# 深度學習Deep Learning (1)

## 112-1

朱學亭老師

# 大綱

- 課程規定
- 課程大綱
- 教材
- 工具

# 課程規定

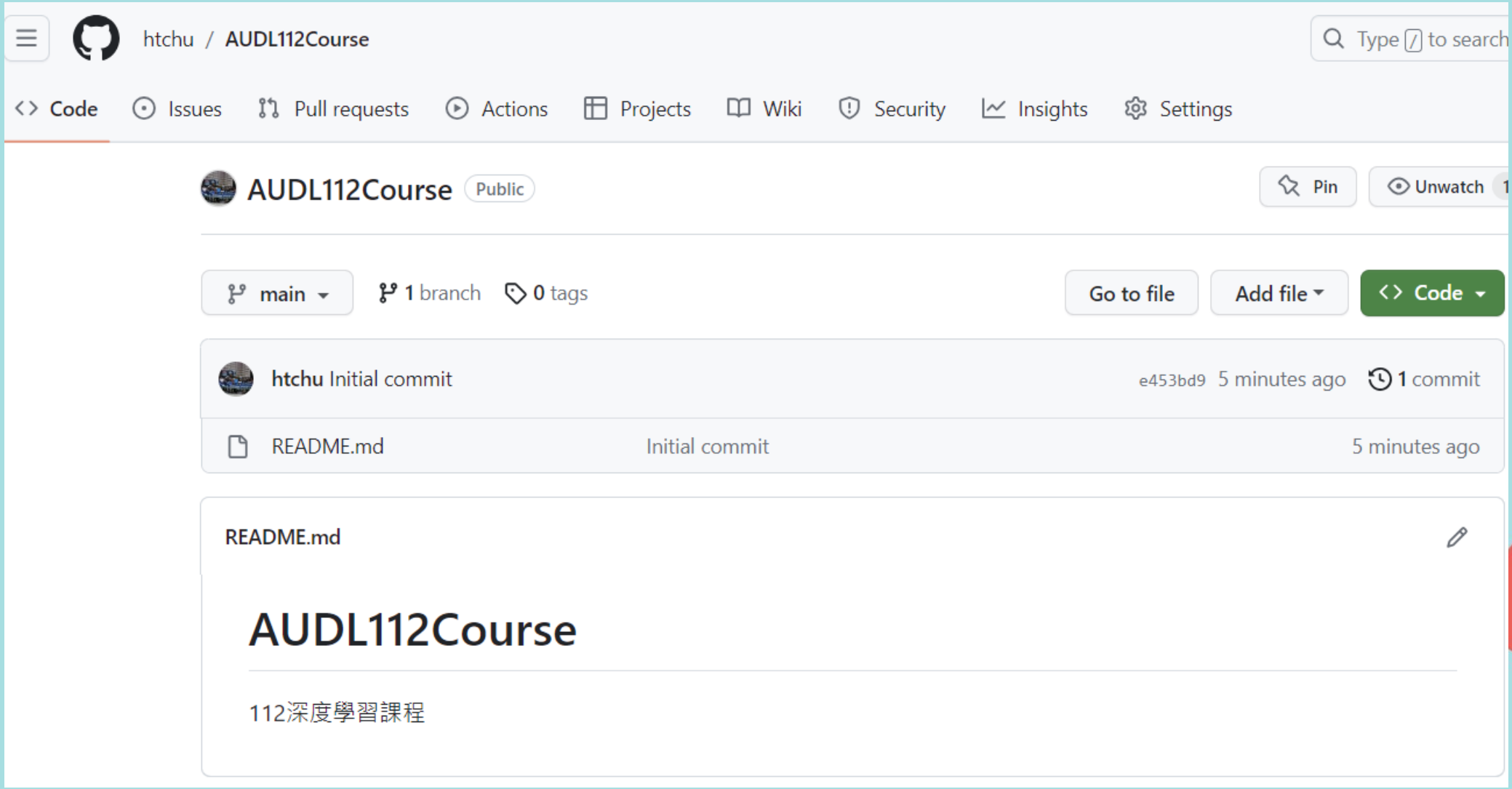
- 期中是個人成績、期末是分組成績
- 期中作業: 2-3個PyTorch作業
- 期末作業: 使用TensorFlow或PyTorch都可以

# 課程大綱

- W1-課程介紹/Introduction
- W2-深度學習與PyTorch函式庫
- W3-預先訓練的模型
- W4-介紹張量
- W5-用張量表示現實中的資料
- W6-學習的機制
- W7-使用神經網路來擬合資料
- W8-從圖片 中學習
- W9-Midterm presentation
- W10-卷積神經網路
- W11-利用PyTorch對抗癌症
- W12-訓練模型分辨結節的真假
- W13-評估改善訓練成效
- W14-不同類型的資料分割
- W15-ImageCaptioning
- W16-Natural Language Processing
- W17-音訊分類
- W18-Final presentation

