Hands on Deep Learning with pytorch

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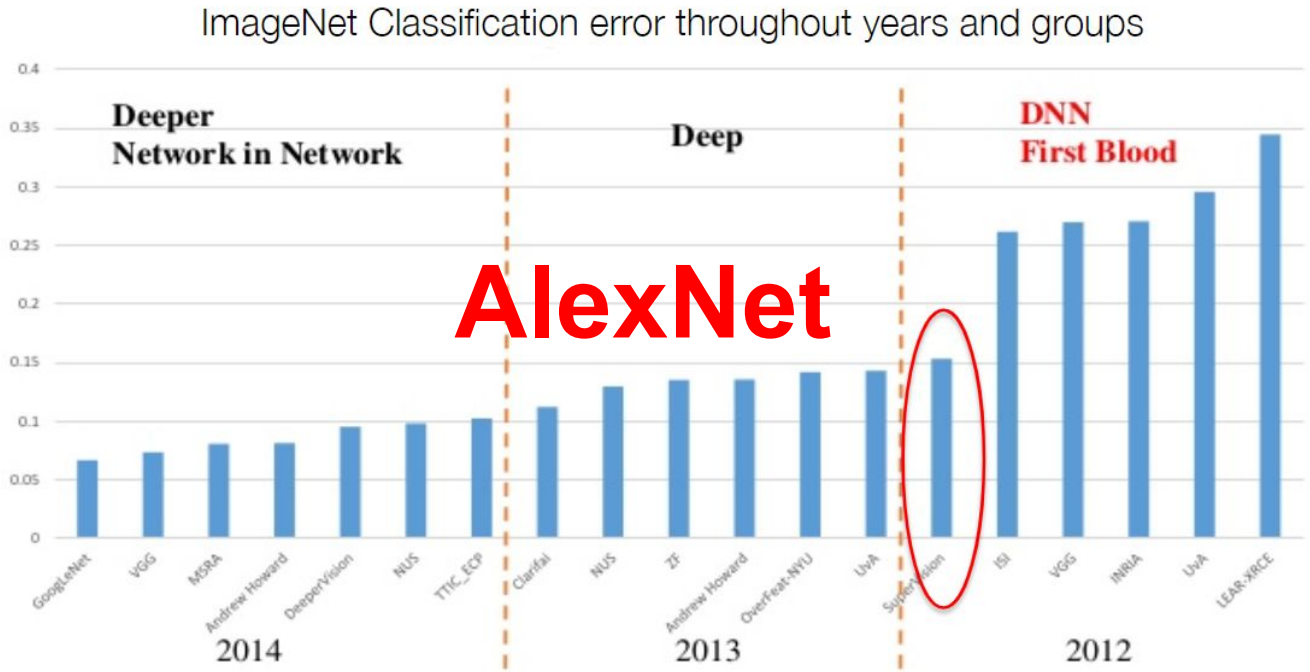
Date: March, 2021

