Deep Learning Assignment-3

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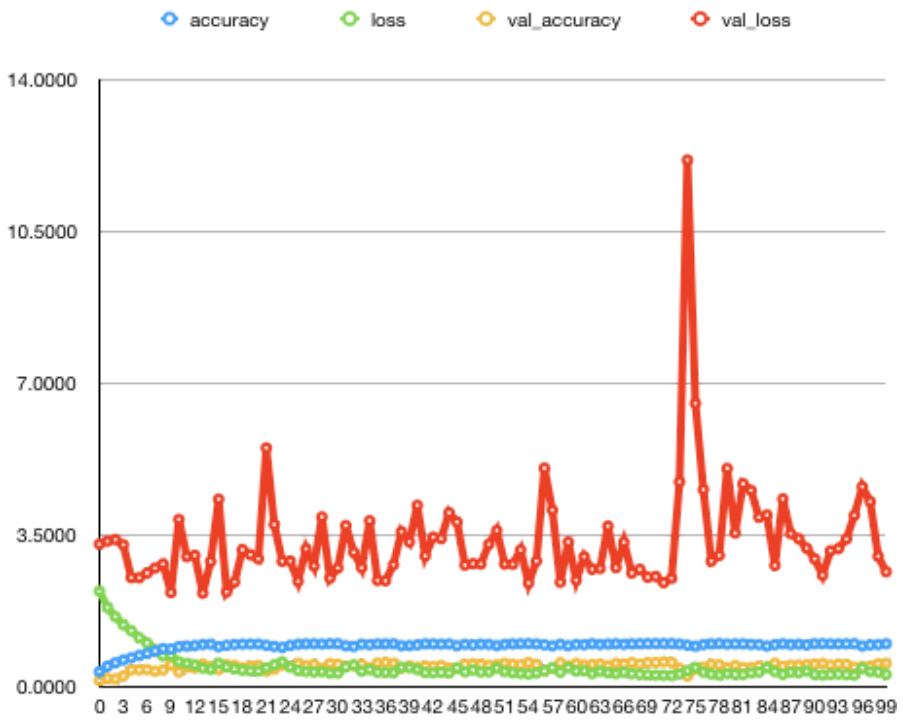
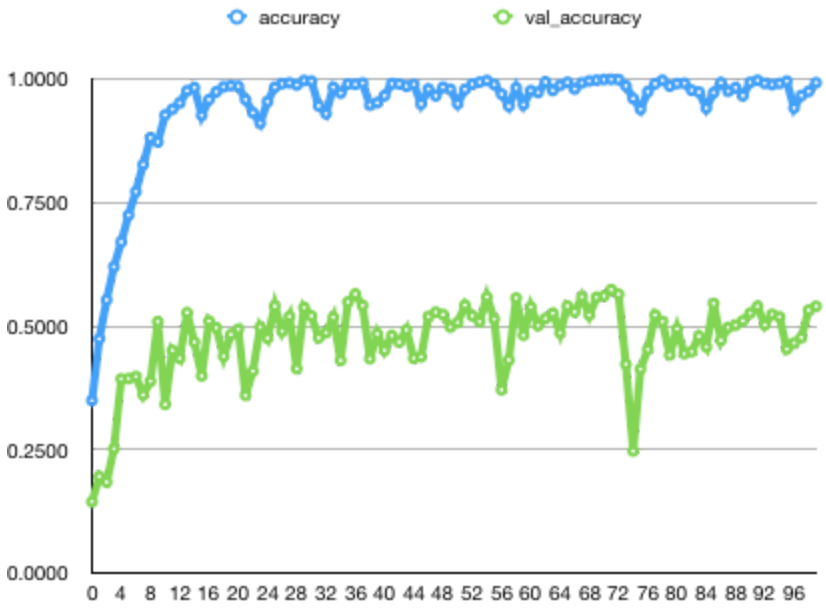
1. Train your Resnet model without augmentation and report the results.