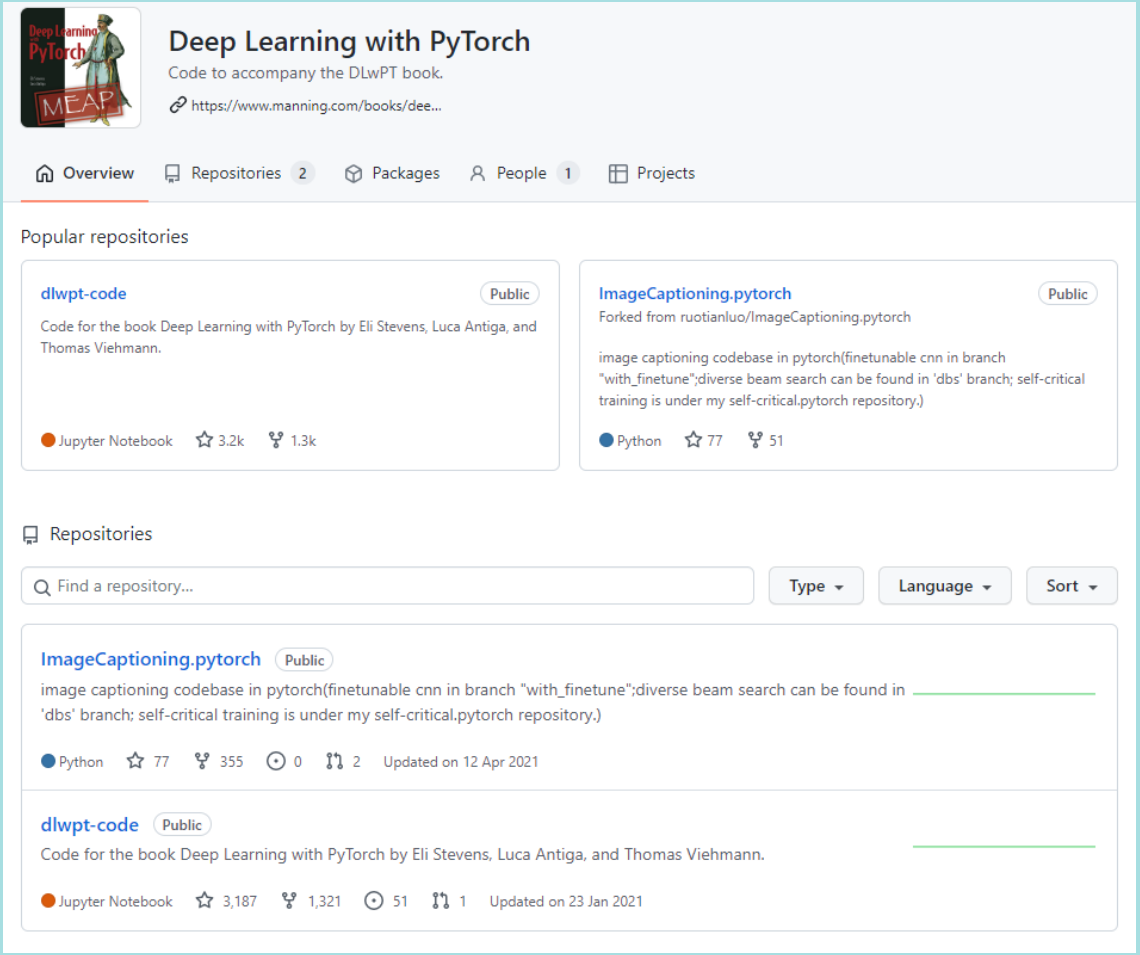
# 課本-PyTorch深度學習攻略

# Course Github




https://github.com/htchu/AUDL112Course

# Textbook Gitbook




https://github.com/deep-learning-with-pytorch/

# Deep Learning EBooks

aniruddhachoudhury / Data-Science-Books Public

Code | Issues | Pull requests | Actions | Projects 1 | Wiki | Security | Insights

