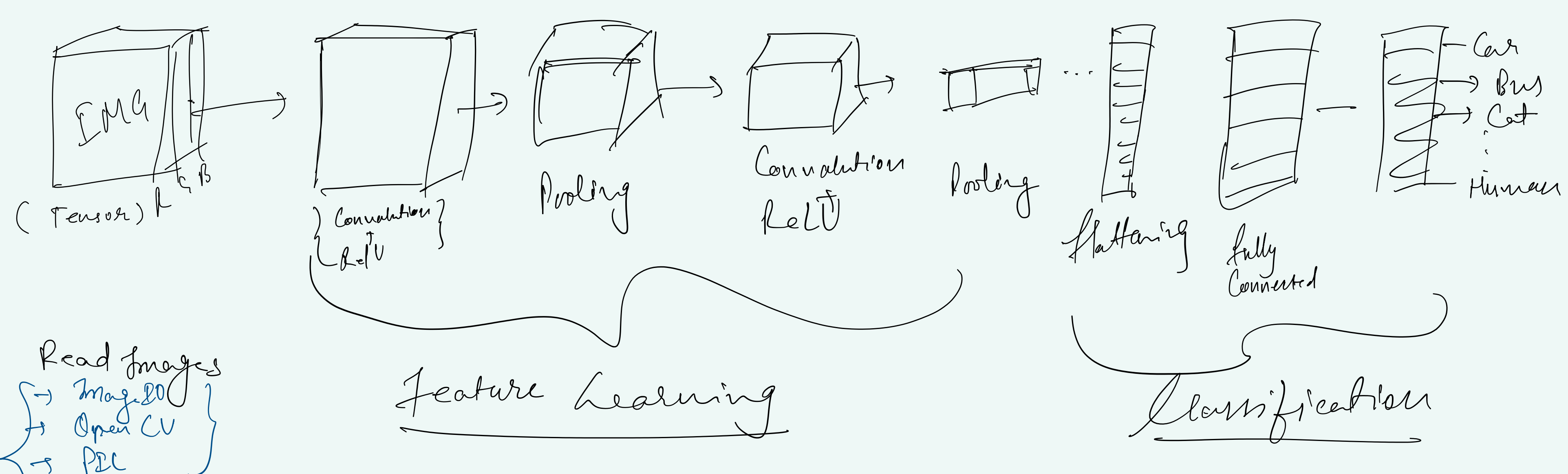
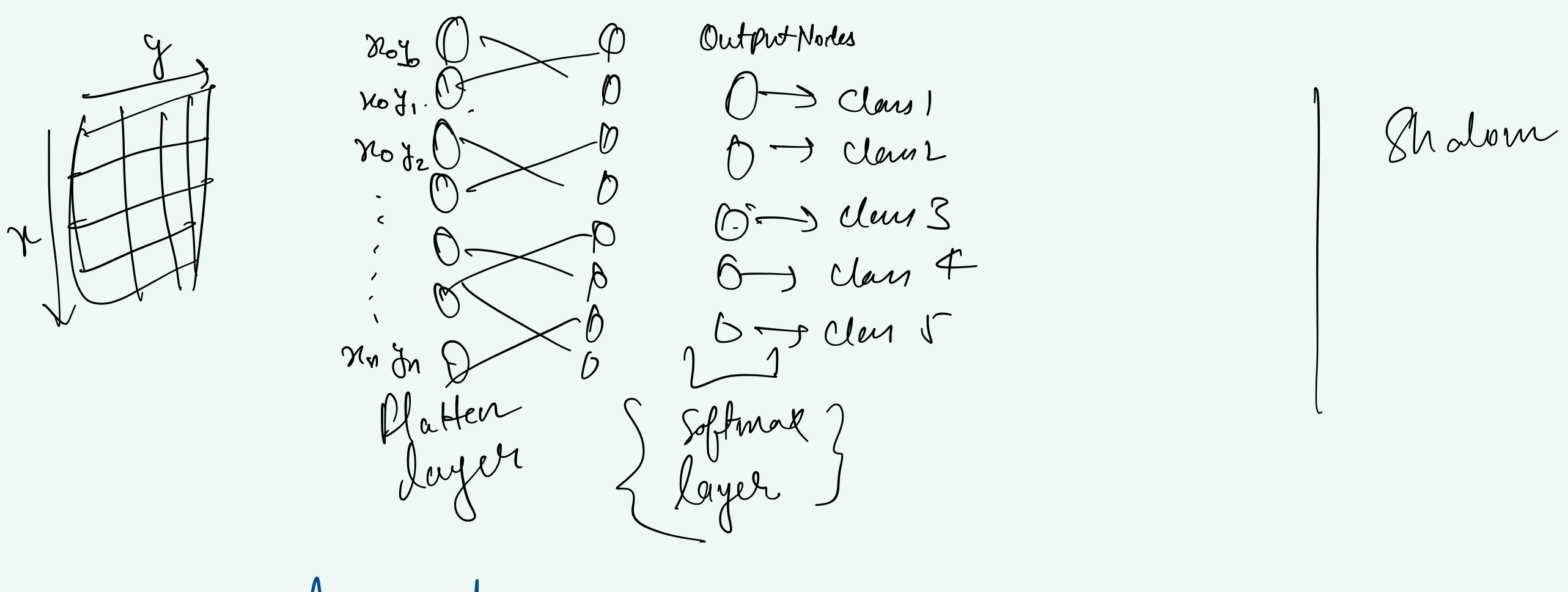