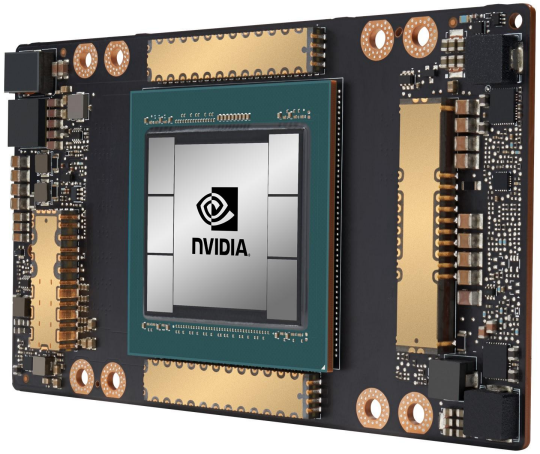
Why Neural Network

ILSVRC

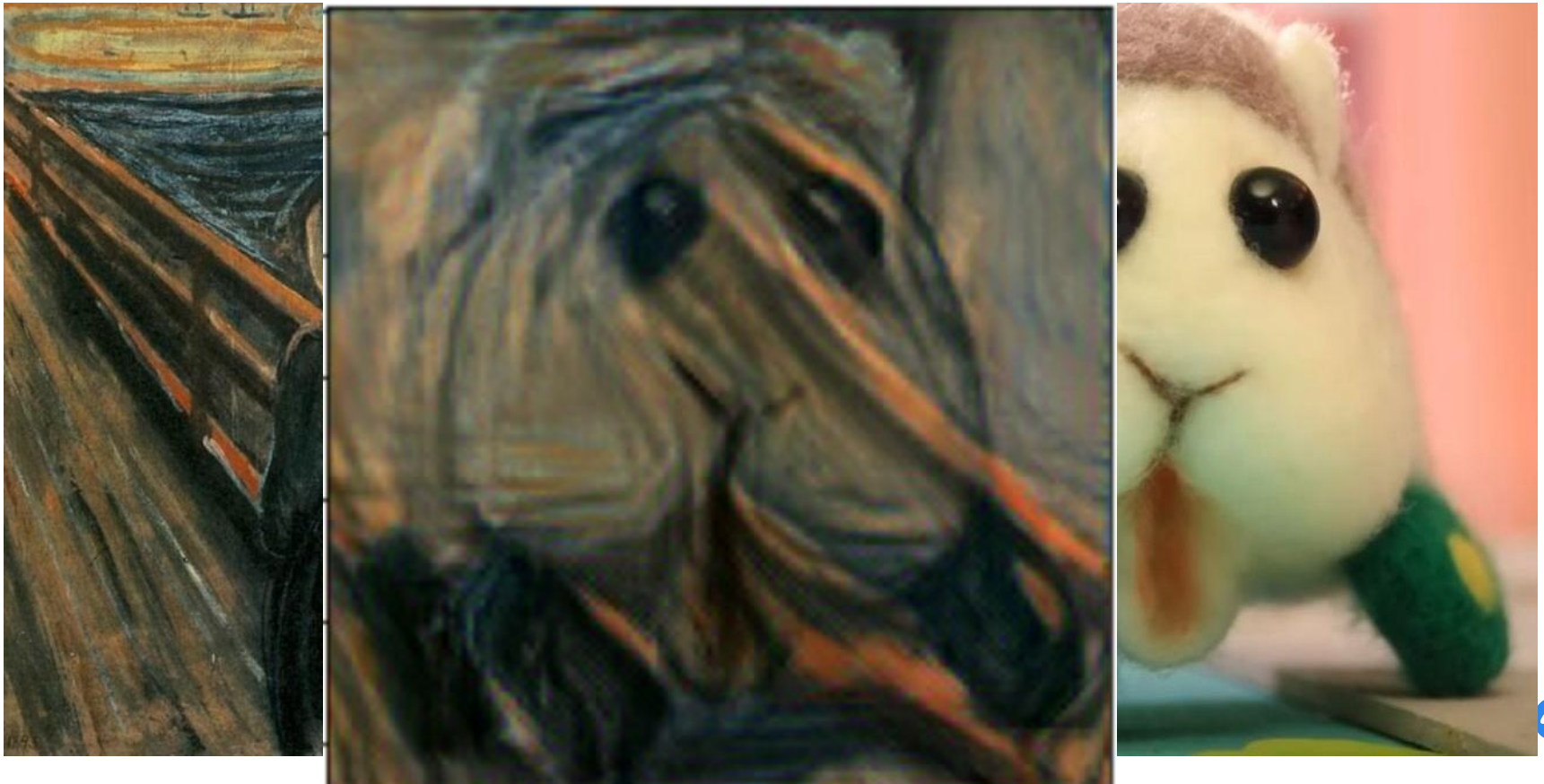
Why Neural Network getting deeper….