master | 2 branches | 0 tags | Go to file | Add file | Code

aniruddhachoudhury Add files via upload 75543dc on 22 Oct 2019 13 commits

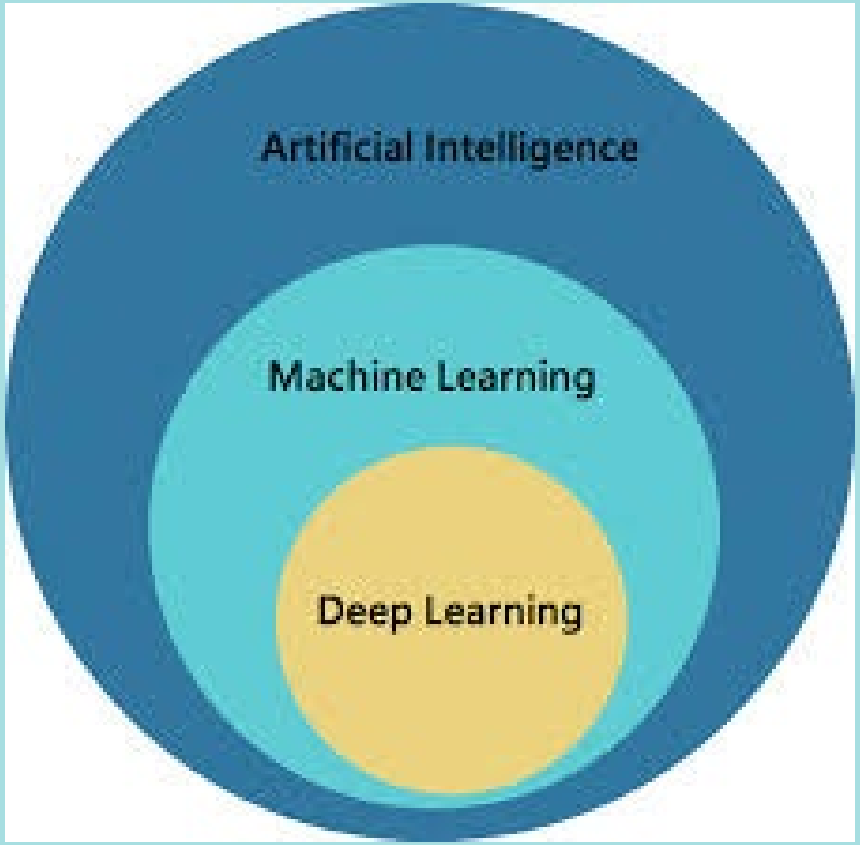
| | | |
|---|---|---|
| .gitignore | Initial commit | 3 years ago |
| Deep Learning - A Practitioner's Appr... | Add files via upload | 3 years ago |
| Deep Learning - Ian Goodfellow, Yos... | Add files via upload | 3 years ago |
| Deep Learning in Python.epub | Add files via upload | 3 years ago |
| Deep Learning with Applications Usin... | Add files via upload | 3 years ago |
| Deep Learning with Hadoop.epub | Add files via upload | 3 years ago |
| Deep Learning with Keras.epub | Add files via upload | 3 years ago |
| Deep Learning with PyTorch.epub | Add files via upload | 3 years ago |
| Deep Learning with Python - A Hand... | Add files via upload | 3 years ago |
| Deep Learning with Python.pdf | Add files via upload | 3 years ago |
| Deep Learning with Theano.pdf | Add files via upload | 3 years ago |
| Deep_Learning_in_NLP_1.pdf | Add files via upload | 3 years ago |

https://github.com/aniruddhachoudhury/Data-Science-Books

# 深度學習

- W1:課程介紹/Python程式練習
- Part 1: Machine learning
- Part 2: Deep learning
- Part 3: Python程式

# AI, ML, DL

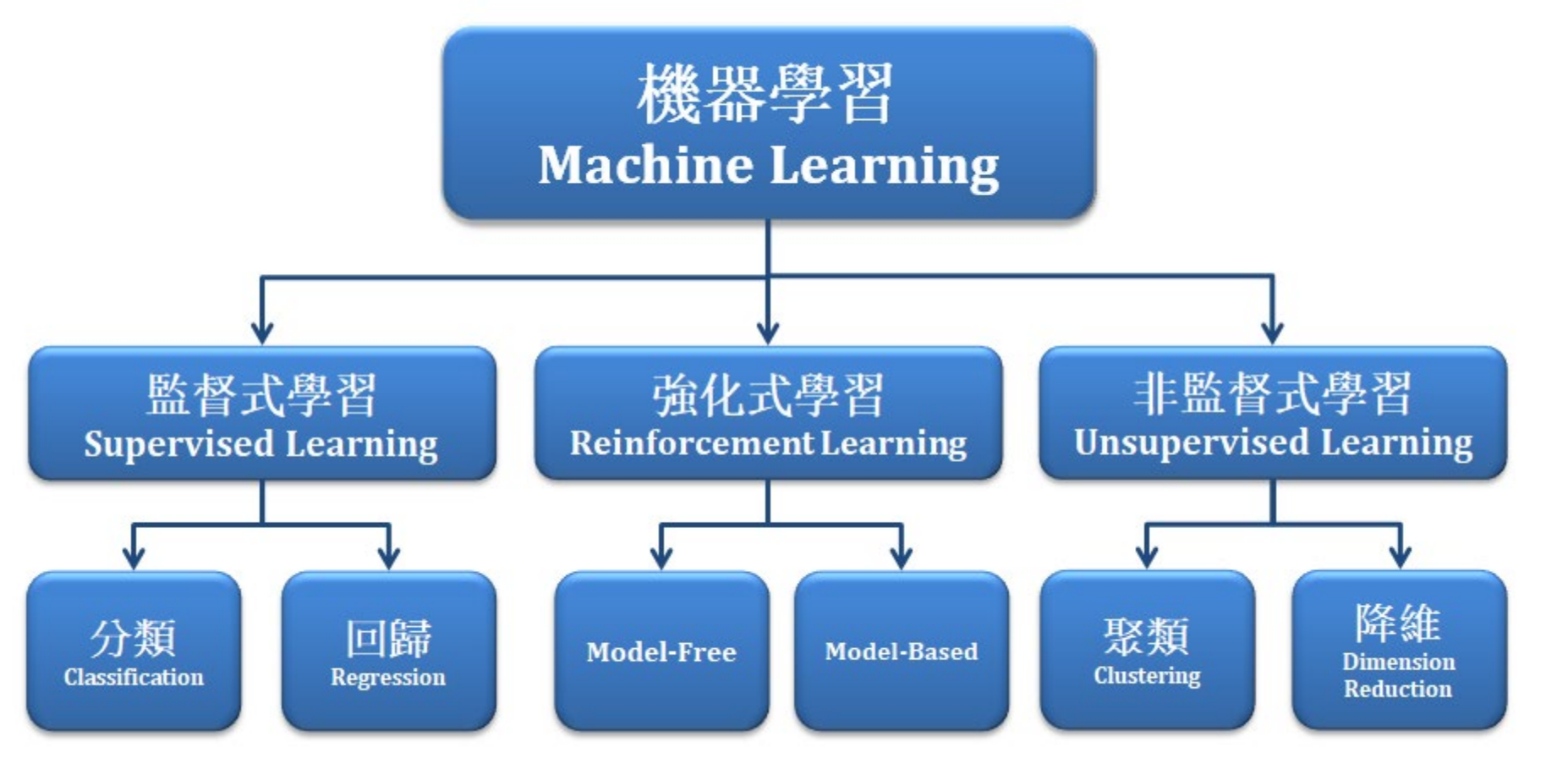



人工智慧(Artificial Intelligence, AI)

