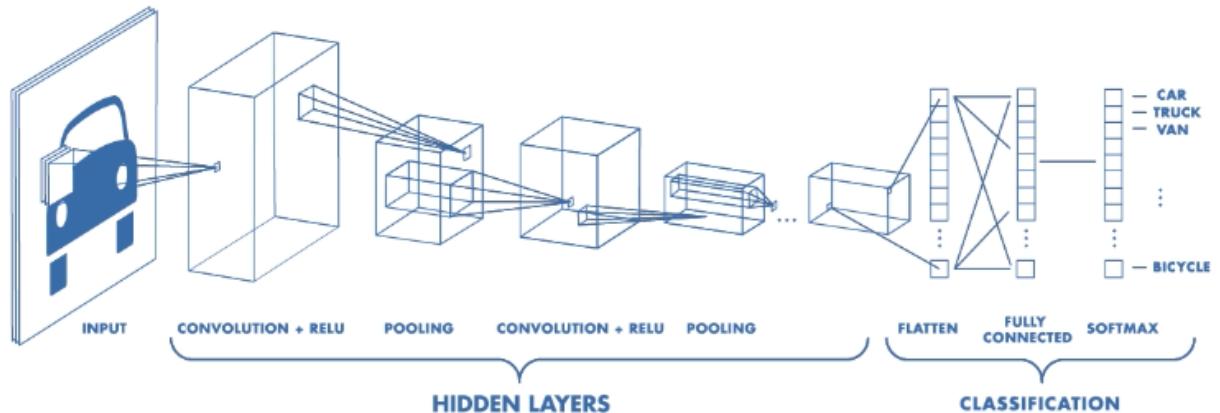
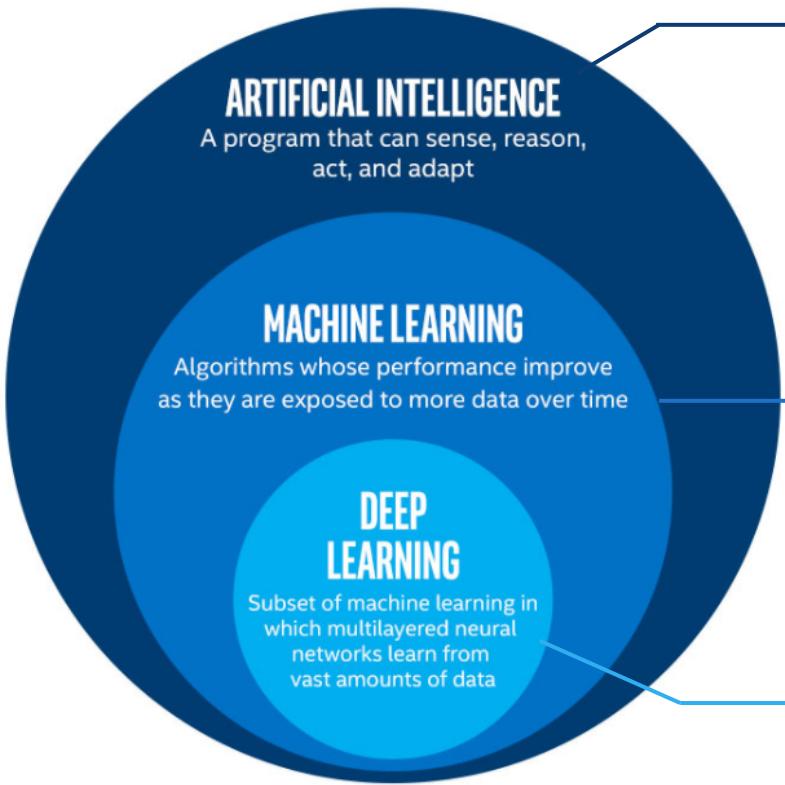


# A Basic Introduction to Convolution Neural Network



Rachel Chen

# What's the difference between AI, ML, and DL?



**AI** refers to the simulation of human intelligence processes by machines.

General AI (Dream) &  
Narrow AI (What we can do now!)

**ML** is the study of computer algorithms that improve automatically through experience.

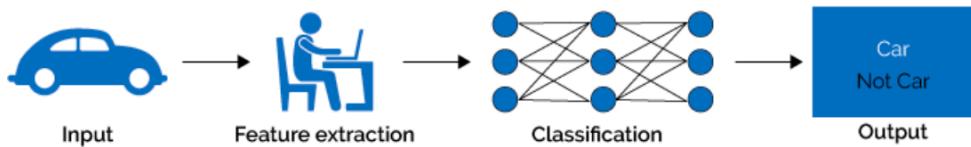
**DL** is part of ML based on artificial neural networks with feature learning.

Then...what's the difference between **ML**, and **DL**?



