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PGD - Data Science with AI
Batch 7.

MCQs

Q1: (iv) Sigmoid

Q2: (iv) Dropout

Q3: (iii) Batch norms makes training faster

Q4: (iii) The number of biases is equal to the number of filters.

Q5 (ii) The process of scanning misclassified examples to identify weakness of a model.

TASK-3:

W = 12	W = 16	W = 4
B = 4	B = 4	B = 1

$W = 12 + 16 + 4$

$W = 32$

$B = 4 + 4 + 1$

$B = 9.$

$T = W + B.$

Trainable Parameters $= T = W + B$

$T = 32 + 9$

$\boxed{T = 41}$

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Answer any 4 - Questions.

(b) TWO BENIFITS OF USING CONVOLUTIONAL LAYERS.

ii) It shares weights region of input and reducing the number of parameters compared to fully connected layer.

(ii) It is inherently designed.
It is designed to capture spatial pattern

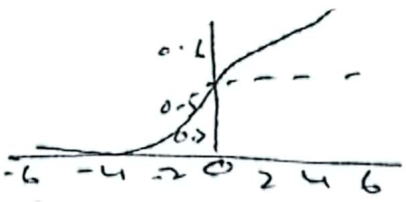
(c) ACTIVATION FUNCTION

An activation function in a neural network is a mathematical function. It takes weighted sum of inputs and add bias then apply the activation function to give output.

ii) SIGMOID:

Two classes can be seperate with the help of probability in Sigmaid function.

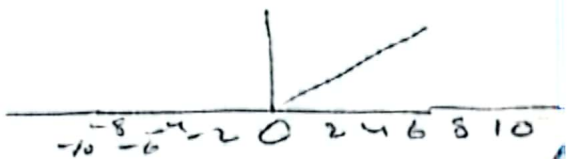
$$a = \frac{1}{1 + \exp(-z)}$$



(ii) Rectifier (Relu) Function:

By default function is used, it is called Rectifier (Relu) Function. Here Let we will find out the value of "z".

$$R(z) = \max(0, z)$$



(c) Data augmentation Techniques.

(i) Image Augmentation :=> flipping the images to create new variation. => Rotate the image => Cropping => Zooming => Color Jettering => Noise addition.

(ii) ~~Text Augmentation:~~

(ii) Text Augmentation: => Synonyms => back translation Insertion/deletion/Swaping => Random. =>

(iii) Audio Augmentation :=> Background noise => speed => Pitch variation => Time shifting.

(iv) Synthetic Data Generation: GANs. rule-based generation.

(v) Data Combination: Combine datasets.

These techniques can help overcome data shortage and improve model performance.

(d) L1 Regularization is a method that leads to weight sparsity.

-> L1 Penalty.

-> Sparsity.

Encourages sparsity by shrinking some weights to zero. And L-2 Shrinks all weights towards zero but doesn't guarantee sparsity.

L1-Regularization promote sparsity, leading to simpler model with fewer non-zero parameters. L2 regularization generally shrinks all weights but doesn't produce the same level of sparsity.