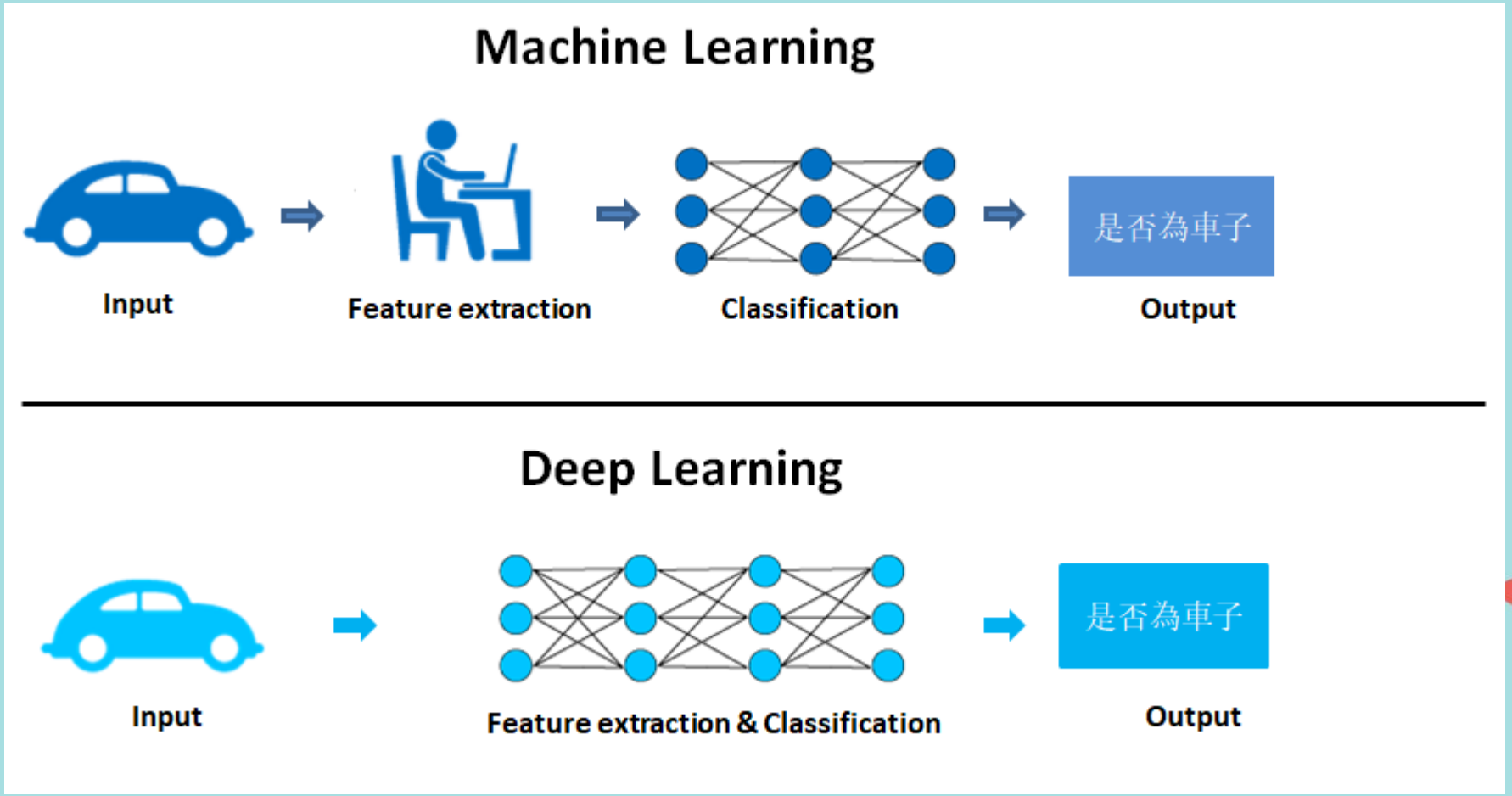
機器學習(machine learning, ML)

深度學習(deep learning, DL)

