

# An Overview of Tensorflow + Deep learning

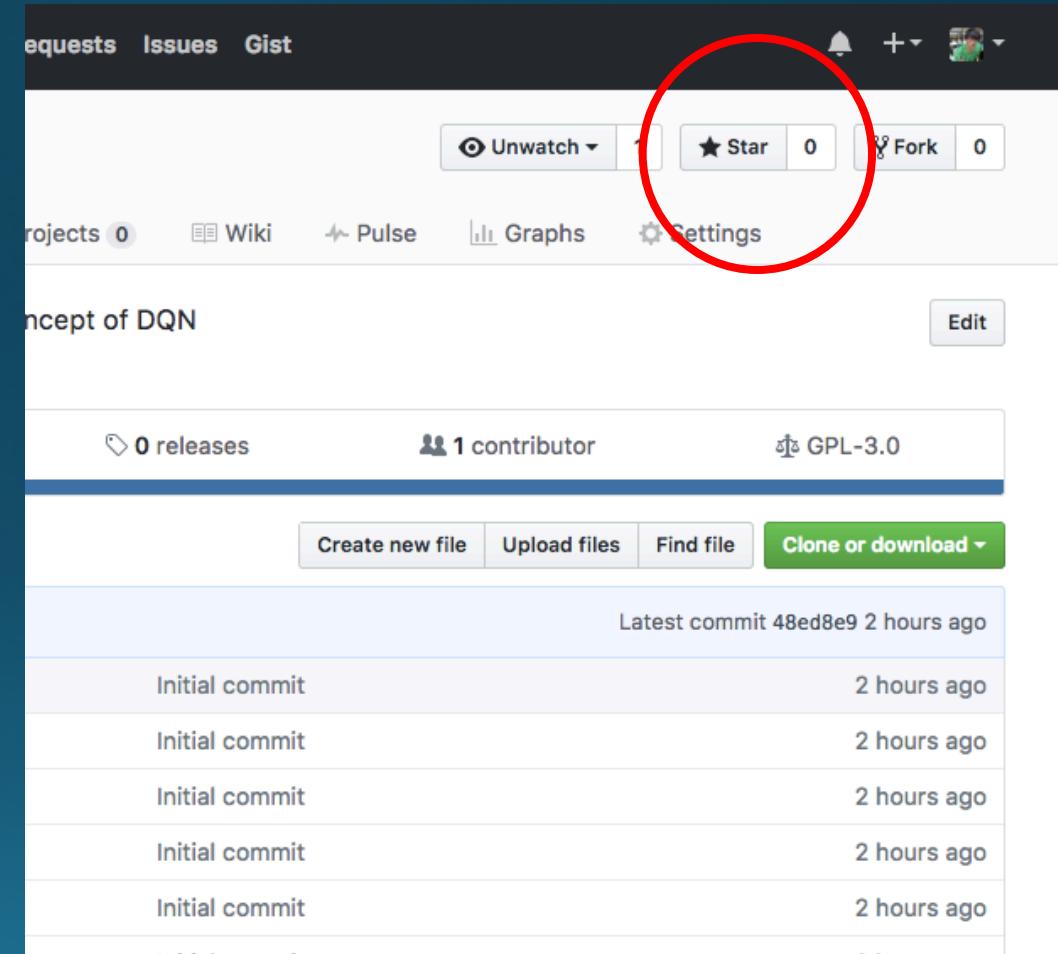
沒一村

# About me

- 邱弘毅 ( 沒一村 )
- 交通大學電資學士班 3 年級
- 沒一村前端筆記 & 沒一村生活點滴
- JavaScript lover, R language, python
- Full stack developer, React Native
- 目前專注於 Deep learning 相關應用
- <https://www.facebook.com/noootown>

# Before we start

- 程式碼：
- <https://github.com/noootown/Forex-DQN>
- 受用的話，請給我一顆 star :P



# Outline

- What is Machine Learning?
- What is Deep learning?
- What is Tensorflow?
- Do it!
- Summary

