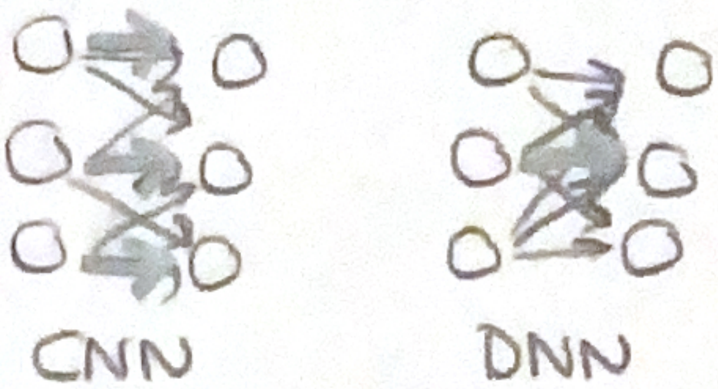
Parameter Sharing



→ Connections that use a particular parameter.

(Reduces storage requirements!)

Equivariance

An equivariant function means if the input changes, output changes in the same way.

$f \underset{\text{equivariant}}{\longleftrightarrow} g$ if $f(g(x)) = g(f(x))$

- For convolution → If we move object in the input, it's representation will move the same amount in the input. Thus we can create 2D map of where certain features appear.

Pooling

→ Pooling replaces outputs of the net at a certain location with a summary statistic of the nearby outputs.

→ Max pooling reports the maximum outputs within a rectangular nbhd. (Other pooling func: L^2 norm, average, weighted average)

→ The representation becomes invariant to small translations. (Useful when some feature is present than exactly where it is.)

e.g. we don't need to know exact location of eyes, we need to know that a face has eyes on right & left.

→ Pooling is essential to handle varying input sizes. (Varying size of an offset between pooling regions such that classification layer always receives the same number of summary stats regardless of input size.