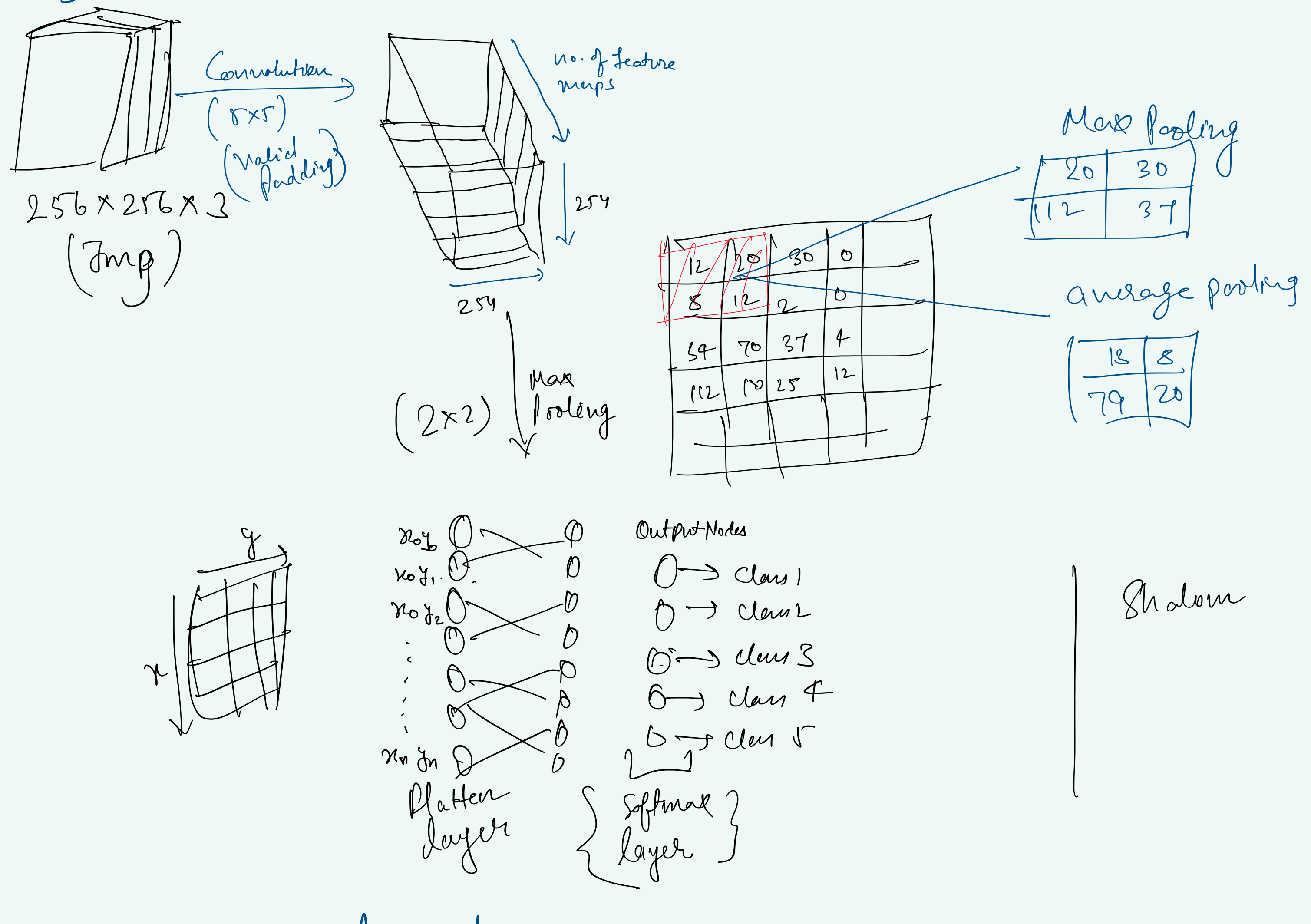


