CM5

April 26, 2021

1 [CM5]

1.1 Critical Code Blocks of Models

The critical code blocks of the models are as belows:

1. Loss Function: - Typically, with neural networks, we seek to minimize the error. As such, the objective function is often referred to as a cost function or a loss function and the value calculated by the loss function is referred to as simply "loss." - We have used **categorical_crossentropy** for both models, CNN and Resnet. - Same Loss function can give different results for different models, for example in CNN model it gives less error, whereas in Resnet model it gives more error.

2. Optimizer: - The process to take the loss and try to minimize it, because a lower loss means our model is going to perform better is called optimizer. - We have selected **SGD** optimizer for CNN and **Adam** optimizer for Resnet.

3. Learning Rate: - The steps are optimizer takes into the direction of the local minimum are determined by the learning rate. - And to reach the local minimum we must set the learning rate to an appropriate value, which is neither too low nor too high. - We have used default learning rate for both models:
Adam = 0.001
SGD = 0.01

4. Activation Function: - An activation function in a neural network defines how the weighted sum of the input is transformed into an output from a node or nodes in a layer of the network. - Activation function which gave best results for simple CNN was **Sigmoid** and for Resnet, we used **ReLu**.

1.2 For Simple CNN,

We compared different activation function - optimizers pairs and got the below results:

- SGD optimizer works better than Adam Optimizer, as loss rate for SGD is much higher than Adam.
- For Adam optimizer, Tanh activation function is more efficient compares to others.
- For SGD, Sigmoid provides perfect fit.