# What is Machine learning ?

# What is Machine learning ?

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

Arthur Lee Samuel, 1959

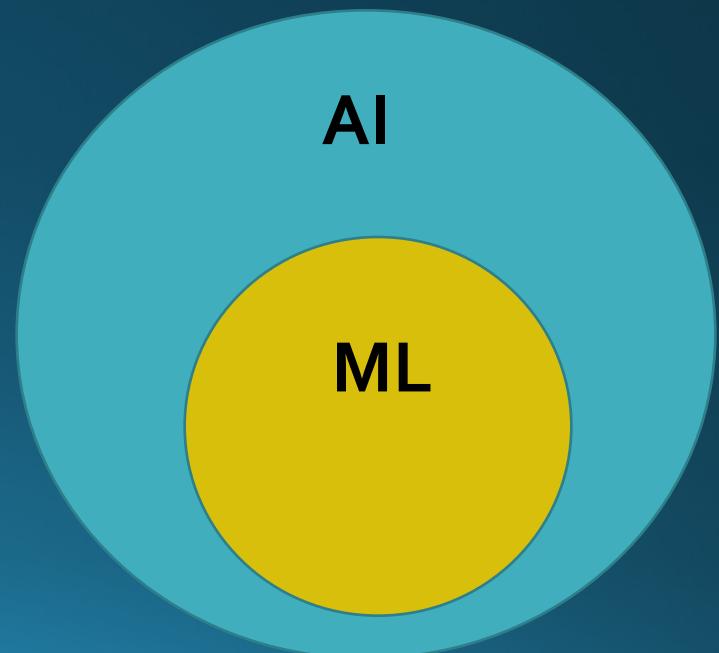
# Machine Learning

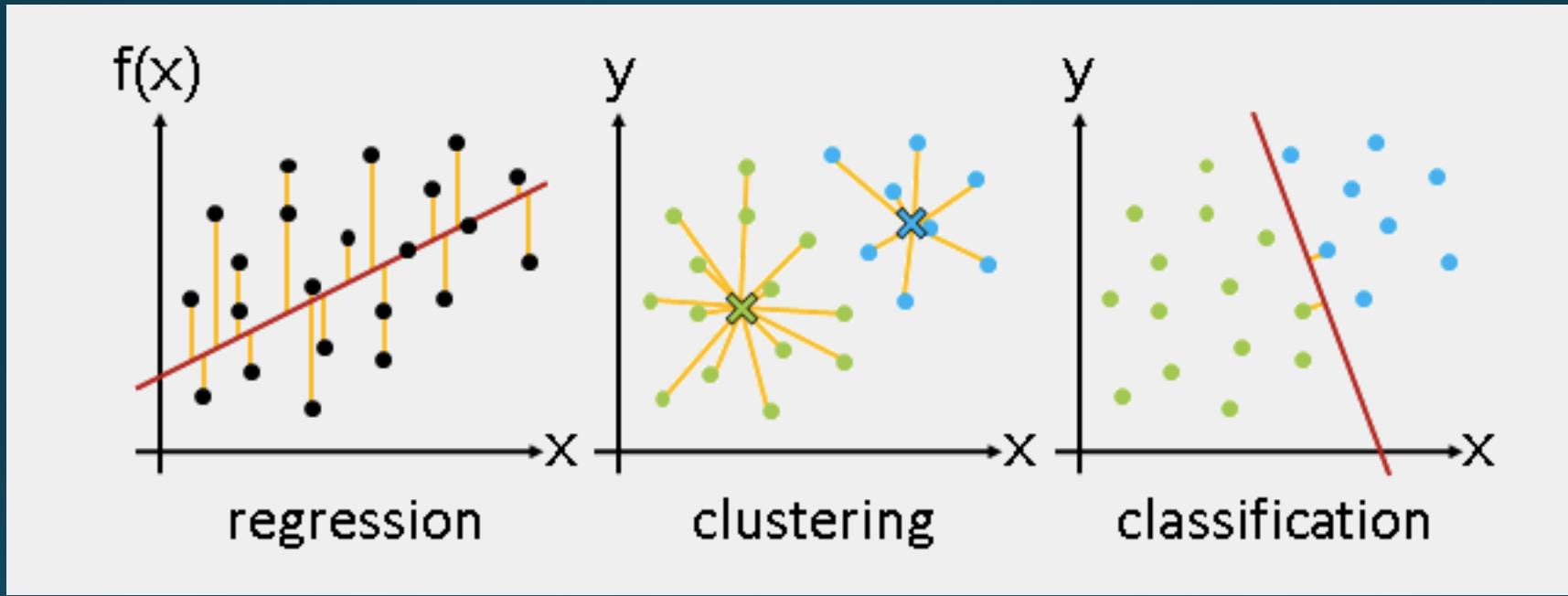
實踐 AI 的一種手段

透過各種 Machine learning 演算法，從少量或大量的資料中學出一個 rule。藉這個 rule 對未來做預測。

問題分類：cluster, regression, classification

常見演算法: KNN, SVM.....





pic from: <http://www.csie.ntnu.edu.tw/~u91029/Classification.html>



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# What is Deep learning ?