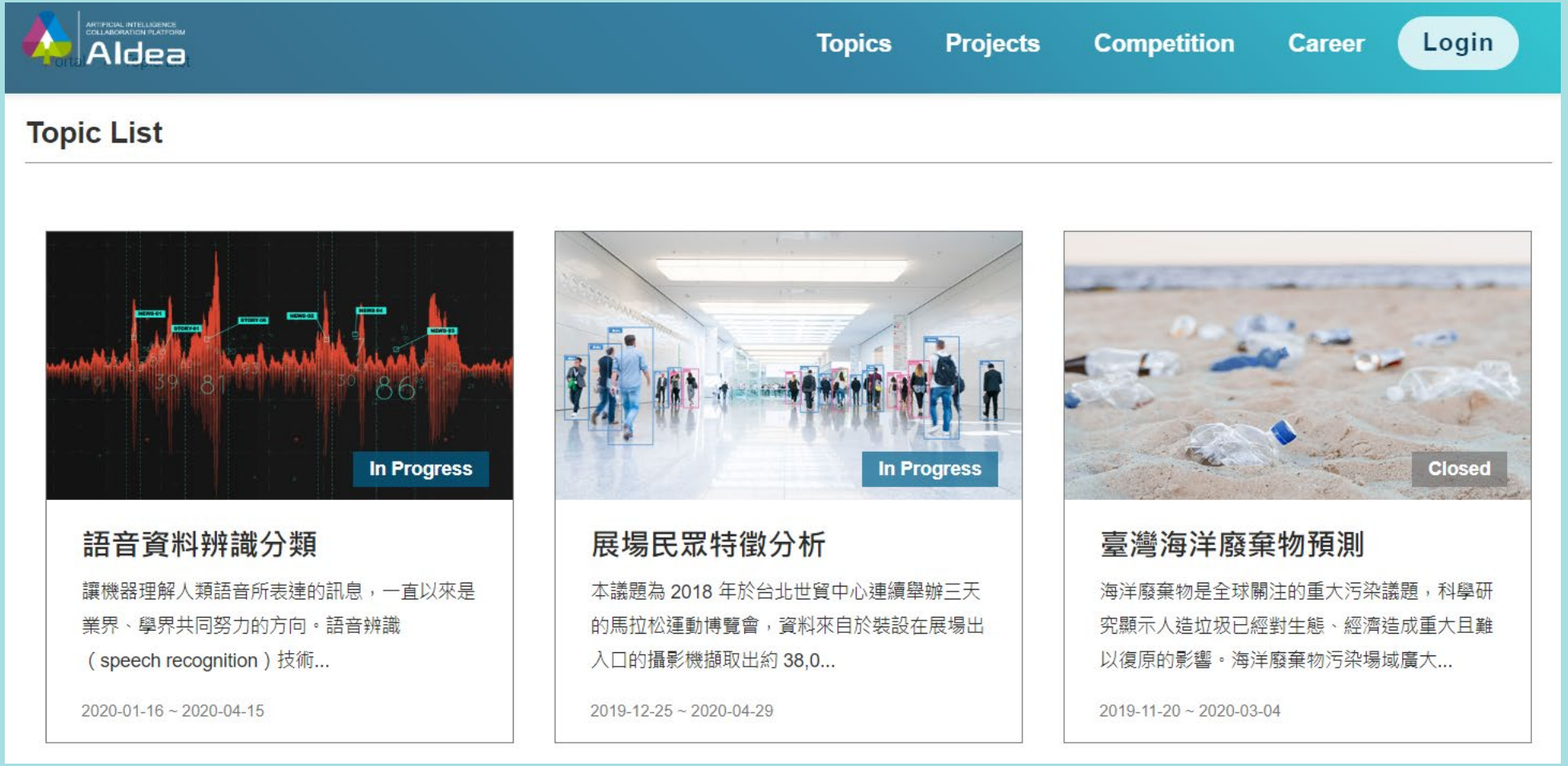
# 機器學習


機器學習
Machine Learning
監督式學習
Supervised Learning
強化式學習
Reinforcement Learning
非監督式學習
Unsupervised Learning
分類
Classification
回歸
Regression
Model-Free
Model-Based
聚類
Clustering
降維
Dimension Reduction