Why Neural Network



What is Deep Learning



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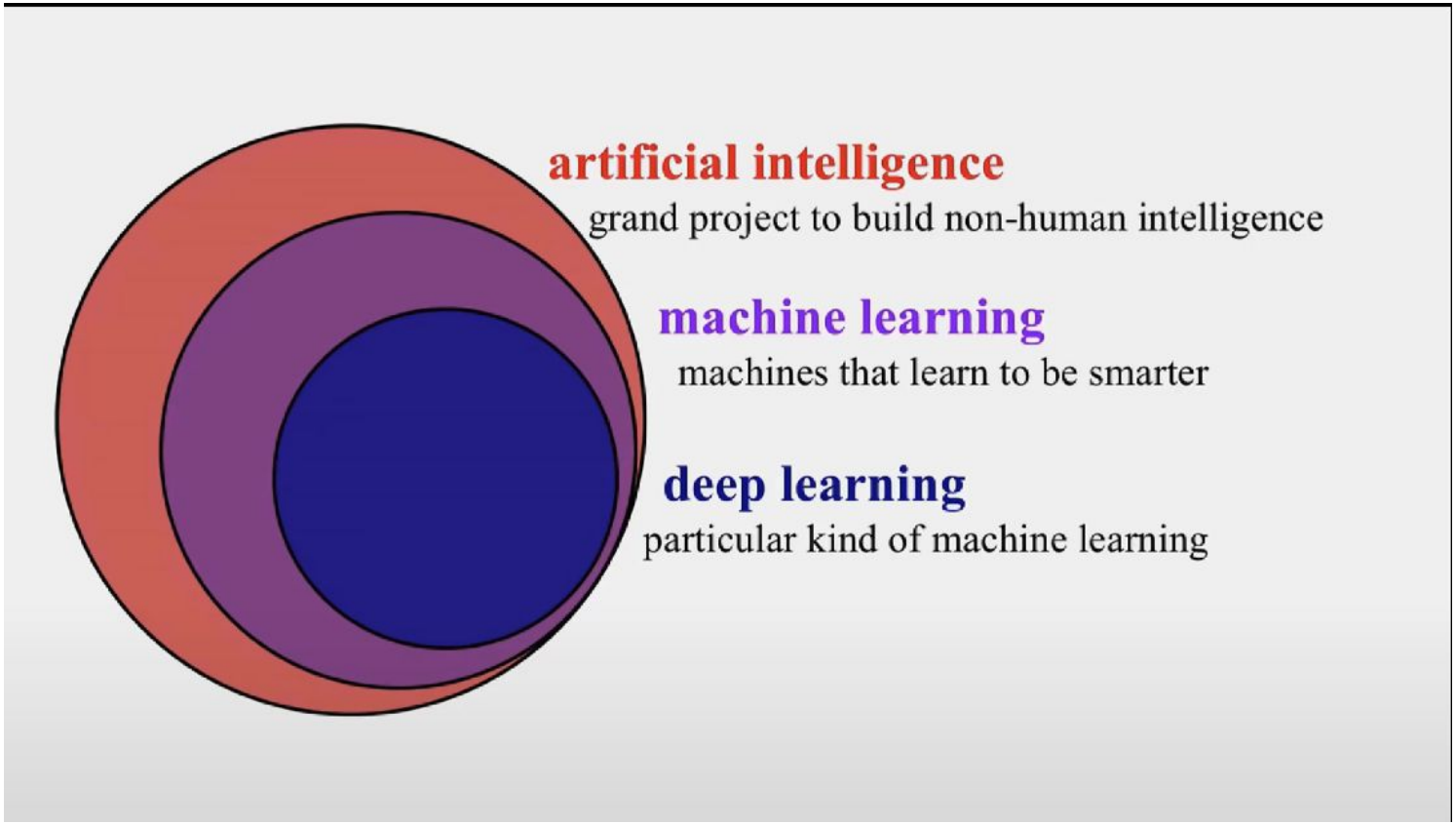
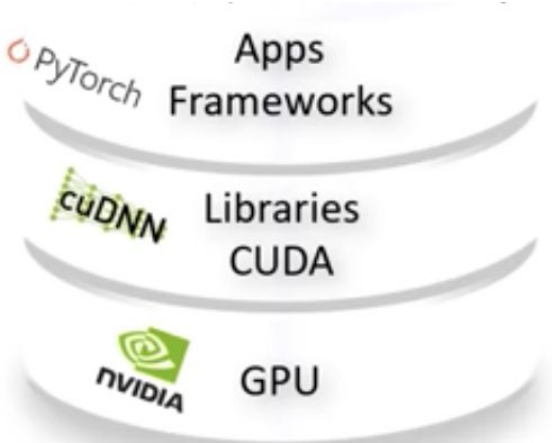


Why need GPU

parallel computing ability



Neural Network Framework : Pytorch

Neural Network Framework : Pytorch

- Easy to use
- Dynamic computational graph
- OOP design
- Abundant resources (arXiv)
- Over 1700+ GitHub contributors
- FaceBook (Sugar Daddy)

https://github.com/pytorch/pytorch

Tensor

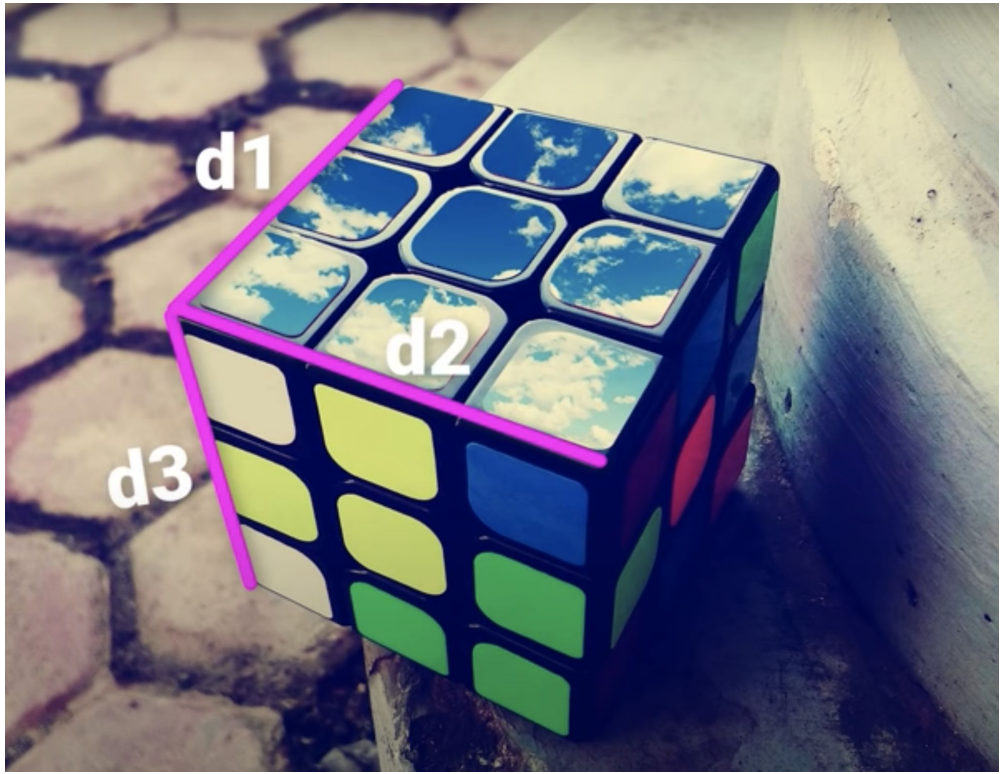
the primary data structures used by neural networks

