

ASSIGNMENT 3

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Question 1

Image of ball



Image of cat



Image of mona



Question 2

Now the image of the football is saved in the network. The weights are not perturbed (set to zero). Then a patch of the original image is given as the input. The original image is retrieved back by the network as follows:

Image after 0 iterations for 0% of weight damage



Image after 20 iterations for 0% of weight damage



Image after 40 iterations for 0% of weight damage



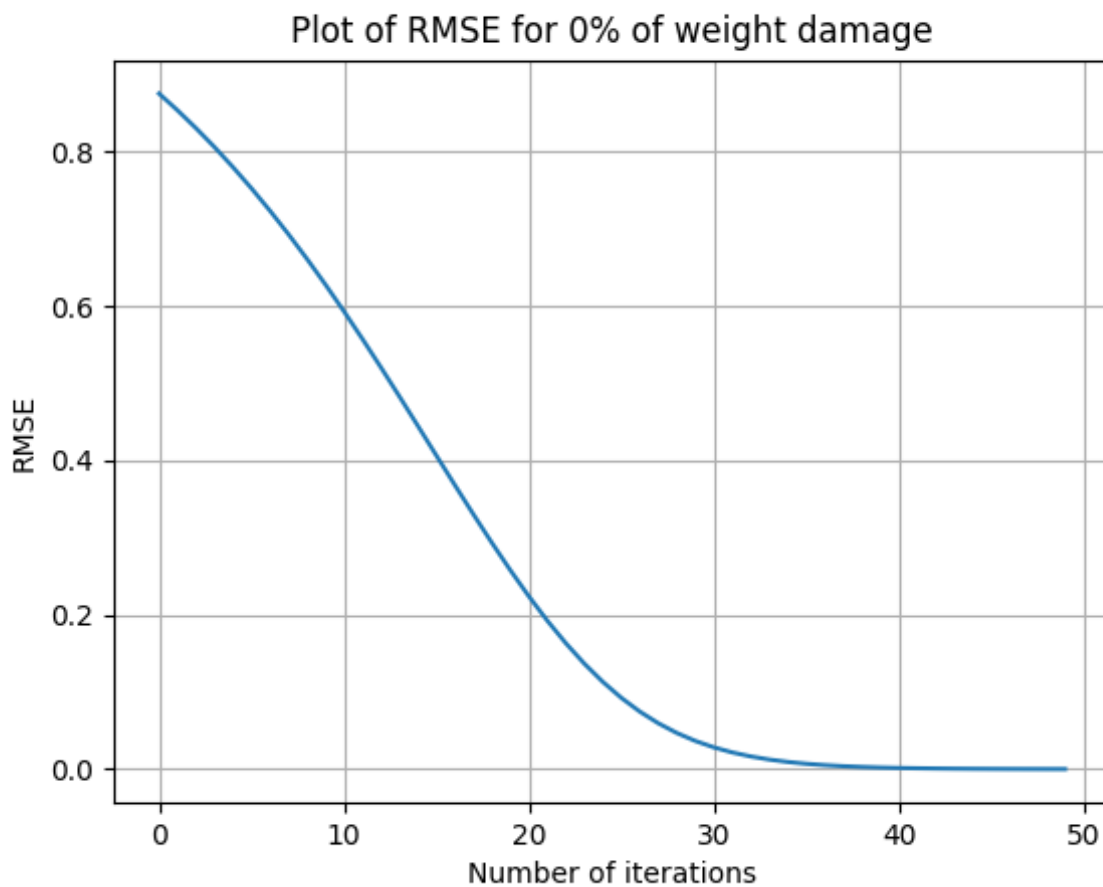
Image after 10 iterations for 0% of weight damage



Image after 30 iterations for 0% of weight damage



The Root mean Square of the change in the network is plotted with respect to number of iterations. Initially there is a linear decrease in the loss and then after 20 iterations there is an exponential decrease in the loss which plateaus after 38 iterations.



Question 3

Now all three images are loaded into the network,(Cat, Mona Lisa and Ball). Then the weights are perturbed (set to zero) with some probability 'p'. Then a patch of the image of the ball is given as the trigger. This will make the initial retrievals a little hazy(has hallucinations of Mona Lisa and the cat) because of the presence of the other images in the network as well as the weights being disturbed. But after some number of iterations there is almost no difference between the original and the retrieved image. The amount of hallucinations as well as the number of iterations required to get almost similar image depends on the percentage of weights disturbed.

