**Day 43**

**What to do?**

Learn about kernels/filters and how different filters detect different things.

**Kernels/Filters:**

Usually filters in CNN are used for detecting edges, like horizontal edges, vertical edges, lines for buildings, walls, railings, pedestrians, etc. There are multiple filters for different detections. Vertical edge detection was seen in yesterday’s document.

When filters are assigned for feed forward propagation, the values of filters can be changed during back propagation so that the filter works properly.

**Convolutions over volume:**

RGB images are volume input as it has three channels added to the image. Hence, its dimension is always N x N x 3. The rule for filters when convoluted with volume is that the value of the third dimension should be the same. For example, consider an image (input) of size 6 x 6 x 3, possible filter is 3 x 3 x 3. However, the output is a 2D image, in this case, 4 x 4 x 1.

**Multiple filters:**

Say, you have an image of size 6 x 6 x 3 that has railings and buildings. It must detect horizontal edges, vertical edges, and walls. Hence, it requires three filters (each of size 3 x 3 x 3) that must be used at the same time. Hence, the output will be 4 x 4 x 3. The third dimension is 3 because three filters are used for convolutions.