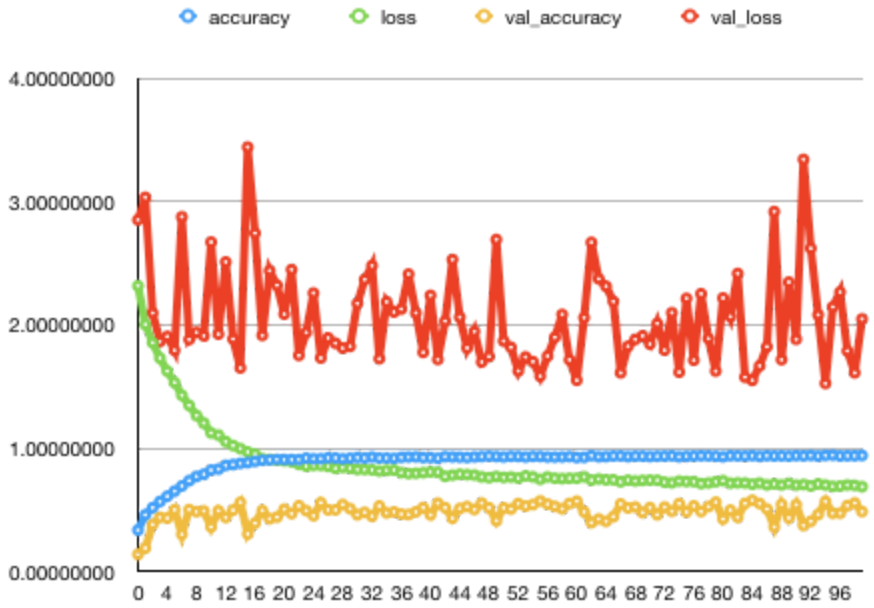
   Statistics at 100th epoch:
   Training Accuracy: 0.9929
   Training Loss: 0.287717107391357
   Validation Accuracy: 0.540199995040894
   Validation Loss: 2.65303751716614

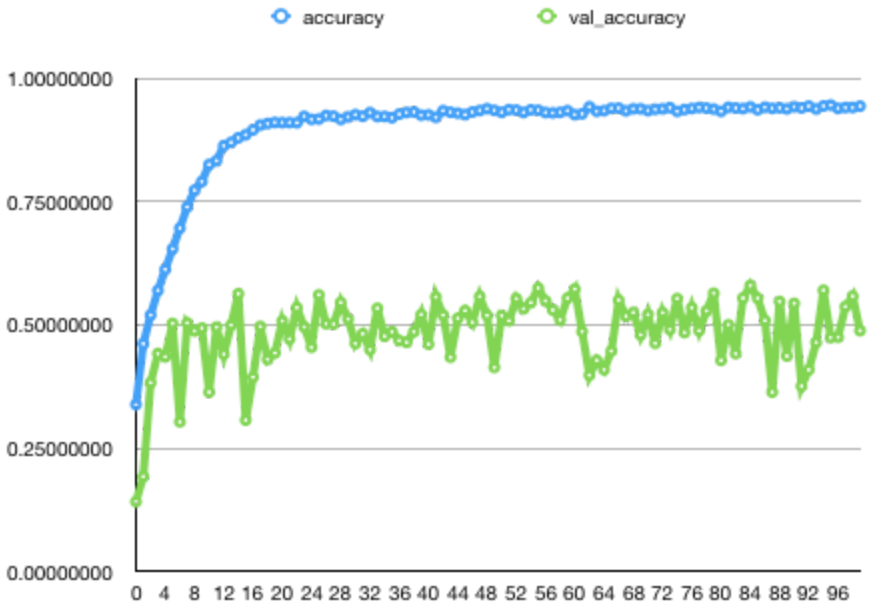




2. Mix-up Augmentation
    a. Alpha = 0.2

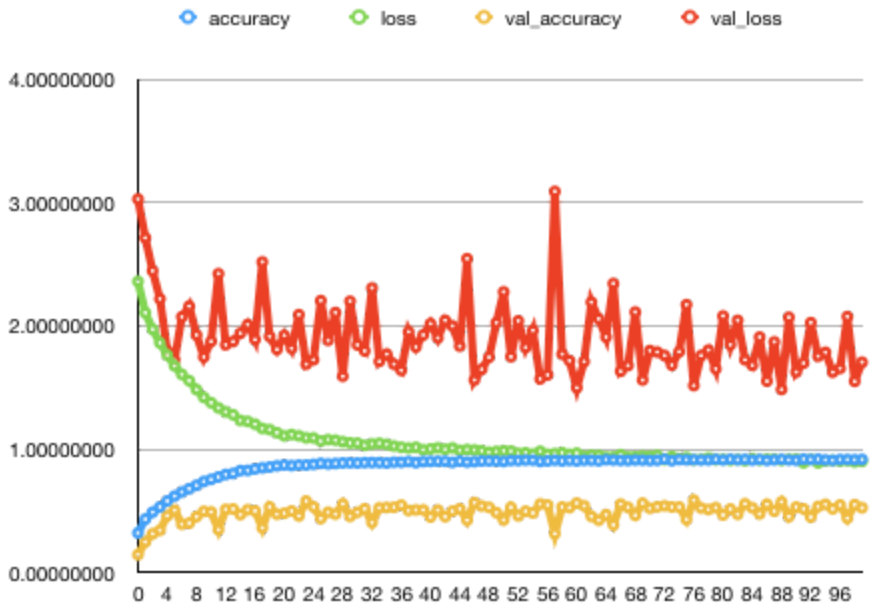
Statistics at 100th epoch:
Training Accuracy: 0.94340944
Training Loss: 0.689970469627625
Validation Accuracy: 0.48870000243187
Validation Loss: 2.04885023841858