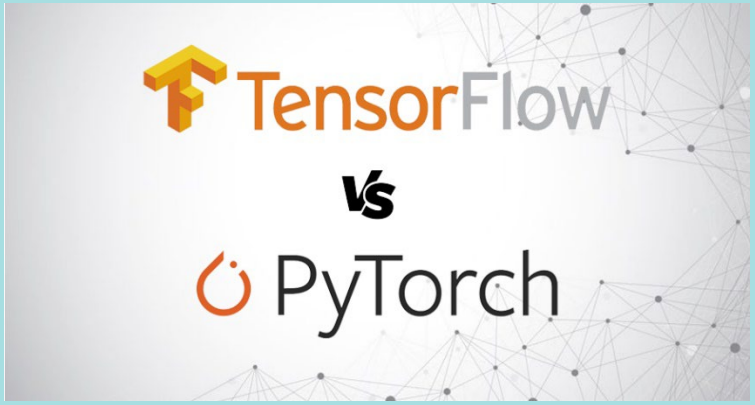
# ML VS DL

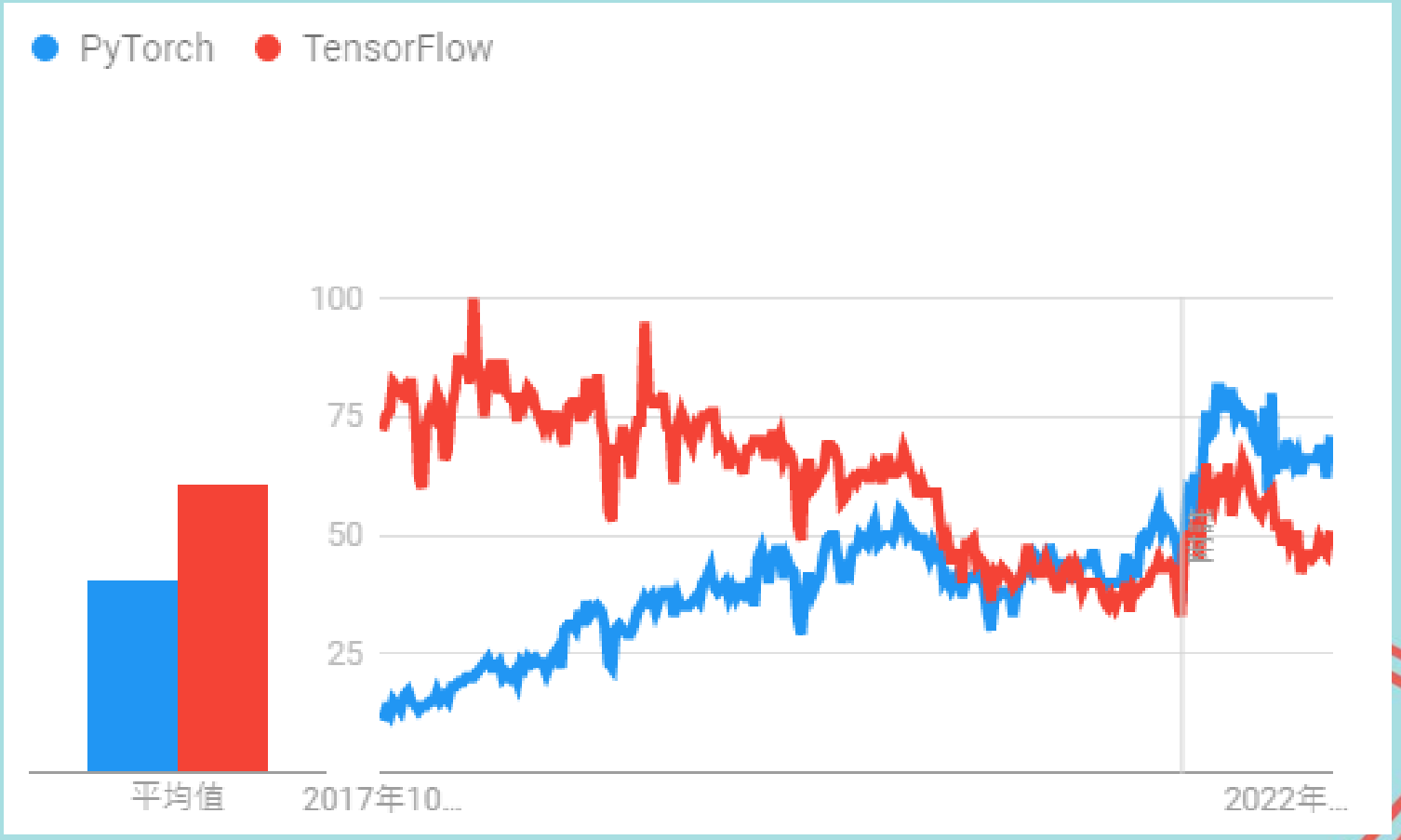

Machine Learning
Input
Feature extraction
Classification
是否為車子
Output
Deep Learning
Input
Feature extraction & Classification
是否為車子
Output

# AIDEA專題


ARTIFICIAL INTELLIGENCE COLLABORATION PLATFORM
Aidea
Topics
Projects
Competition
Career
Login
Topic List
In Progress
語音資料辨識分類
讓機器理解人類語音所表達的訊息，一直以來是業界、學界共同努力的方向。語音辨識（speech recognition）技術...
2020-01-16 ~ 2020-04-15
In Progress
展場民眾特徵分析
本議題為 2018 年於台北世貿中心連續舉辦三天的馬拉松運動博覽會，資料來自於裝設在展場出入口的攝影機擷取出約 38,0...
2019-12-25 ~ 2020-04-29
Closed
臺灣海洋廢棄物預測
海洋廢棄物是全球關注的重大污染議題，科學研究顯示人造垃圾已經對生態、經濟造成重大且難以復原的影響。海洋廢棄物污染場域廣大...
2019-11-20 ~ 2020-03-04