Scalar : 0d-tensor

Vector : 1d-tensor

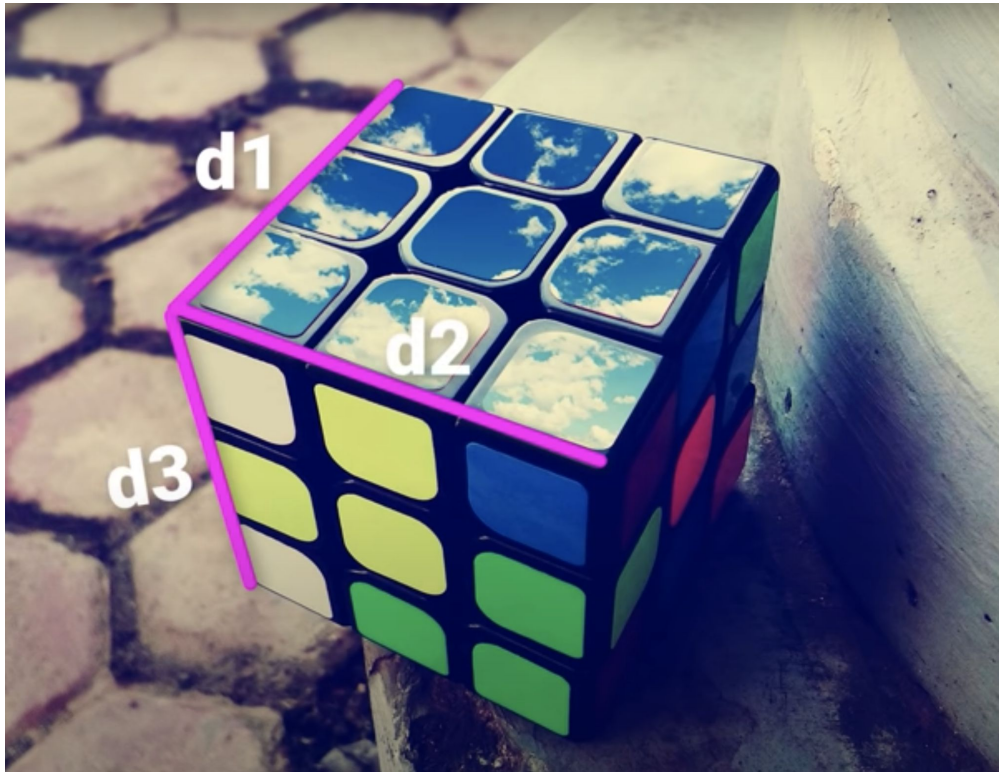
Matrix : 2d-tensor

Multi-dimensional array: Nd-tensor



Tensor (Rank, Axes, Shape)

1. Rank : The number of dimensions present within the tensor
2. Axes : 1st Axis, 2nd Axis, ...
3. **Shape** : How many indices along each axis



What is neural network ?