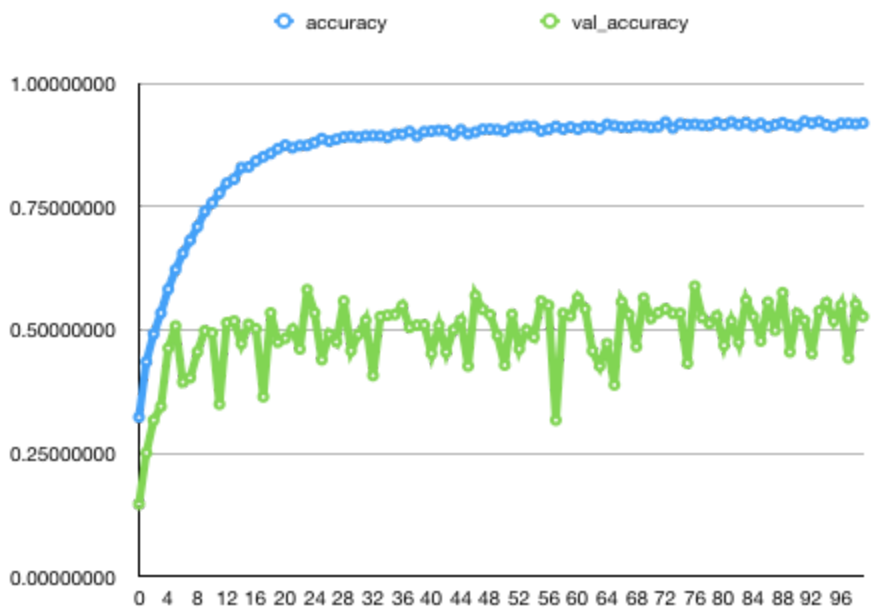




b. Alpha = 0.4

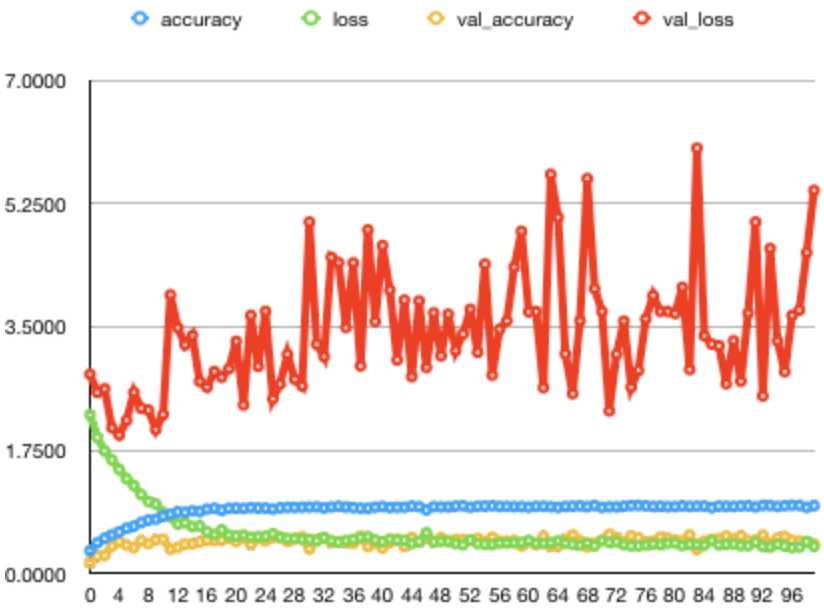
Statistics at 100th epoch:
Training Accuracy: 0.919371
Training Loss: 0.903876070792858
Validation Accuracy: 0.527400016784668
Validation Loss: 1.706871758461