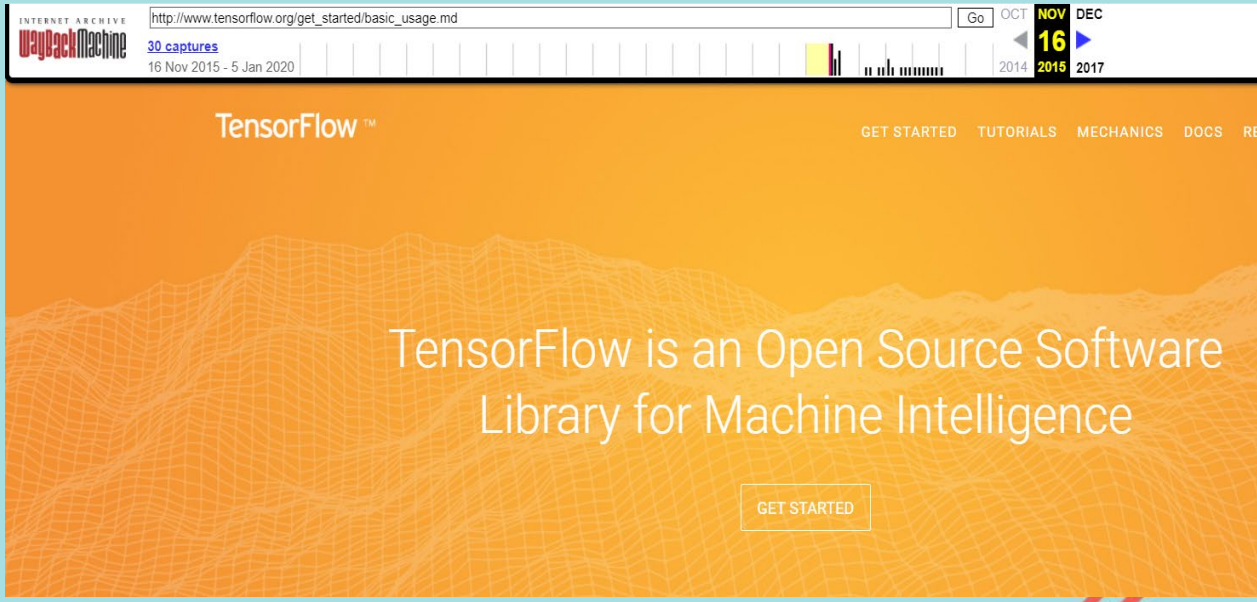
# PyTorch vs. TensorFlow



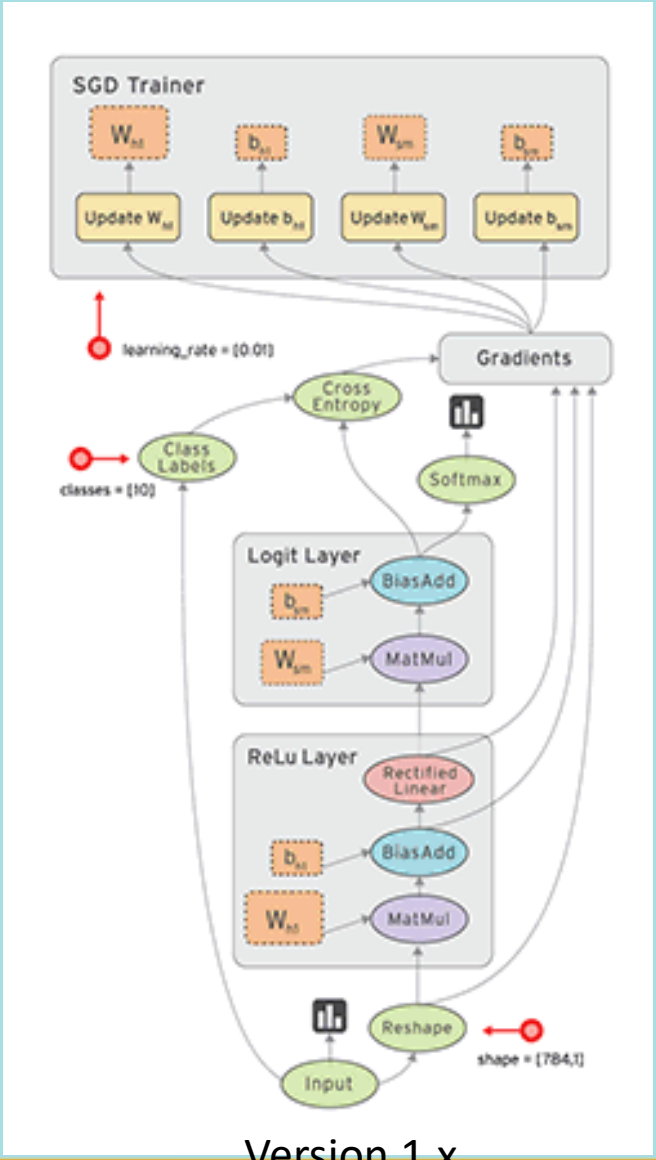
# Tensorflow

| TensorFlow | |
|---|---|
| | |
| Developer(s) | Google Brain Team[1] |
| Initial release | November 9, 2015; |
| Stable release | 2.4.0[2] / Dec. 14, 2020 |
| Repository | github.com/tensorflow/tensorflow |
| Written in | Python, C++, CUDA |
| Platform | Linux, macOS, Windows, Android |



