**Transfer learning using Resnet50 – CIFAR 10 Dataset**

**Results:**

**Regularisation, Dropout and CNN extra layers -**

epoch: 2 completed!!

total train loss : 2.3035728931427

train accuracy : 10.423992156982422

100%|██████████| 3/3 [03:09<00:00, 63.17s/it]

total test loss : 2.3050448894500732

test accuracy : 10.000000953674316

**Using Dropout and CNN extra layers –**

It is quick in learning the representation but was overfitting.

epoch: 2 completed!!

total train loss : 0.6039741635322571

train accuracy : 80.40999603271484

100%|██████████| 3/3 [02:25<00:00, 48.38s/it]

total test loss : 0.8851484060287476

test accuracy : 73.71002197265625

**without CNN extra layers (direct linear layer)-**

epoch: 2 completed!!

total train loss : 0.45894187688827515

train accuracy : 84.19796752929688

100%|██████████| 3/3 [01:59<00:00, 39.96s/it]

total test loss : 0.6093978881835938

test accuracy : 79.53999328613281

Also for higher epochs it didn’t generalise properly as expected as it has only linear layers apart from Resnet50.

epochs: 8

batch: 0

train loss : 0.6541237235069275, accuracy: 75.0

batch: 250

train loss : 0.6376399993896484, accuracy: 75.0

batch: 500

train loss : 0.9025124311447144, accuracy: 70.0

batch: 750

train loss : 0.6079788208007812, accuracy: 77.5

batch: 1000

train loss : 0.8409689664840698, accuracy: 70.0

epoch: 8 completed!!

total train loss : 0.6339343190193176

train accuracy : 77.93397521972656

90%|█████████ | 9/10 [06:09<00:40, 40.34s/it]

total test loss : 0.855075478553772

test accuracy : 73.31999206542969

epochs: 9

batch: 0

train loss : 0.27205854654312134, accuracy: 92.5

batch: 250

train loss : 0.9508918523788452, accuracy: 67.5

batch: 500

train loss : 0.7760902643203735, accuracy: 75.0

batch: 750

train loss : 0.573147714138031, accuracy: 77.5

batch: 1000

train loss : 1.0620501041412354, accuracy: 62.5

epoch: 9 completed!!

total train loss : 0.7183562517166138

train accuracy : 74.98401641845703

100%|██████████| 10/10 [06:49<00:00, 40.97s/it]

total test loss : 0.8365107178688049

test accuracy : 71.78002166748047

**Without CNN layers and fixing all but the last layer of Resnet50 –**

underfitting as mostly linear layers are changeable parameters here

epochs: 8

batch: 0

train loss : 1.8195254802703857, accuracy: 65.0

batch: 250

train loss : 1.8659038543701172, accuracy: 60.000003814697266

batch: 500

train loss : 1.8597705364227295, accuracy: 60.000003814697266

batch: 750

train loss : 1.879193902015686, accuracy: 57.5

batch: 1000

train loss : 1.915376901626587, accuracy: 52.499996185302734

epoch: 8 completed!!

total train loss : 1.8718247413635254

train accuracy : 58.86997985839844

90%|█████████ | 9/10 [06:11<00:41, 41.35s/it]

total test loss : 1.8674246072769165

test accuracy : 59.29000473022461

epochs: 9

batch: 0

train loss : 1.7684738636016846, accuracy: 70.0

batch: 250

train loss : 1.907842993736267, accuracy: 55.0

batch: 500

train loss : 1.945214033126831, accuracy: 52.499996185302734

batch: 750

train loss : 1.9338089227676392, accuracy: 52.499996185302734

batch: 1000

train loss : 1.8919938802719116, accuracy: 57.5

epoch: 9 completed!!

total train loss : 1.8758598566055298

train accuracy : 58.46394729614258

100%|██████████| 10/10 [06:54<00:00, 41.41s/it]

total test loss : 1.8697645664215088

test accuracy : 59.08001708984375