Tensor → Tensor → Tensor

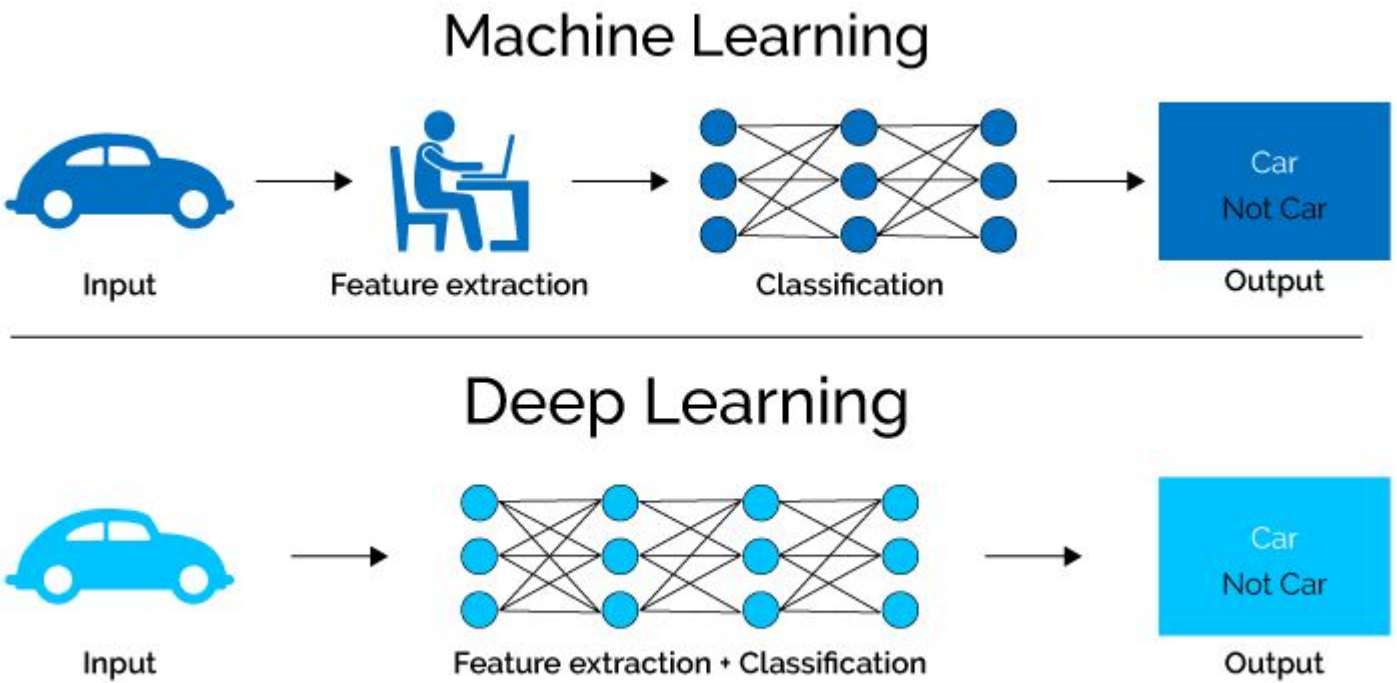
- reshape()
- squeeze()
- cat()
- stack()
- flatten()
- elementwise operation
- matmul()

Cats (O)
Dog (X)

What is neural network advantage ?

NN drink “data”, less traditional feature engineering
(domain knowledge)

What is neural network advantage ?



The way we think in deep learning

Accumulate dataset

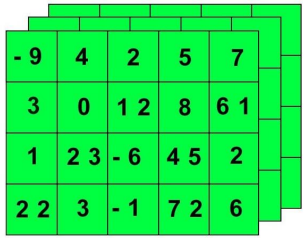
Define search spec (model structure)

Optimizer (loss function tuning)

What we need to do in deep learning

1. Prepare the data
    a. **E**xtract data from data source
    b. **T**ransform data to suitable format
    c. **L**oad data to suitable structure
2. Build the **Model**
3. **Train** the model
4. **Analyze** the model's result