3  
7  
9



6  
1



9  
7  
2



101



26624



9  
8



103



175



2



2503



205



100

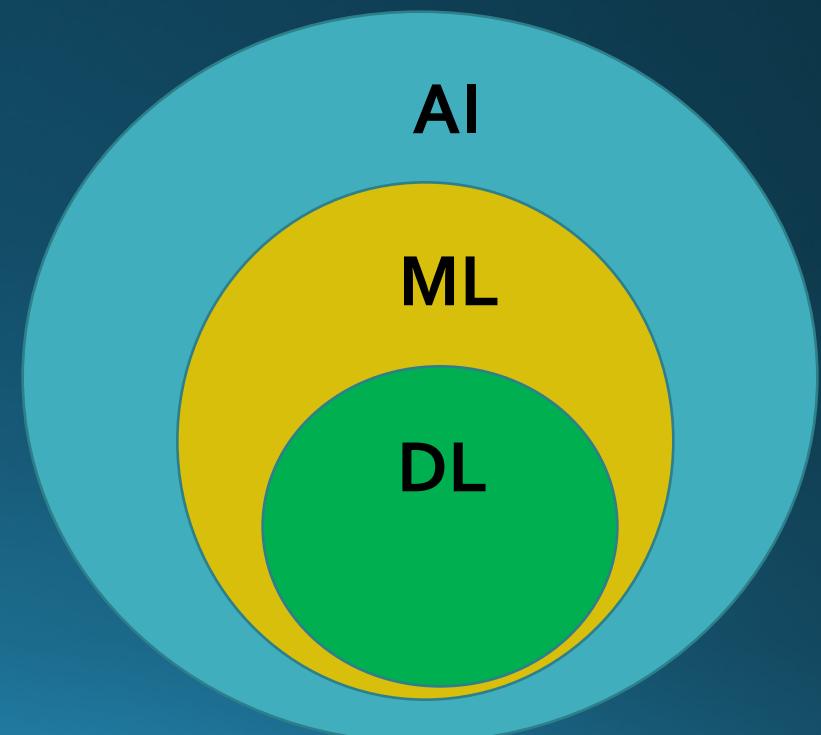
# Deep Learning

也是實踐 AI 的一種手段

讓機器自己提取特徵，自己試誤，自己學習

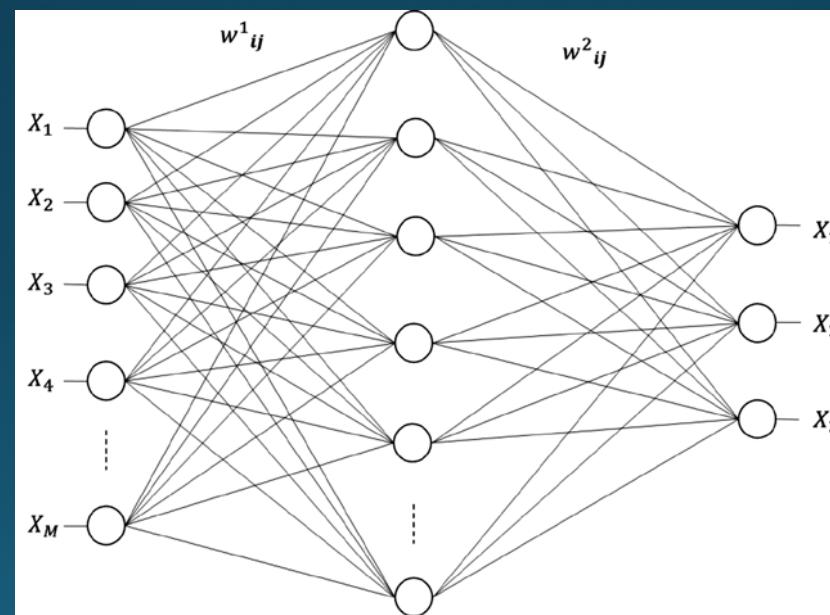
各種不同的 Model

Ex: CNN, RNN, LSTM