Things to go over:

- CNNs vs ANNs
- Kernels, Padding, Pooling, Striding
- Equation of a Basic Model
- Parameter Sharing
- Extra Neurons
- Same vs Valid Padding



Read Images
→ Image
→ OpenCV
→ PIL



CNN Vs ANN

Similarities :-

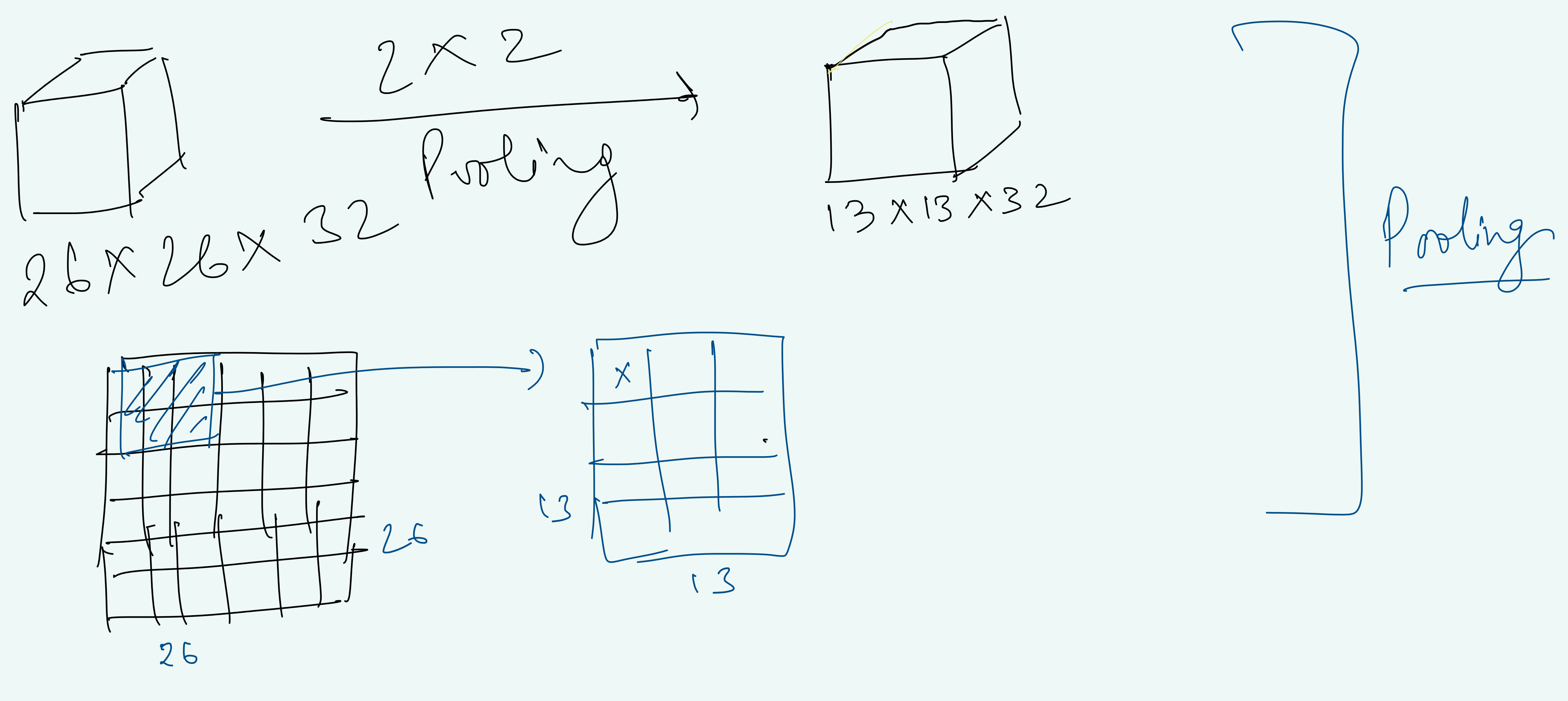
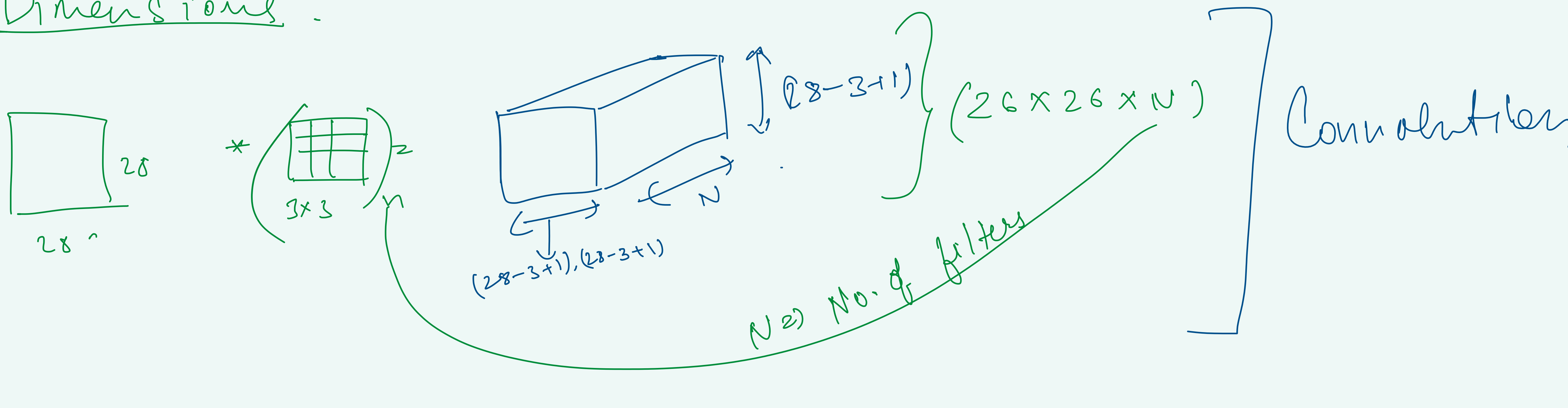
→ weights, Activation & Backprop