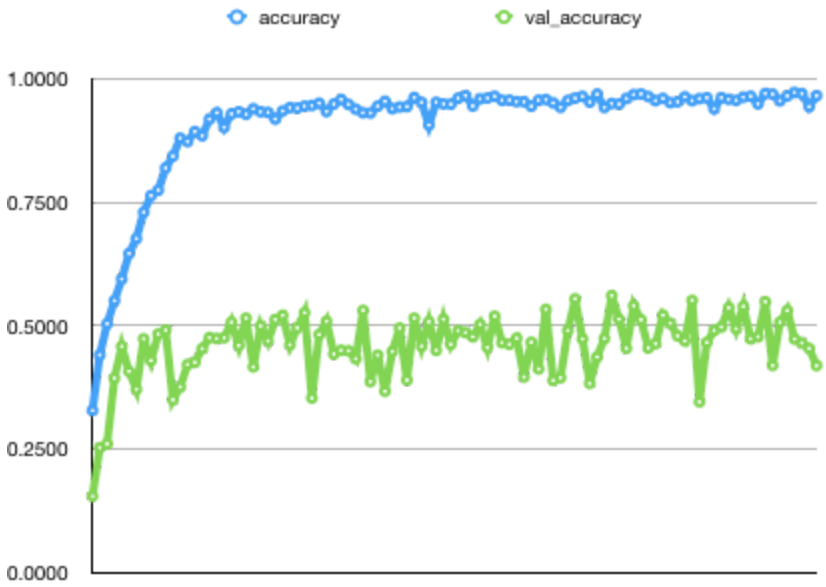




3. Cutout Augmentation

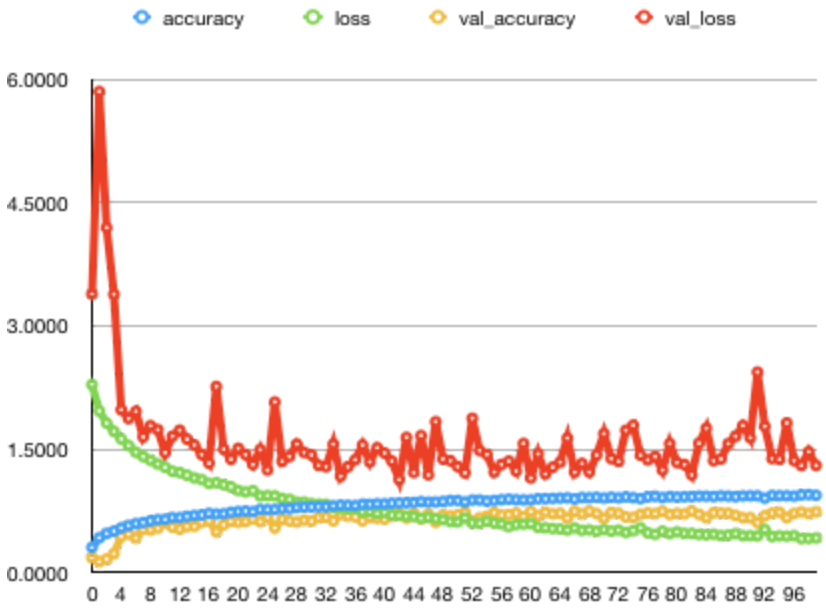
Statistics at 100th epoch:
Training Accuracy: 0.9661
Training Loss: 0.39077698392868
Validation Accuracy: 0.419600009918213
Validation Loss: 5.43591504516602