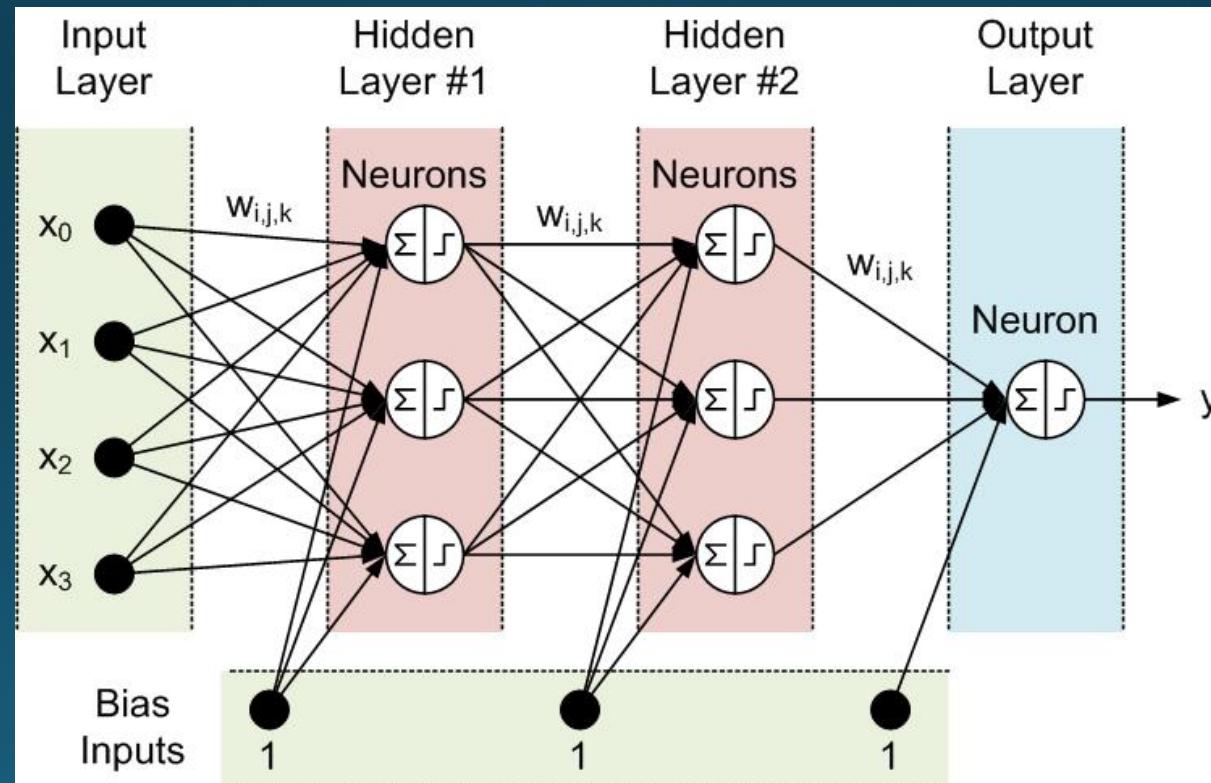
# Deep Learning vs 類神經網路

模擬人類神經傳導機制

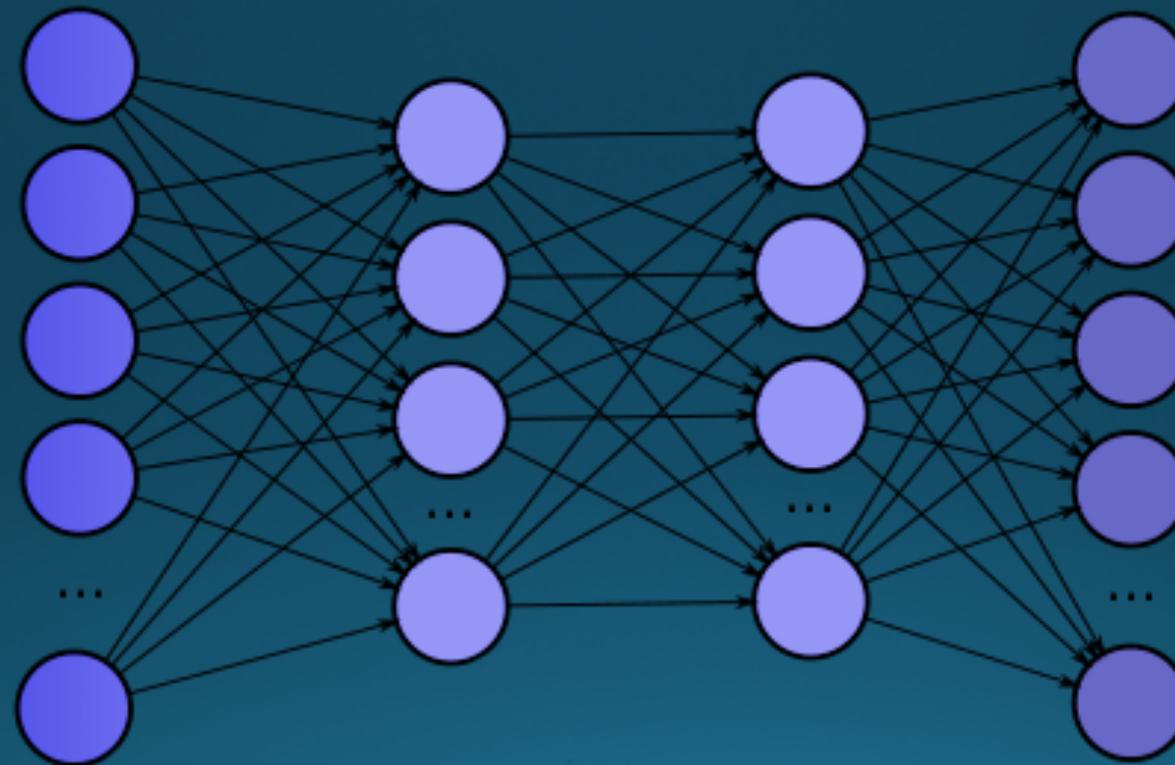


# How Neuron works?

Control weight and bias

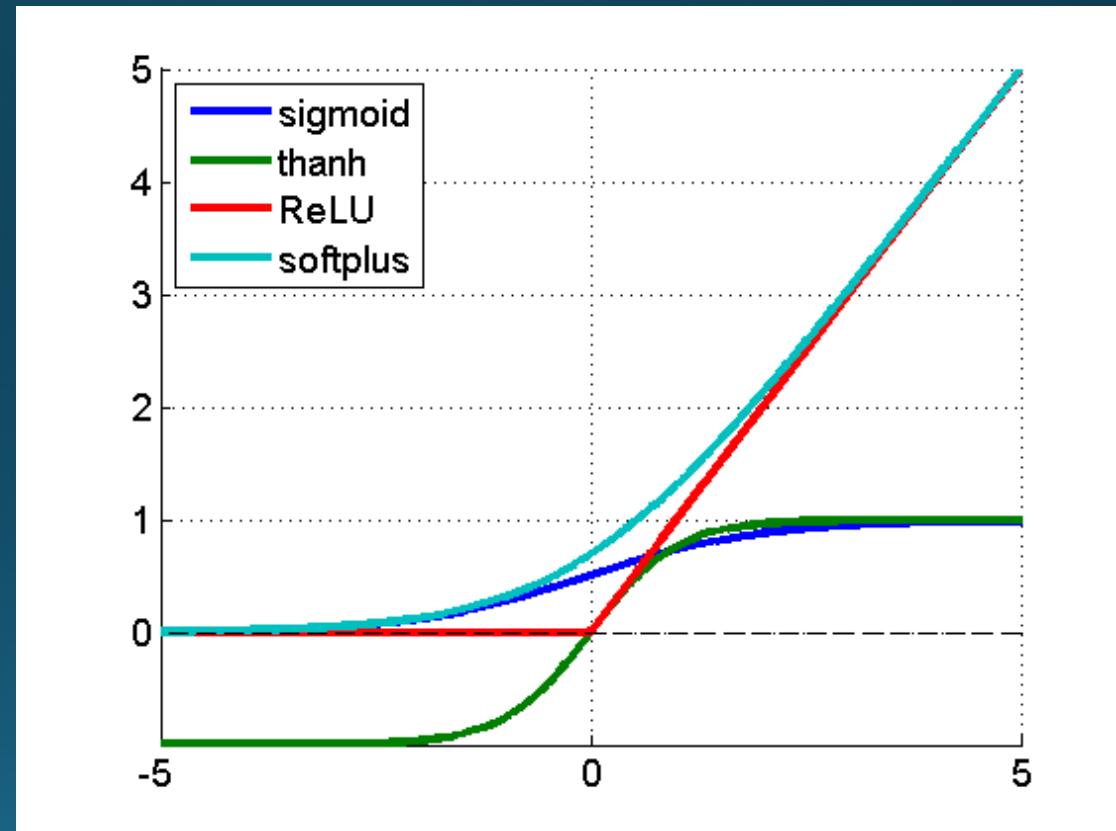


# Fully connected



# They need activation!!!

Ex: relu, sigmoid.....