Prepare the data



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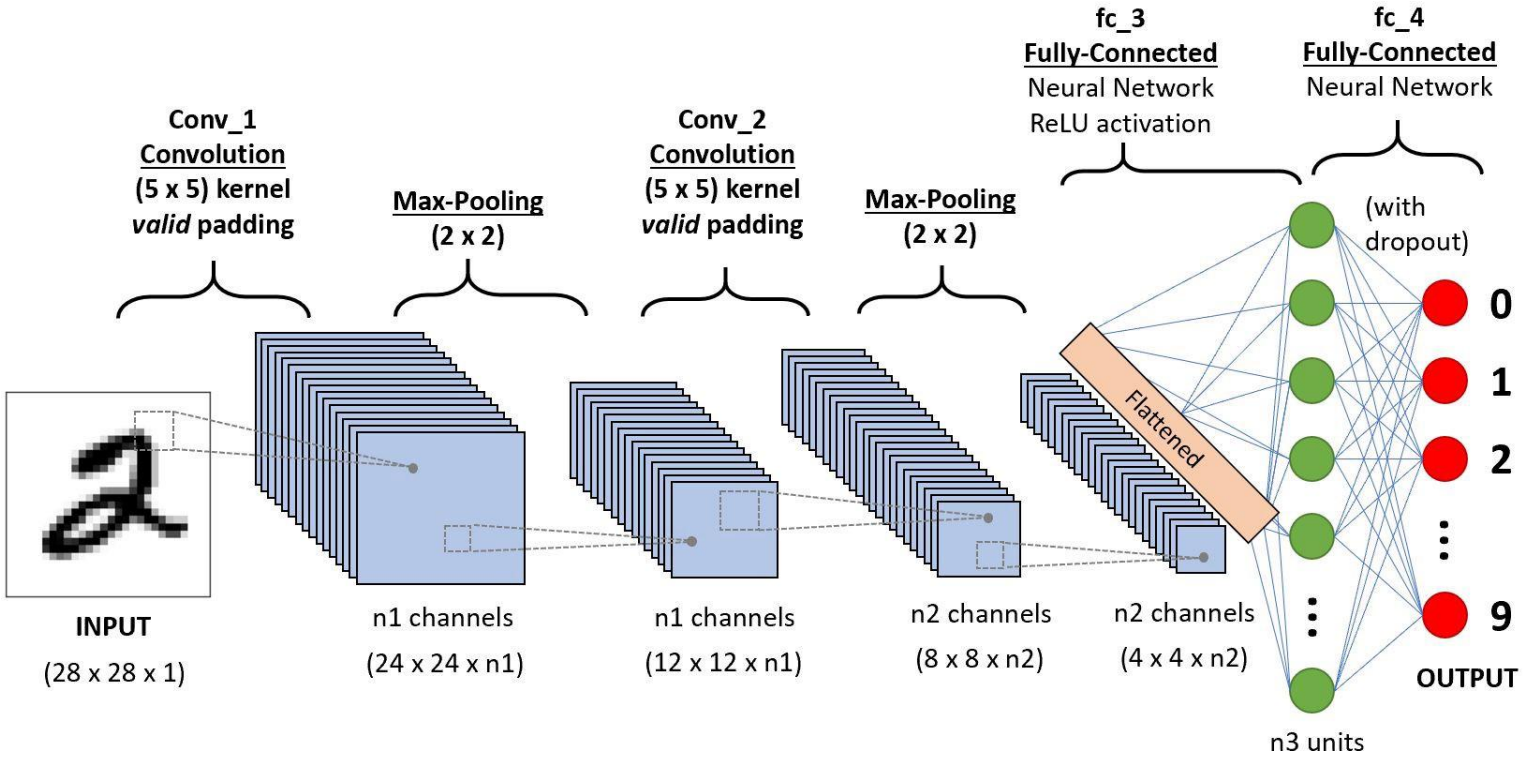
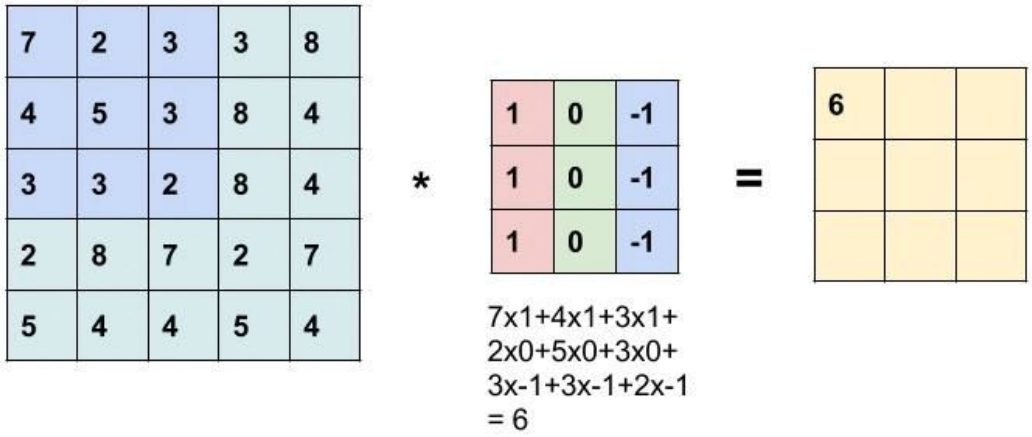
Convolution Neural Network