Damage : 25%

Image after 0 iterations for 25.0% of weight damage

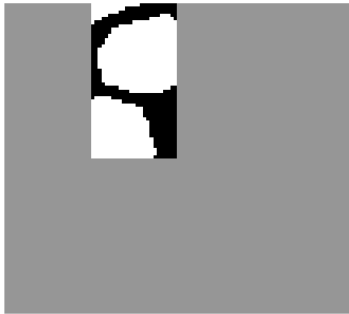


Image after 10 iterations for 25.0% of weight damage



Image after 20 iterations for 25.0% of weight damage



Image after 30 iterations for 25.0% of weight damage



Image after 40 iterations for 25.0% of weight damage



Image after 50 iterations for 25.0% of weight damage



Image after 60 iterations for 25.0% of weight damage



Image after 70 iterations for 25.0% of weight damage



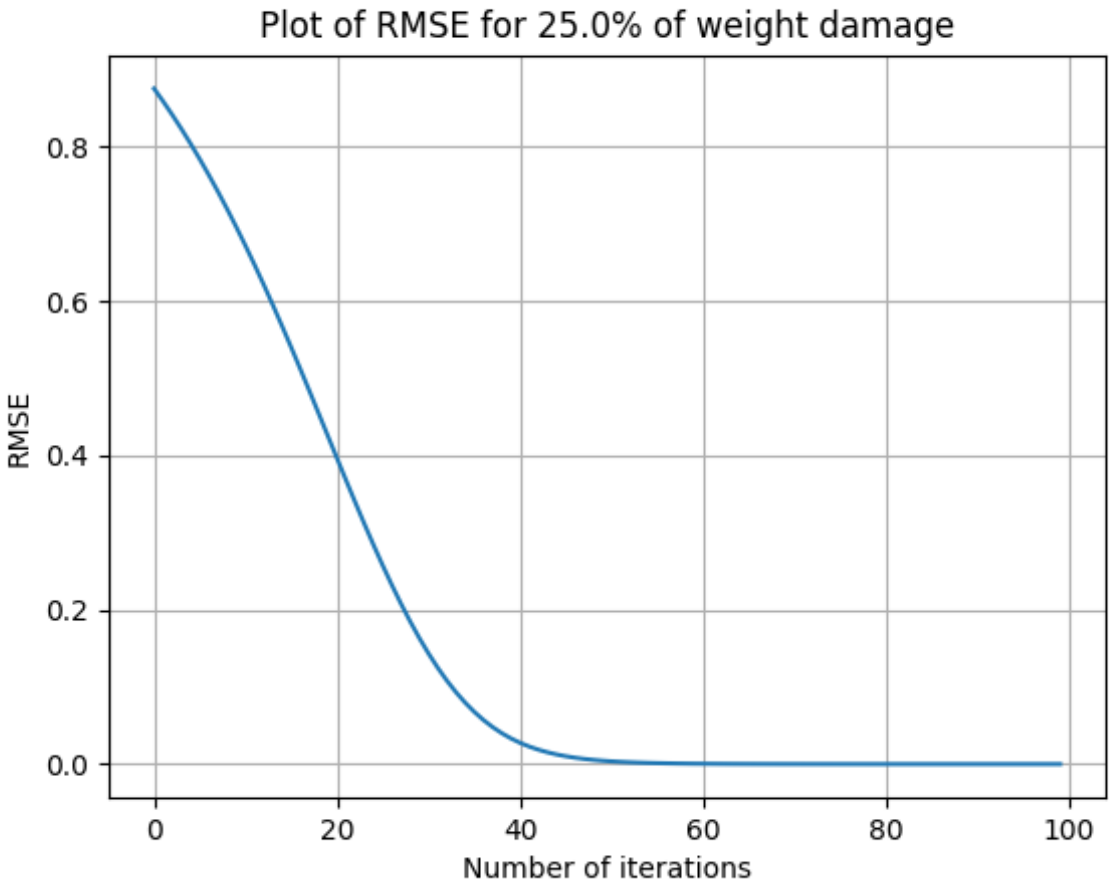
Image after 80 iterations for 25.0% of weight damage



Image after 90 iterations for 25.0% of weight damage



The Root mean Square of the change in the network is plotted with respect to number of iterations. Initially there is a linear decrease in the loss and then after 30 iterations there is an exponential decrease in the loss which plateaus after 45 iterations.