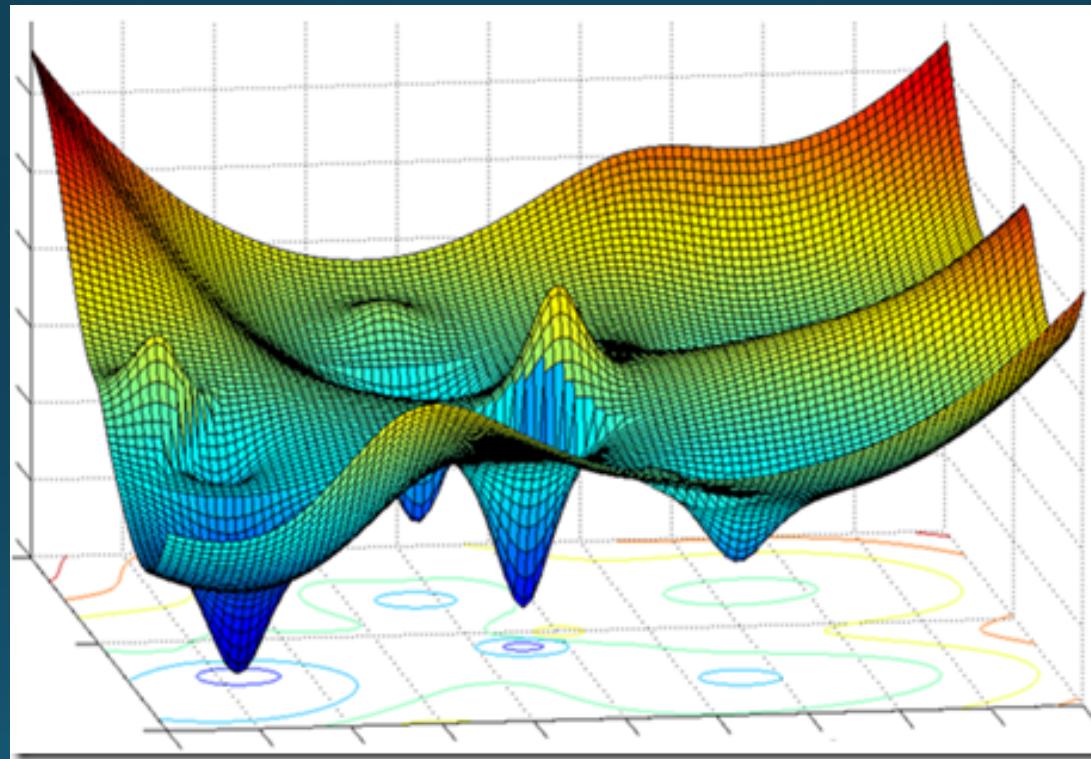
# Target: Minimize loss



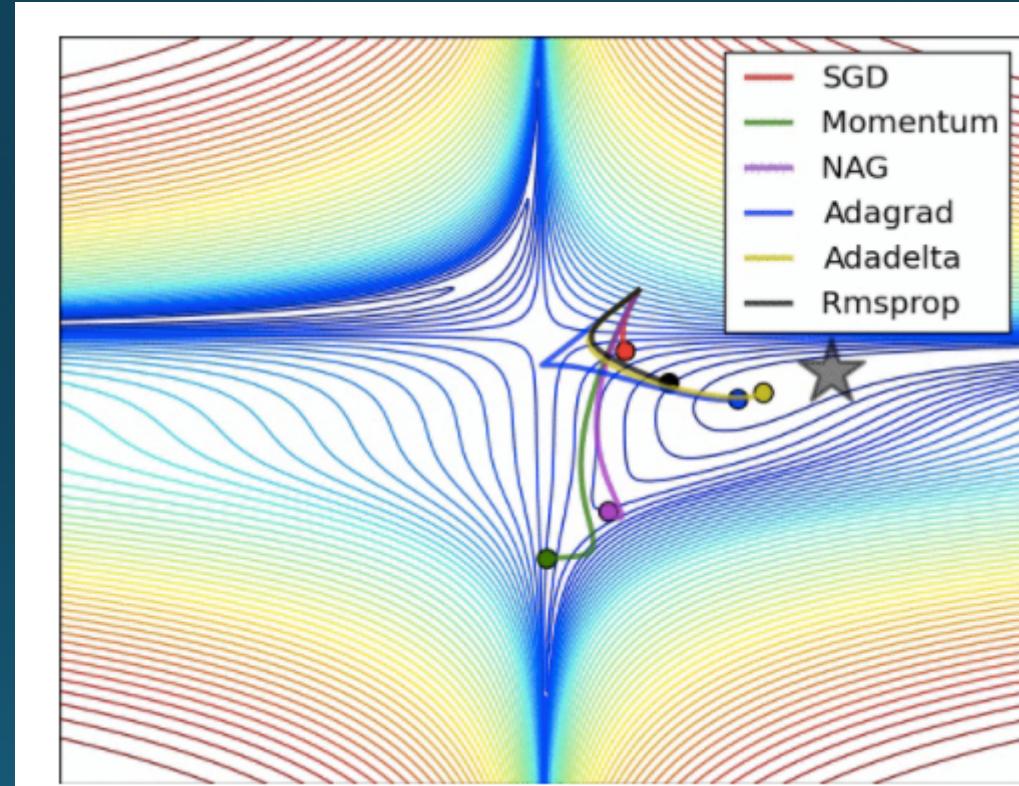
$$f(\begin{matrix} 1 \\ 3 \end{matrix}) = \begin{matrix} 3 \\ 5 \end{matrix}$$