Convolution Layer



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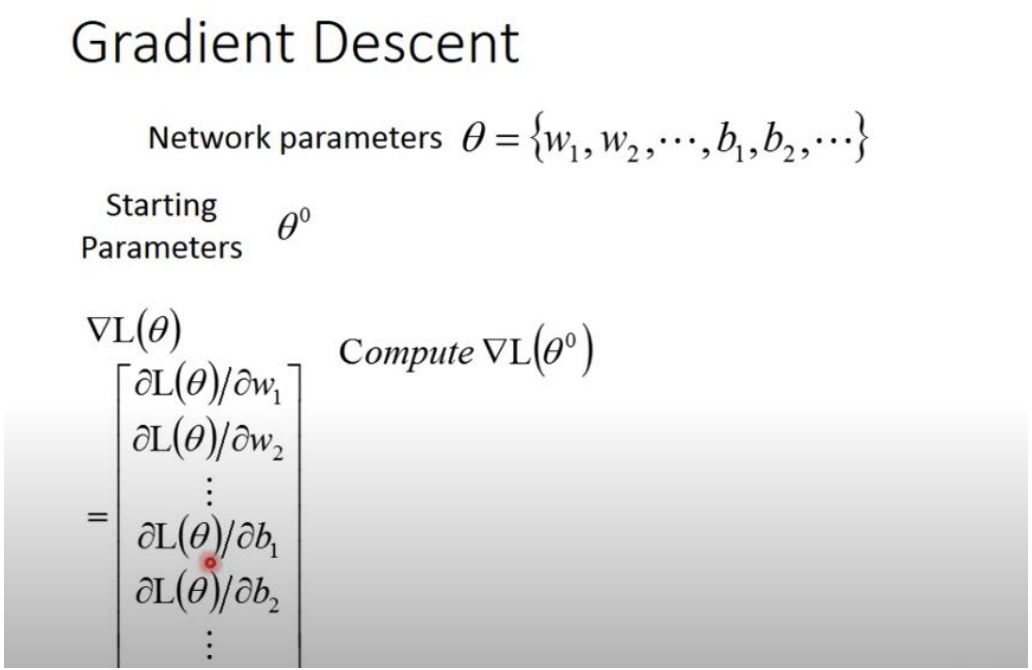
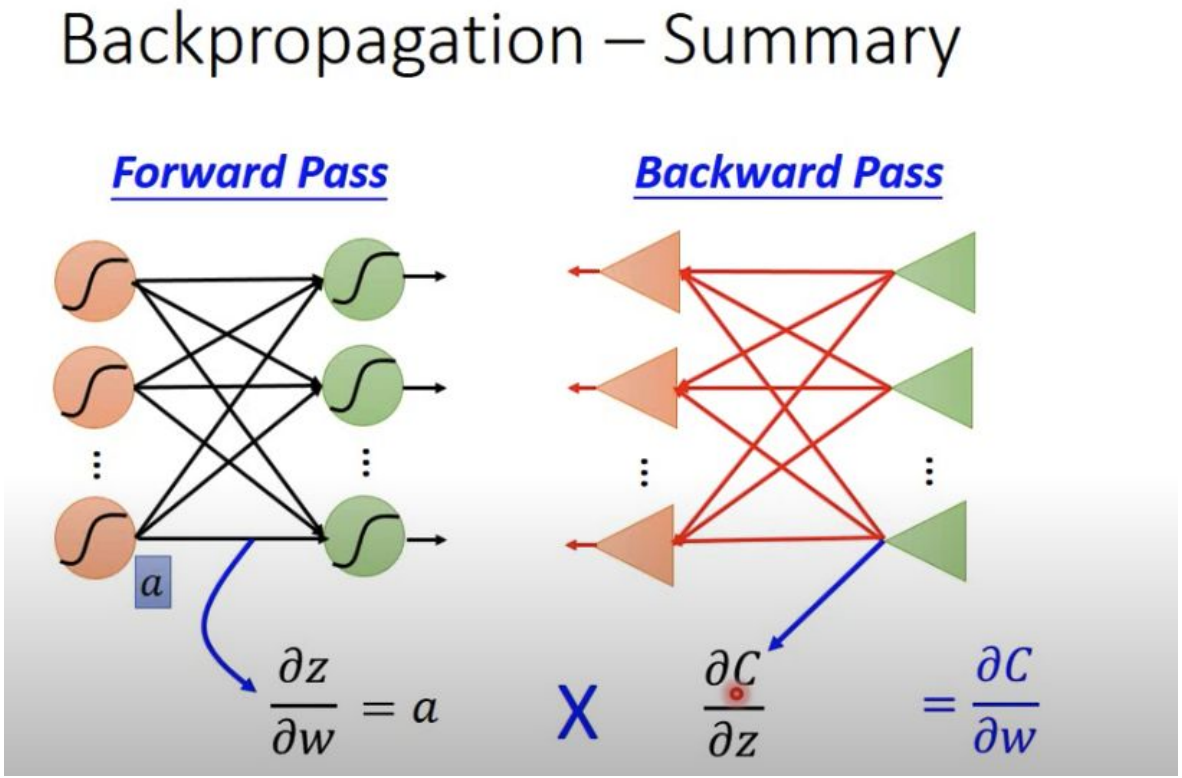
Gradient Descent