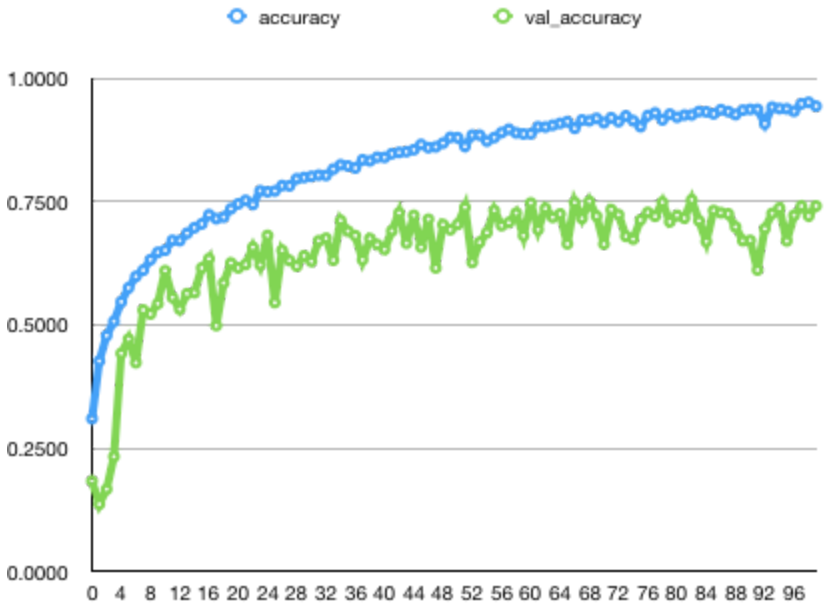




4. Standard Augmentation

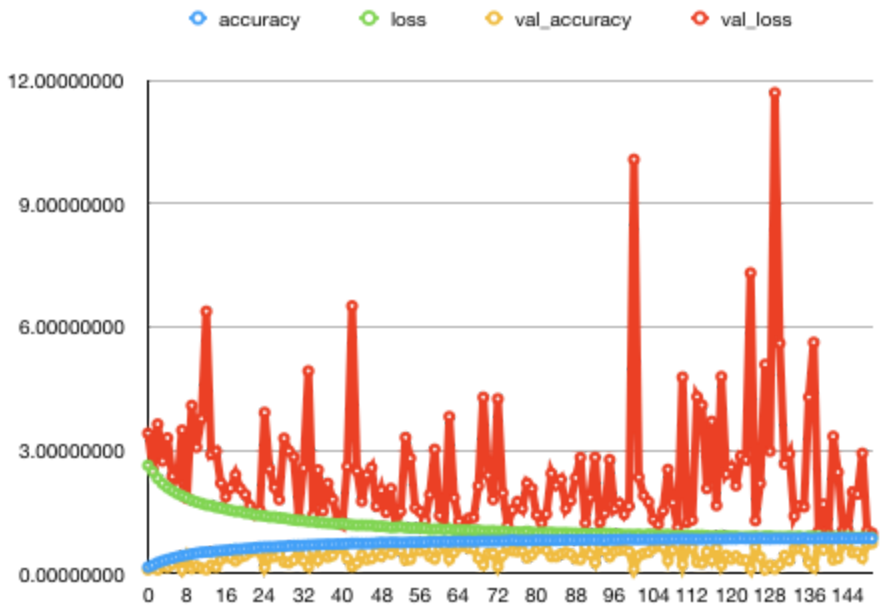
Statistics at 100th epoch:
Training Accuracy: 0.9433
Training Loss: 0.423723747634888
Validation Accuracy: 0.741199970245361
Validation Loss: 1.3061096036911

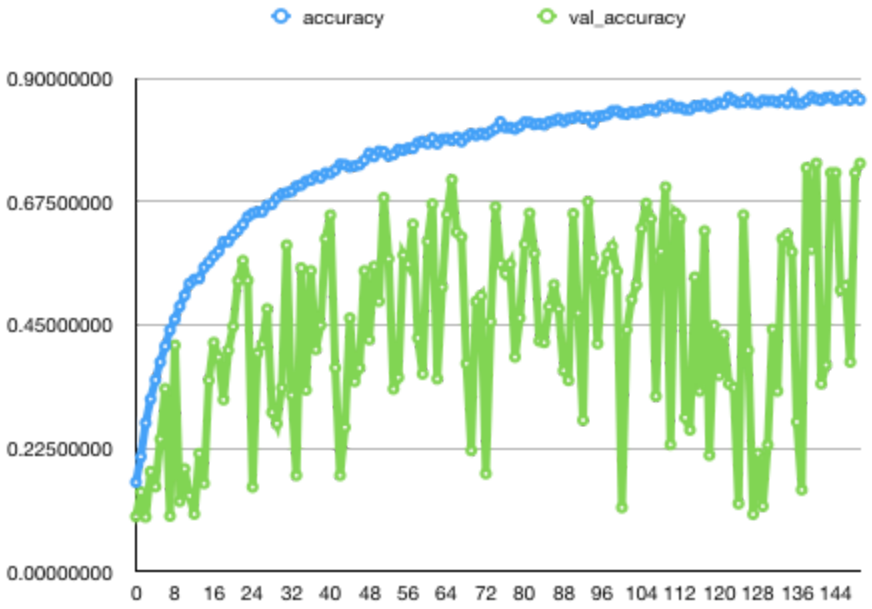




5. Miscellaneous Augmentation

Statistics at 150th epoch:
Training Accuracy: 0.86067706
Training Loss: 0.887196426972365
Validation Accuracy: 0.744700014591217
Validation Loss: 0.990146549606323





6. Comment on the role of data augmentation. How does it affect test accuracy, train accuracy and the convergence of optimization? Is test accuracy higher? Does training loss converge faster?

Answer:

Data Augmentation leads to better test accuracy and less test loss. As evident from the resnet model implemented, there appeared a significant difference in accuracy of the model because of data augmentation.

- Training accuracy decreases with augmentations.
- Test accuracy increases with augmentations.
- Augmentations provide better convergence of optimizations.
- Test accuracy was higher with augmentations.
- Training loss converges slowly because of augmentations.