Loss function  
Ex: Cross entropy,  
mean square

# How ? Gradient Decent



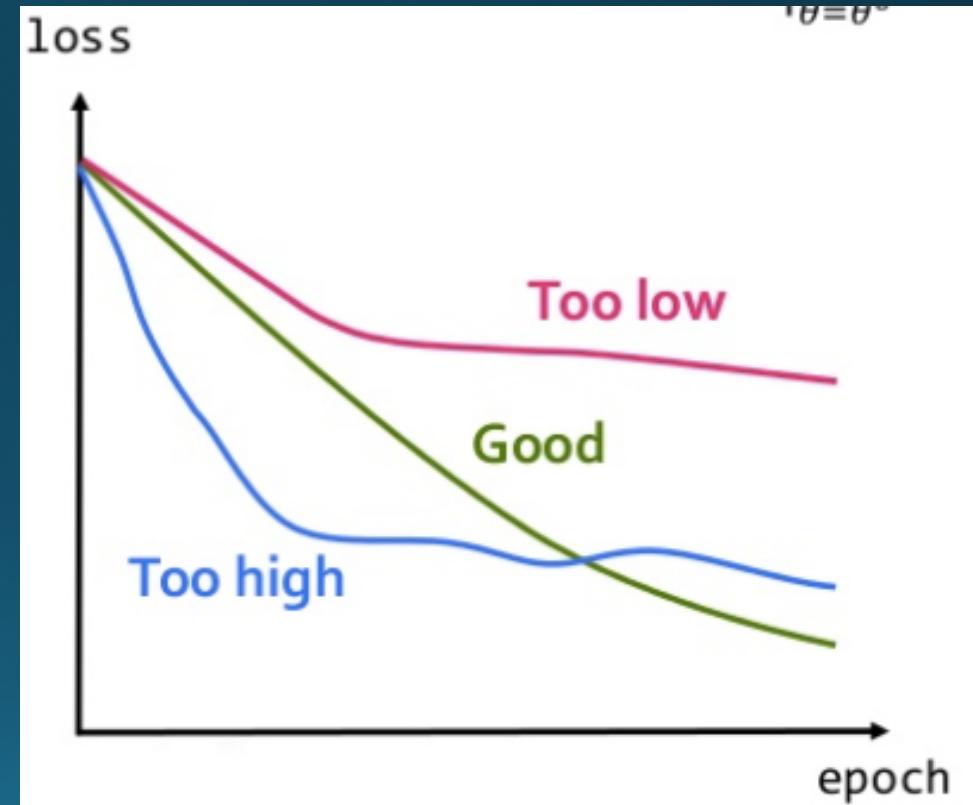
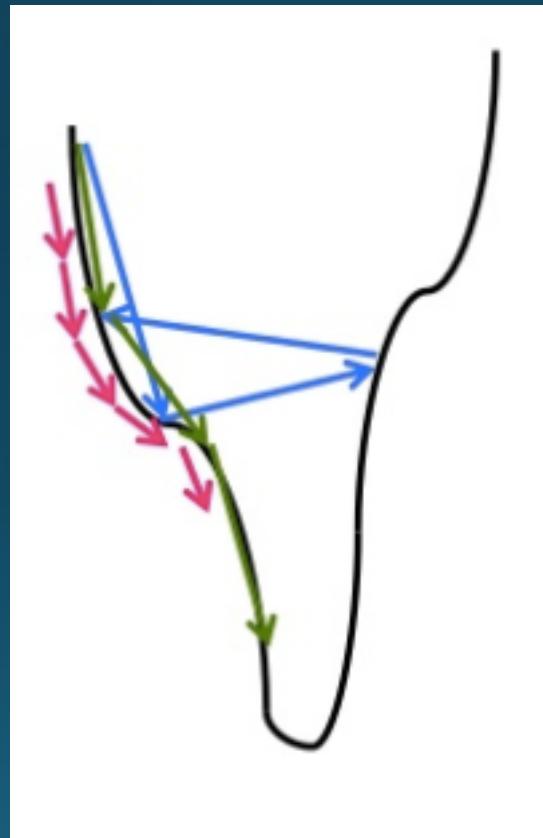
# Optimize function