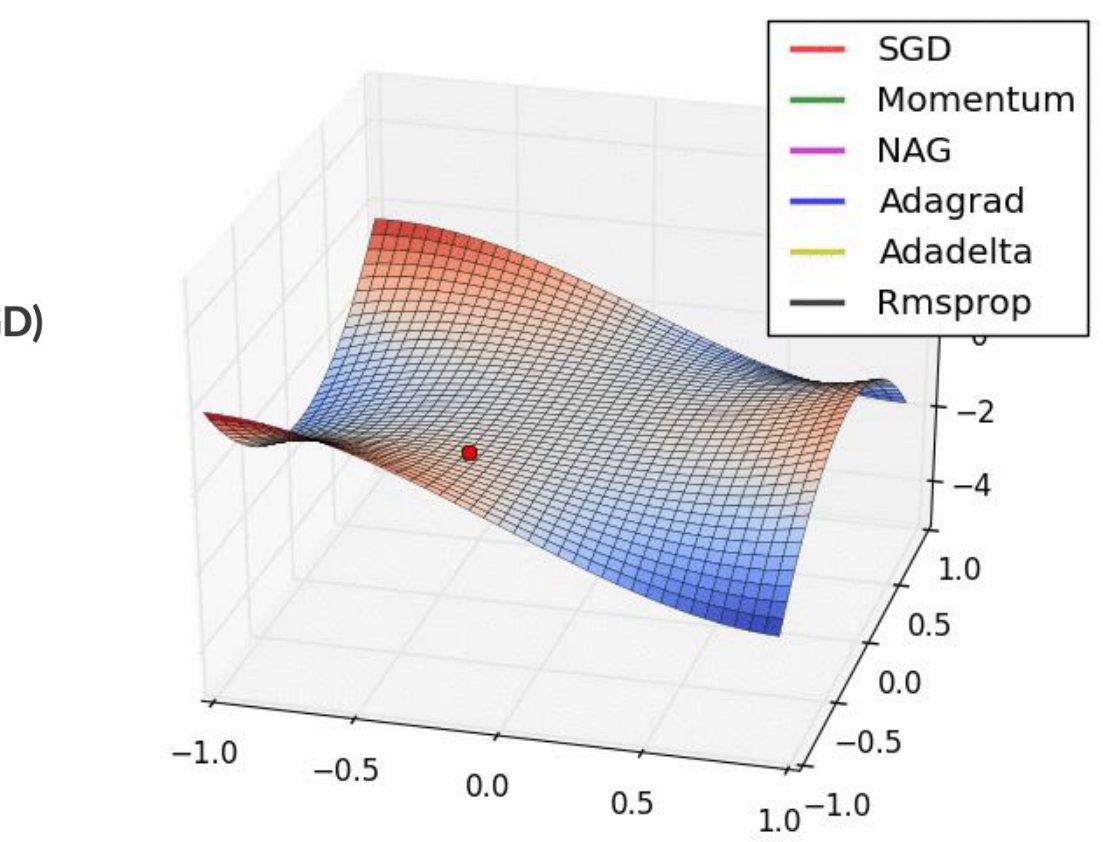
Gradient Descent (Backpropagation)



Opitimizer

Stochastic Gradient Decent(SGD)

$$W = W - \eta \frac{\partial L}{\partial W}$$



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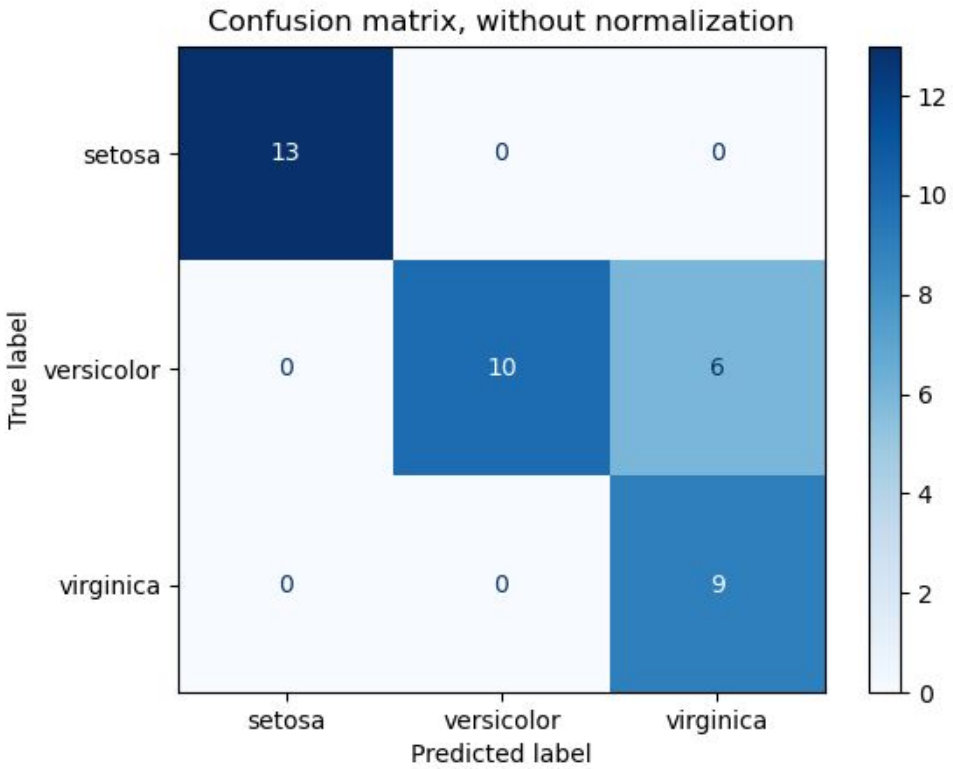
Accuracy, Confusion Matrix,



Let’s move on !

https://github.com/victorlin12345/HandsOnPytorch