Damage 50%

Image after 0 iterations for 50.0% of weight damage



Image after 10 iterations for 50.0% of weight damage

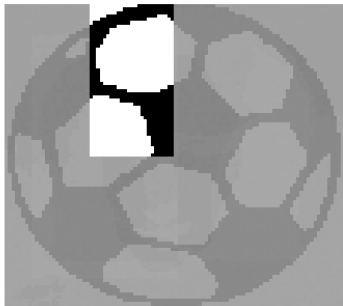


Image after 20 iterations for 50.0% of weight damage



Image after 30 iterations for 50.0% of weight damage



Image after 40 iterations for 50.0% of weight damage



Image after 50 iterations for 50.0% of weight damage



Image after 60 iterations for 50.0% of weight damage



Image after 70 iterations for 50.0% of weight damage



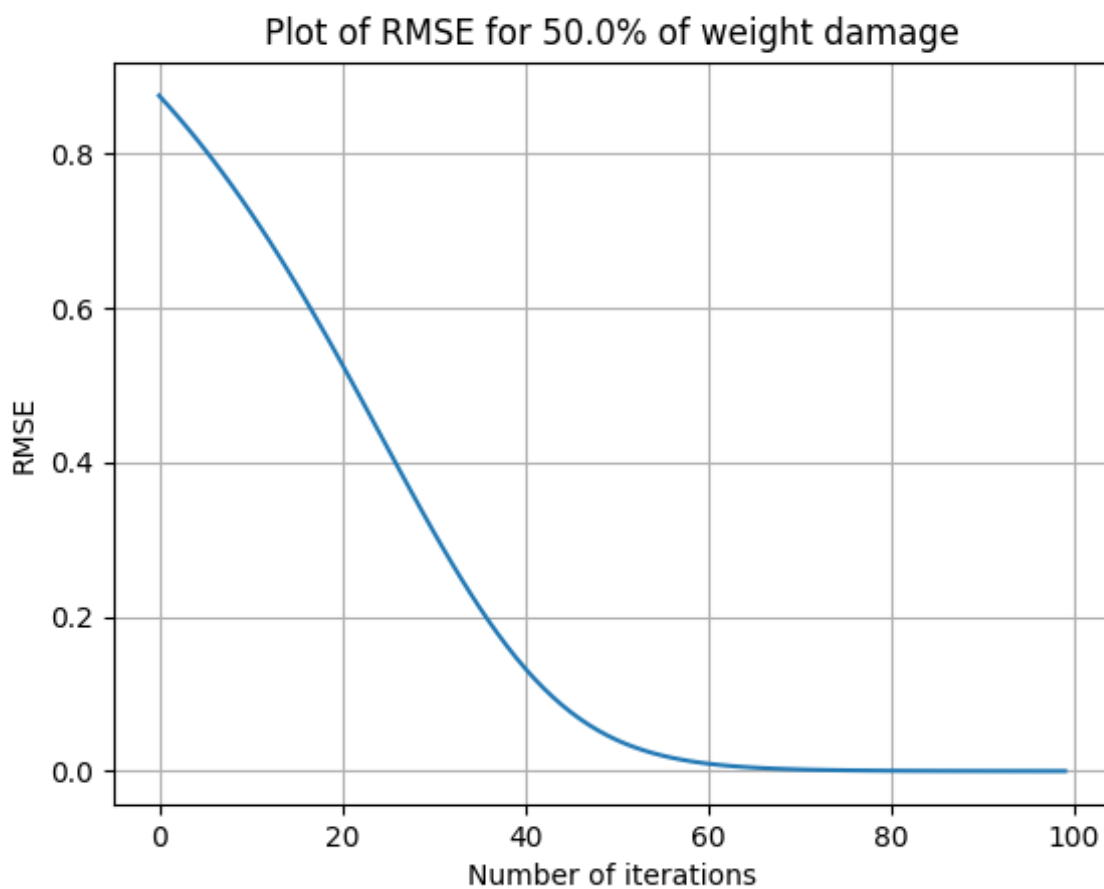
Image after 80 iterations for 50.0% of weight damage



Image after 90 iterations for 50.0% of weight damage



The Root mean Square of the change in the network is plotted with respect to number of iterations. Initially there is a linear decrease in the loss and then after 40 iterations there is an exponential decrease in the loss which plateaus after 65 iterations.