# Learning rate

$$0 < lr < 1$$

影響收斂的速度  
影響結果的好壞



# Review

Gradient 受下列因素影響

Loss function

Learning rate

Optimize function

# Gradient descent 問題

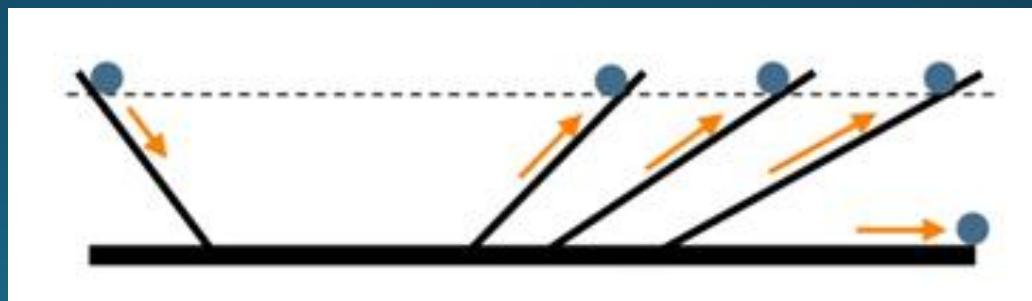
Speed up?



Mini-batch

Stuck in Local minimum?

