75
17	6/18	Final Project Presentation	Final Presentation (30)	105

Bonus: 5 For class participation.

Course Project

Project Proposal (10)

Submission:

1 page Proposal (.doc, .pdf)

1 PPT file (.ppt)

- Title
- Problem/Motivation
- What do you want to do (Solution)
- Dataset (1-2 datasets)
- Techniques To use (at least 2 techniques)
- Evaluation Metrics

Final Project (30)

Submission:

1 Report (.doc, .pdf)

1 PPT file (.ppt)

1 Folder of Full Source Code Uploaded

- Title
- Problem/Motivation
- What do you want to do (Solution)
- Dataset (1-2 datasets)
- Techniques To use (at least 2 techniques)
- Evaluation Metrics
- Result
- Conclusion

*Please cite all sources of your code in the final report

*It can be 1-3 person for a group

Course Github Repository

130 lines (92 sloc) | 2.84 KB

Raw Blame   

EI320A(3) 深度學習使用Python,R70802 (deeplearning_with_python)

This repository is a part of the course EI320A(3) 深度學習使用Python @ YZE university

Get started guide

1. Download this repository on your local computer and Unzip the folder
2. Download and Install Anaconda
<https://www.anaconda.com/distribution/>
3. Change to course folder

```
cd deeplearning_with_python
```
4. Create the course environment

```
conda env create
```

wait for the environment to create.