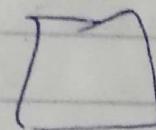
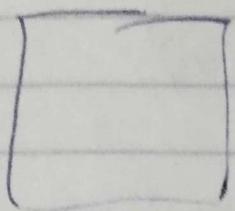


\Rightarrow Flattening: The flattened matrix is fed as input to the fully connected layer to classify the image.

functions: The fully connected layer is a traditional neural network layer where each target neuron is connected to every neuron in the previous and subsequent layers.

parameters: The number of neurons in fully connected layer is critical parameters that affect the model's capacity.

⇒ Pooling: The pooling layer is responsible for reducing the spatial size of the convolved feature. This is to decrease the computational power required to process the data by reducing the dimensions through the extra computational power.



use huiy theeli
data kha process
karna hoga

if use for reducing loss for data. of edges.

⇒ There are two type of pooling operations
maxpooling: Get the Max value/feature in the area where the filter's applies

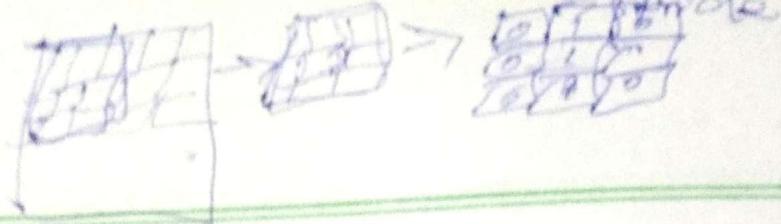
ex
$$\begin{matrix} 1 & 2 & 3 \\ 3 & 4 & 5 \end{matrix} \rightarrow \text{Max}$$

Avg pooling: Get the average of values in the area where the filter is applied.

$1+2+3+4+5 \rightarrow 16$

$$\begin{matrix} 2 & 3 & 1 & 4 \\ 5 & 6 \end{matrix}$$

Pooling is padding
as input we use in the image
edges ahi jeky border jyu una mai jeky
information ahi una less hi thi



→ **filter**: This is also called kernel or feature Detector.

2. **Image section**: The size of image section should be equal to the size of the filter (s) we choose. The number of image sections depends on the **Stride**.

Feature map

The number of steps (pixels) that we shift the filter over the input image is called stride.

⇒ **ReLU layer** (Rectified Linear Unit)

→ ReLU helps in overcoming the vanishing gradient problem and accelerates convergence during training.

→ are those problems whose output comes very nearest to 0. After that they give the output $[0, \infty]$, and the problem will become easier.

→ and joky b negative value hoondi and positive khai 0 kary shaddendo aur shaddendo aw.

~~ReLU~~
ReLU

Diagram.

How a NN work

1	1	0
0	1	1
0	0	1

Input image.

it is in the form

of array, and it has
the values in pixels format

and pixels value hamayon

(0 - 255) wicher mai

hoondyo ahi. then why

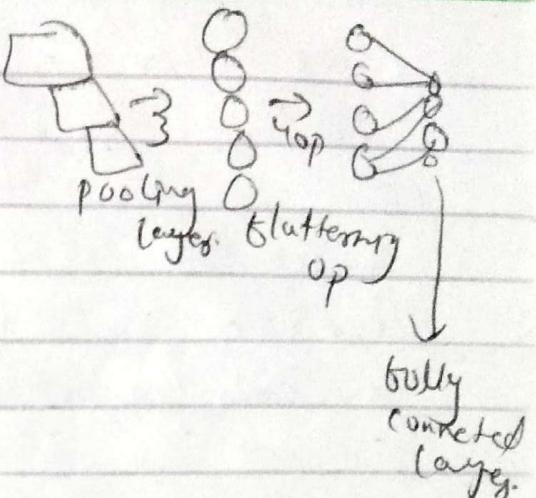
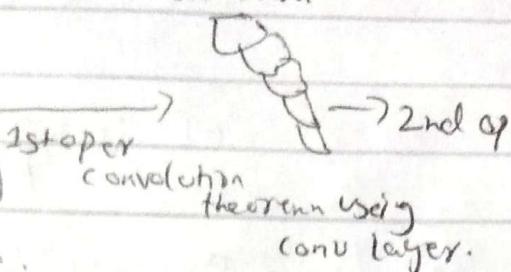
0 and 1 mai ahi?? Image mai?

so hify jekka image ahi then normalized
ahi.

normalized mai uss photo khei same
scale mai (ahir ji koshish kande ayo.
Dekhiya cheta khei

⇒ Convolutional layer: The first layer in a CNN
is a conv layer, it takes the images as
input and begins to process.

There are the three elements in
conv layer:
1, input image
2, filters
3, feature map



fully
connected
layer.

- 1. convolutional layers
- 2. ReLU layers
- 3. pooling layers
- 4. fully connected layers

\Rightarrow So CNN are specially designed to work with images. An image consist of pixels. In deep C, images are represented as arrays of pixel values.
→ image can be in RGB format
or → Gray scale.
In RGB format we 3 channels for creating one image. & Red, Green, Blue in B/w ($0 - 255$)
, it use single channel Black or white.

\Rightarrow There are four main types of layers in a CNN.

- 1. convolutional layers
- 2. ReLU
- 3. Pooling layers.
- 4. Fully connected (dense) layers.

There are four main types of operations.

- 1. convolution operation
- 2. pooling operation.
- 3. flatten operation
- 4. classification op

=> Introduction to Convolutional Neural Networks

=> They are a type of Artificial Neural Networks (ANN) that are really good at understanding images.

Think of them as a way for a computer to see and understand pictures like we do.

How?

CNNs don't look at the whole image at once, They look for small patterns, like edges, shapes, or textures.

3. Convolution.

This is the key trick, it's like using a "filter" to scan the image.

technique / Kernel

- The filter looks for a specific pattern.

e.g. Self-Driving cars

CNNs help cars "see" and understand the road.

They can identify traffic signs, pedestrians, and other cars.

- CNN are great for image recog.

- They find patterns in images

- They learn from examples

- They are used for many different applications.