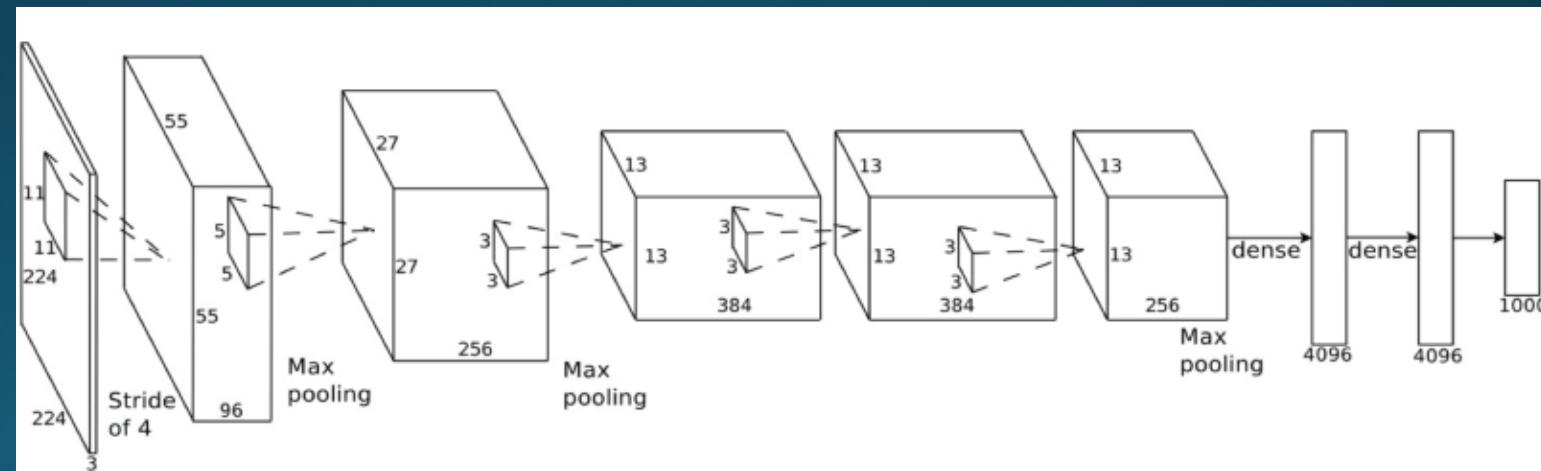
Momentum



# Network structure

到底要幾層？每層要開多大？

依照 input 的大小和特性決定  
一般來說第一層大一點，越來越小



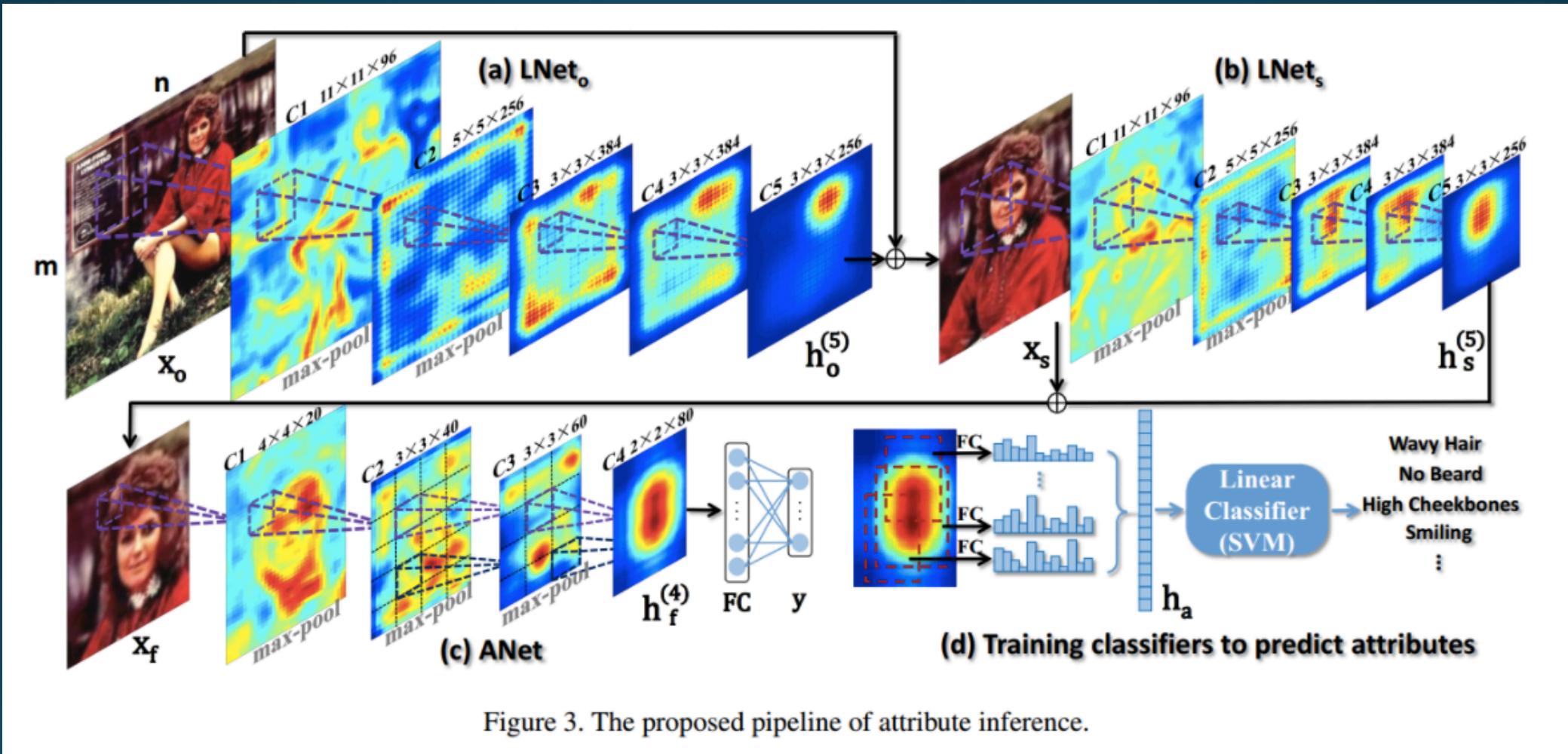


Figure 3. The proposed pipeline of attribute inference.

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# Tensorflow

Google 釋出內部使用的 library

快速建造需要的神經網路

You need Python!

Maybe you demand a nice GPU like 1080Ti

# Tensorboard

Scalars

Graphs

Distribution

Histogram

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# Summary & Way to go

- Mathematics
- Hyperparameter 的過程
- 克服 overfitting 的方法
- Vanish Gradient
- .....