Diffs:

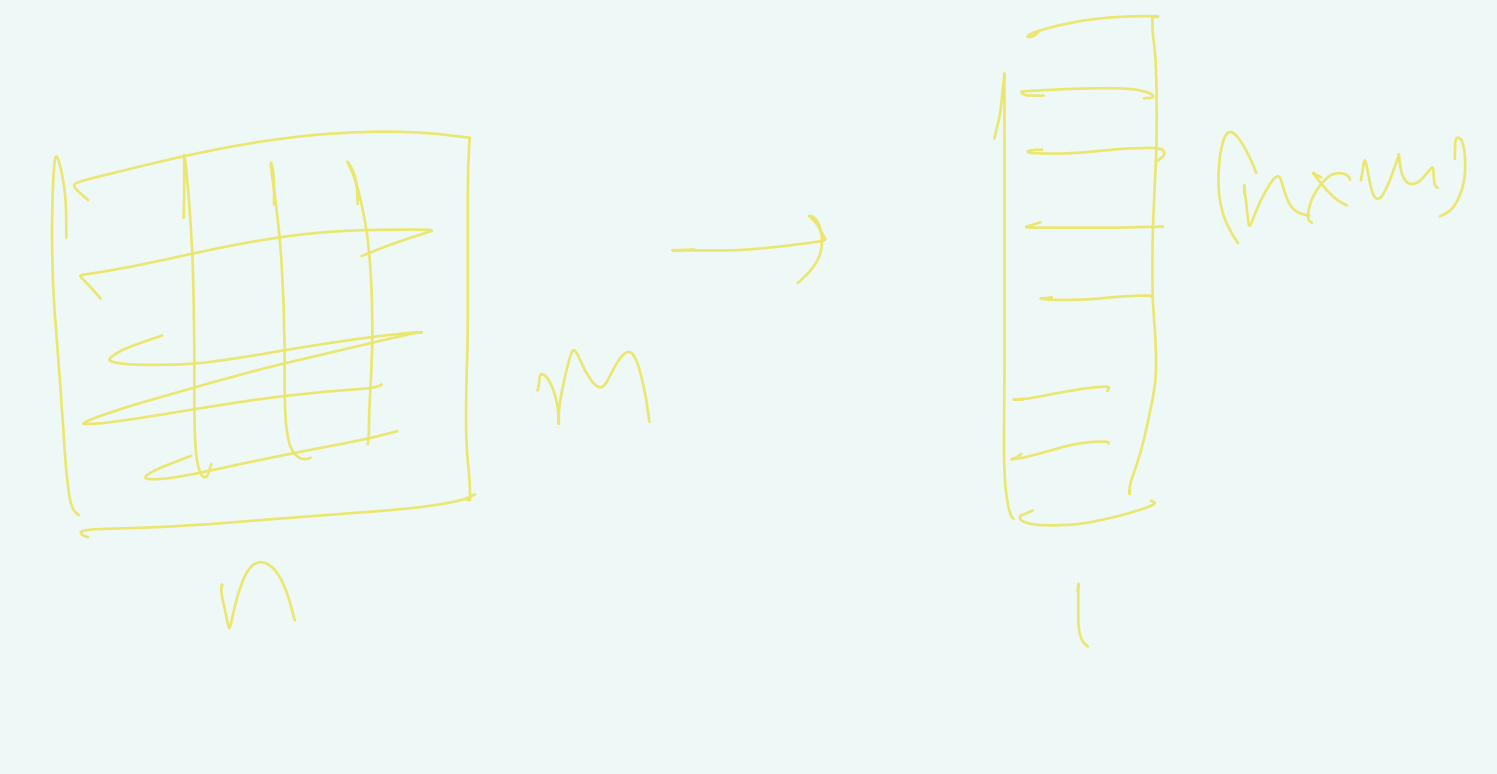
Parameter sharing: CNNs Yes, ANNs No

→ Parameter sharing is sharing of all neurons in a particular feature map.

Dimensions:



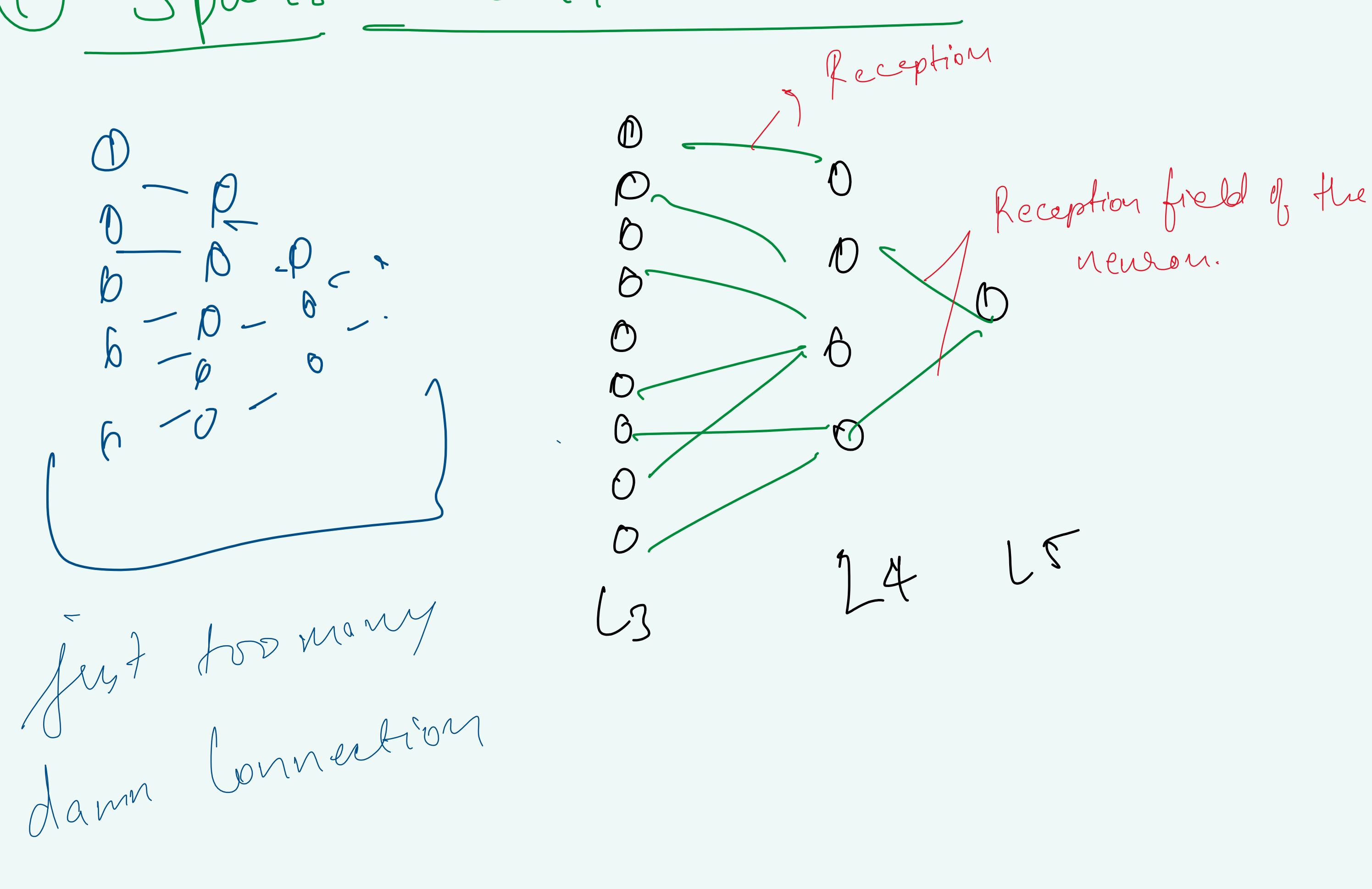
Fully Connected layer:-



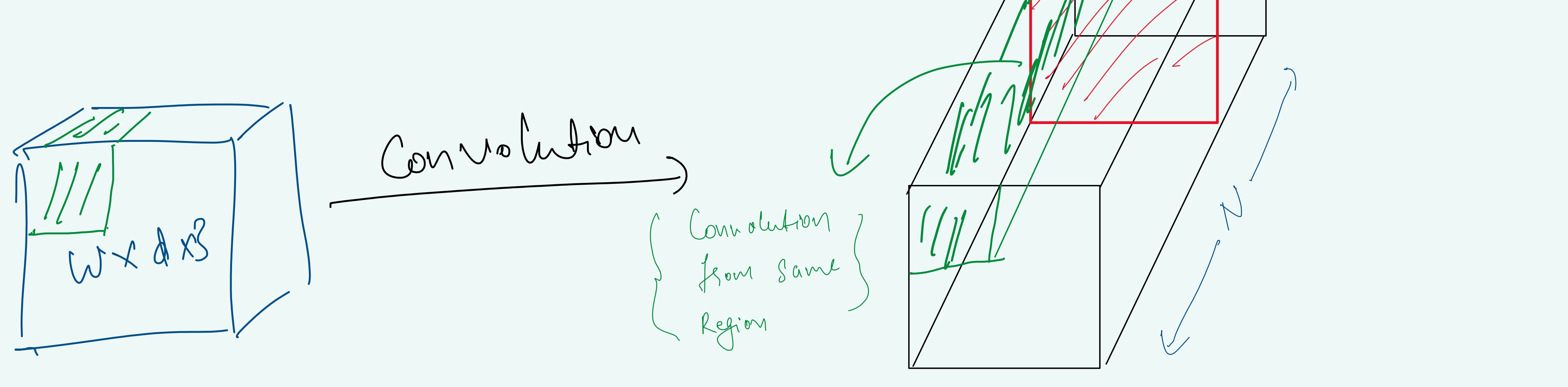
- To learn non-linear combination of features
- Convolutional layers: Provide meaningful low-dim, invariant feature map
- FC-layer: learn non-linear function

Feature of CNNs

① Sparse Interaction :-



② Parameter Sharing :-



③ Equivariant Representation

$$P(g(x)) = g(f(x))$$

What it means that

$$(Img) \xrightarrow{\text{Augmentation}} (Img)_T \xrightarrow{\text{CNN}} (Features)_1$$

$$(Img)_T \xrightarrow[\text{Augmentation}]{\text{Reverse}} (Img) \xrightarrow{\text{CNN}} (Features)_2$$

$$(Feature)_1 \approx (Feature)_2$$