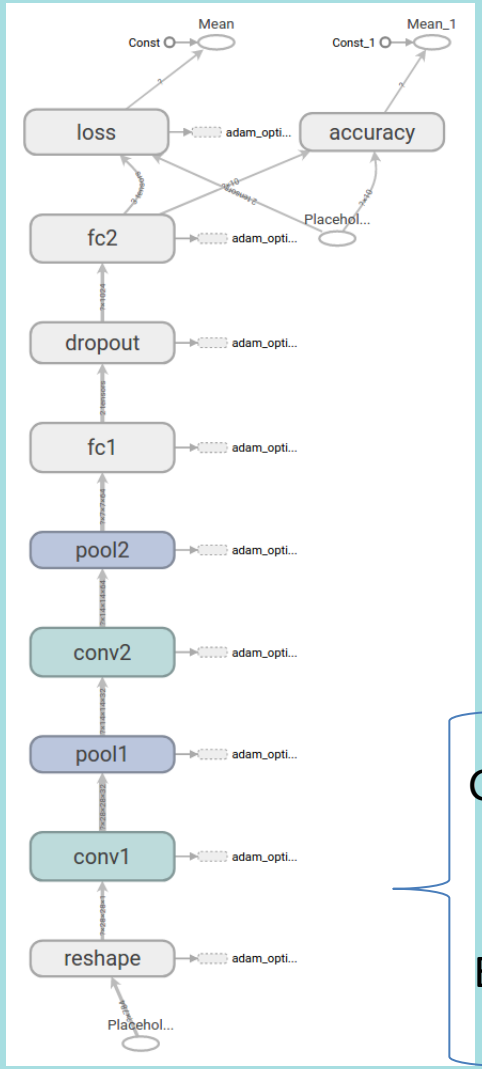

https://web.archive.org/web/20151109150056/https://www.tensorflow.org/

# Tensorflow Version 1.x and 2.x




Version 1.x

tf.Graph
tf.Session
tf.Variable
tf.Tensor
tf.Constant
tf.Placeholder




Version 2.x: Eager + Keras API

tf.keras
tf.data
tf.GradientTape

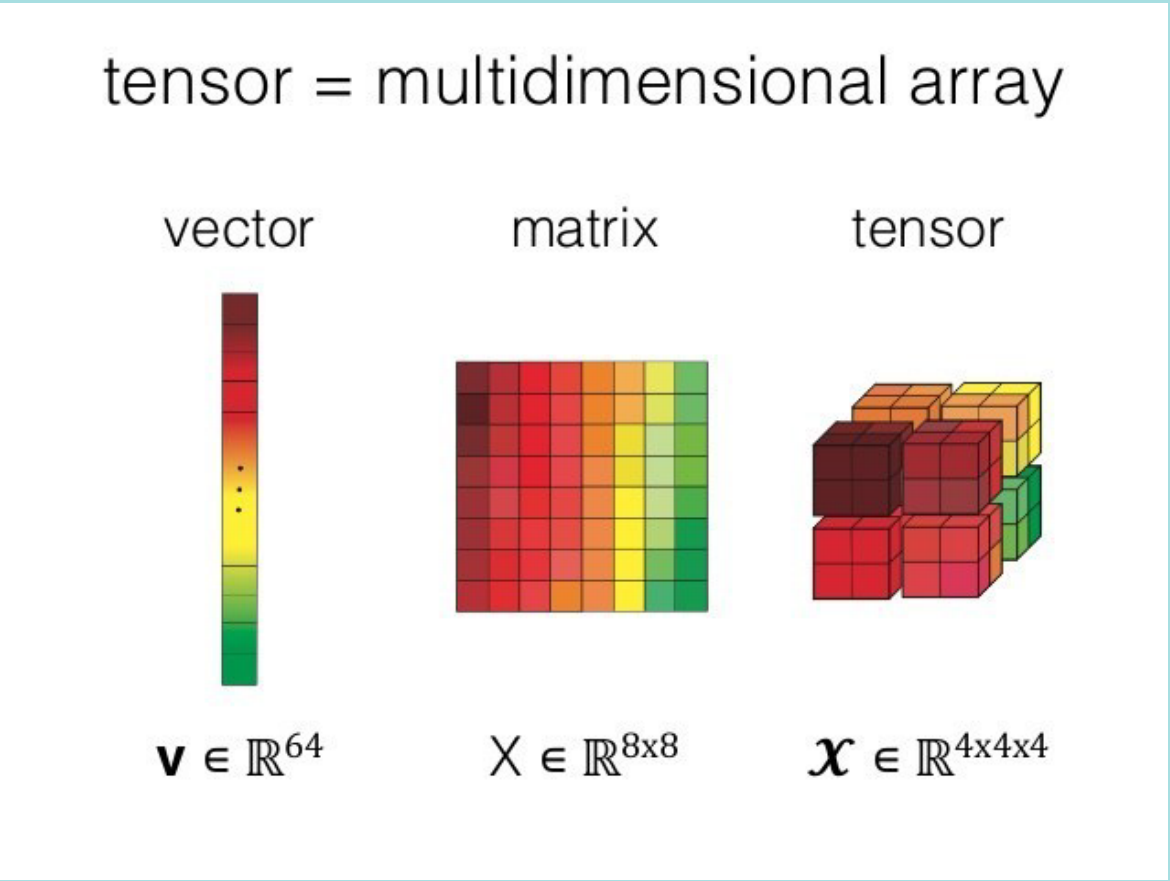
Graph mode

tf.Graph

Eager mode

tf.Eager

# What is a tensor




```
ndarrayB = tf.make_ndarray(
  tensorA
)
```

```
tensorA =tf.convert_to_tensor(
 ndarrayA, dtype=None, dtype_hint=None, name=None
)
```

https://www.tensorflow.org/tutorials/customization/basics

# Deep Learning Code Components

# AI programming stack

1. Python: https://www.python.org/ (基礎程式設計)
2. NumPy: https://numpy.org/ ( 資料科學)
3. pandas: https://pandas.pydata.org/ (資料科學)
4. OpenCV: https://opencv.org/ (數位影像處理)
5. Pillow: https://pillow.readthedocs.io/ (數位影像處理)
6. scikit-image: https://scikit-image.org/ (數位影像處理)
7. scikit-learn: https://scikit-learn.org/ (機器學習)
8. TensorFlow: https://www.tensorflow.org/ (深度學習)
9. Keras: https://keras.io/ (深度學習)
10. PyTorch: https://pytorch.org/ (深度學習)

Thanks!

# Q&A