How human mind processes the images?

* Light from retina goes through optical nerves (cells) to the thallimius and from there to the V1. Electrochemical single is the method through which light moves thorough the nerves.
* Main takeaway is different cells process different aspects

CNN: Architecture is as such where you have Image arrays as input and then you apply filters on it and do the convolutional process. (with padding, strides or without them). And then add pooling to address few issues raised such as

* Reduced array shape
* More impact to the centered pixels
* Overfitting
* Computational efficiency.
* Memory issue
* And translational invariance.

How does the convolutional operation happen:

* 2D: A black and white image is applied with the filter and gets you reduced 2D array with cross multiplying each corresponding element and then adding all the products (dot product).
* For 3D you do the same but with 3D filter but the output you get is 2D array only after every entire operation. Cause the 3D convolutional operation happens with the filter having the same depth as your input and you don’t stride/move your filter backwards but you only move them in 2D and i.e. you get 2D array output as a **FEATURE MAP.** Size of the feature map is always a **2D array X no.of filters.**

Trainable parameters: What you calculate weights and biases rights. (Keep the same principle here as well):kk

What could be the trainable parameter?

Feature maps does look like a trainable parameter but it is not is it?, Those arrays are something similar to the output the ANN. Not something but kind of exactly like the output of the ANN

And then what is similar to the weights?

* Filters are what we want to create and developed for a particular image cause those are the arrays or rather values which are getting applied on our input and producing output right. So, we have to decide those values and those exact values are nothing but the comparatives of the weights.
* And the biases of each filter

So, trainable parameters are size of the ( filter array \* No. of. Filters ) + biases.

Main thing about the CNN that trainable parameters do not depends upon input parameters at all which was the case in ANN that was creating the high computational complexities and memorization error.

Padding and Strides :

Pooling :

* Pooling solves two problems
* 1. Memory Issue:
* 2. Translation Invariance ( Only for minor translation chanes)