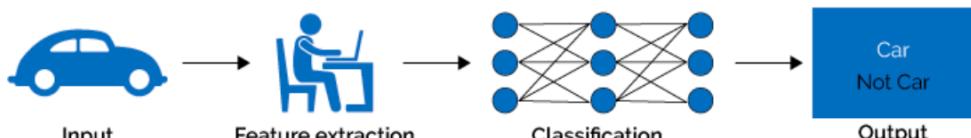


## Machine Learning

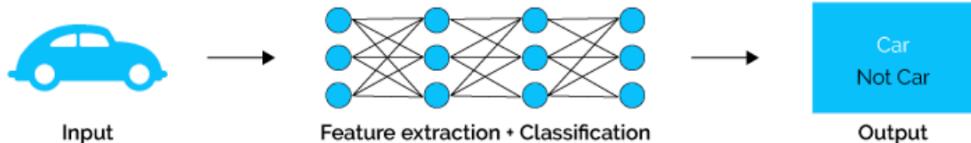




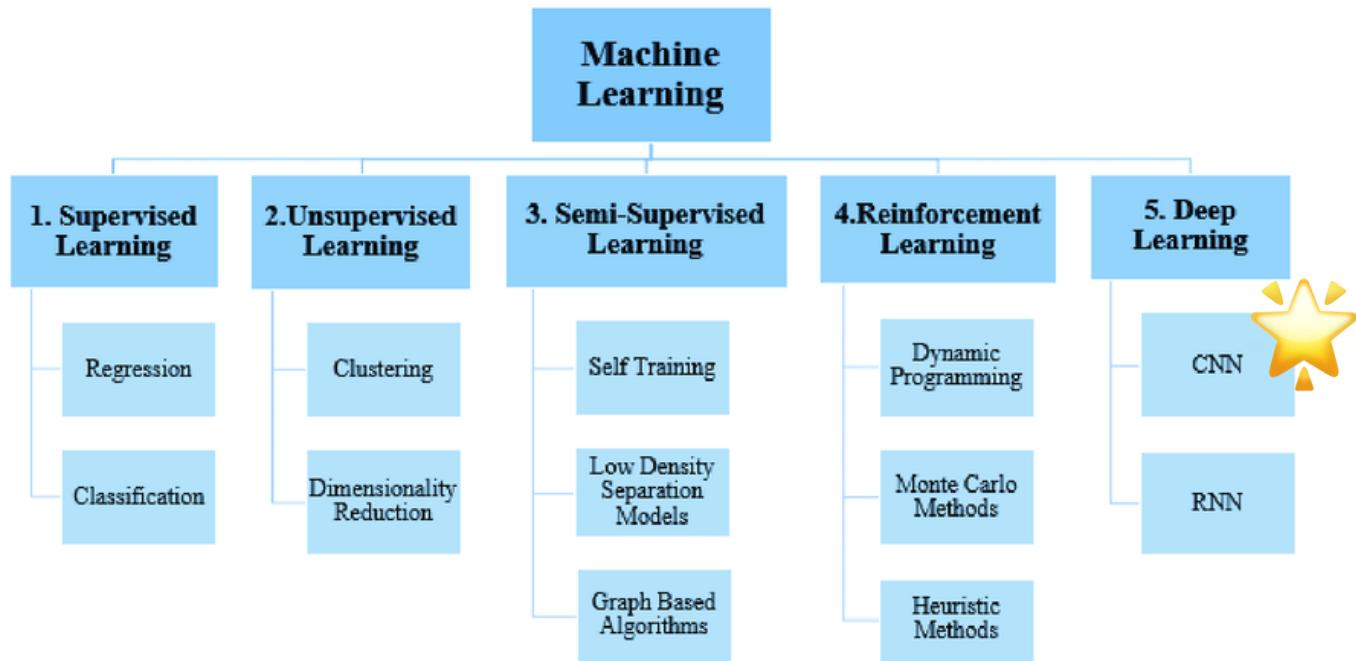
## Machine Learning



## Deep Learning



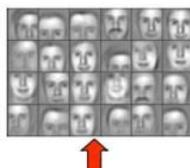
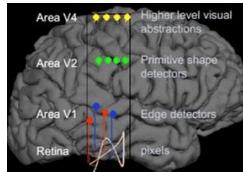
# Different Machine Learning Categories and Algorithms



CNN (Convolutional neural networks)  
卷積神經網路

# Why CNN and what is CNN? 😊

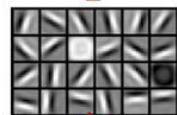
- A class of deep neural networks, most commonly applied to analyzing visual imagery.
- The learning process was surprisingly fast and it's a mature algorithms that are qualified by various applications.