Damage 80%

Image after 0 iterations for 80.0% of weight damage



Image after 10 iterations for 80.0% of weight damage

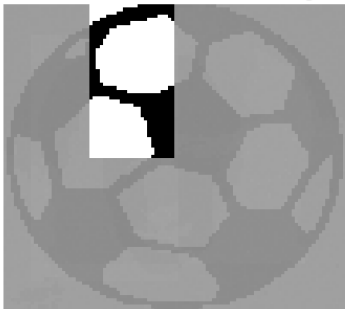


Image after 20 iterations for 80.0% of weight damage

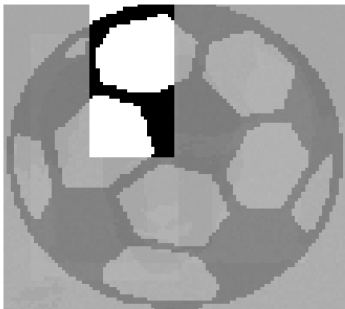


Image after 30 iterations for 80.0% of weight damage

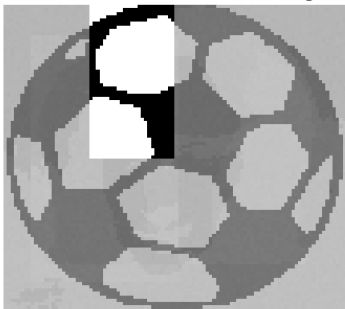


Image after 40 iterations for 80.0% of weight damage



Image after 50 iterations for 80.0% of weight damage

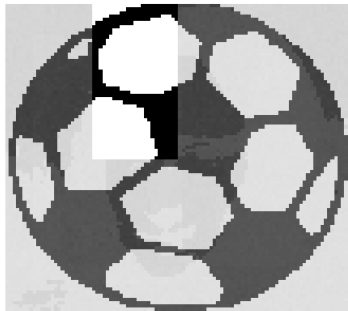


Image after 60 iterations for 80.0% of weight damage

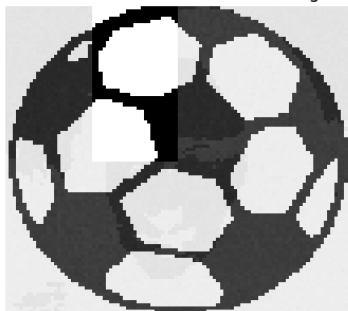


Image after 70 iterations for 80.0% of weight damage



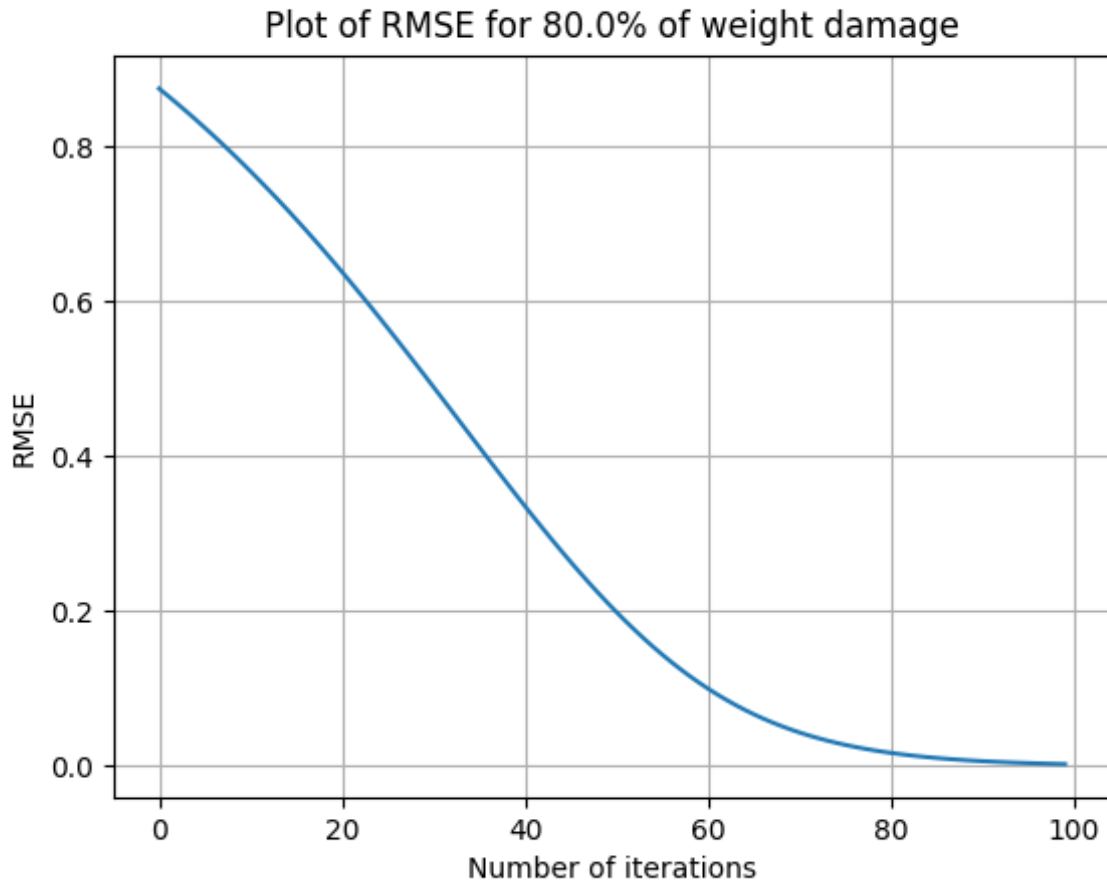
Image after 80 iterations for 80.0% of weight damage



Image after 90 iterations for 80.0% of weight damage



The Root mean Square of the change in the network is plotted with respect to number of iterations. Initially there is a linear decrease in the loss and then after 45 iterations there is an exponential decrease in the loss which plateaus after 95 iterations.



The images for mona and cat are also attached for the above experiments (though the results are not documented here, similar behaviour is observed).