object models



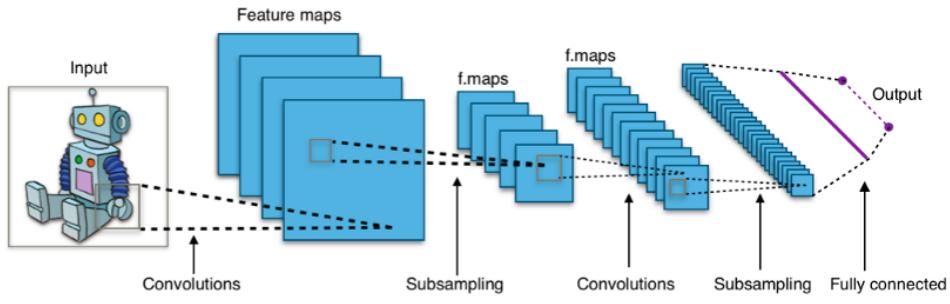
object parts  
(combination  
of edges)



edges

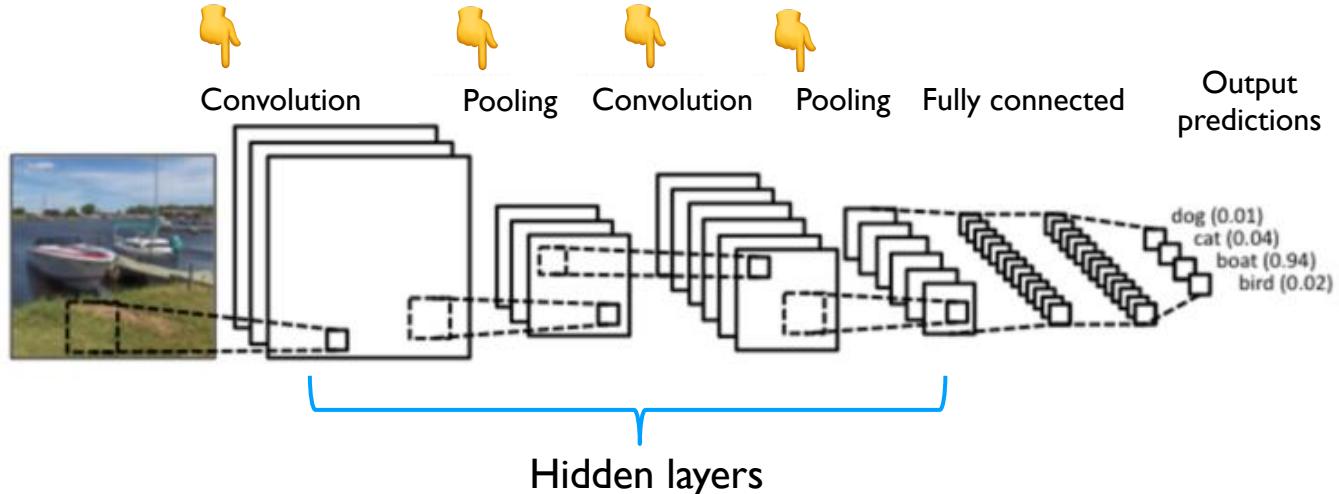


pixels



Typical CNN architecture

# CNN Architecture



- ◆ **Convolution layer** (卷積層) : the core building block of CNN; it extracts features from input images.
- ◆ **Pooling layer** (池化層): extracts particular values from a input set; this reduce the number of parameters, memory footprint and computations, so it can control overfitting.
- ◆ **Fully connected layer** (完全連接層): the last block of CNN, related to the task of classification.

# Good News



- Deep Learning is not too difficult (**yet!**) 😅
  - Basic algebra + Probability + Programming Language
- Many frameworks & unlimited study resources!
- And most of all, it's really fun!





## Deep Learning in Python!

PyTorch is a python package that provides two high-level features:

- Tensor computation (like numpy) with strong GPU acceleration
- Deep Neural Networks built on a tape-based autograd system

**facebook**



**NVIDIA.**



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PARIS INSTITUTE OF TECHNOLOGY

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Mellon  
University**

**UNIVERSITE  
PIERRE & MARIE CURIE  
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**Digital  
Reasoning**

**Stanford  
University**

**OXFORD**  
UNIVERSITY OF OXFORD

**NYU**

**Inria**

**ENS**  
ECOLE NORMALE  
SUPÉRIEURE

Linear, Logistic, softmax models  
DNN: Deep Neural Net  
CNN: Convolutional Neural Net  
RNN: Recurrent Neural Net

We can build state-of-the-art deep learning models with python  
via Pytorch! 😎

# Say “Hello World” to the world of deep learning!



airplane



automobile



bird



cat



deer



dog



frog



horse



ship



truck

