Warning: Do not delete slides.
This includes extra credit slides and any problems you do not complete. All problems, including extra credit, must be assigned to a slide on Gradescope. The only exception is “Bells & Whistles,” which may be left unassigned if you did not attempt it. Failure to follow this will result in a penalty

CS 6476 Project 6

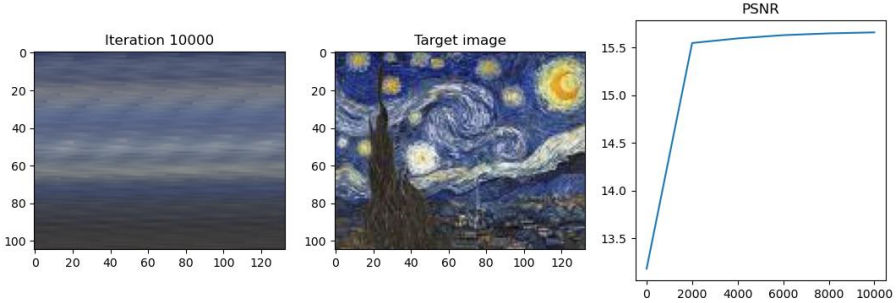
Auryn Yamamura

ayamamura6@gatech.edu

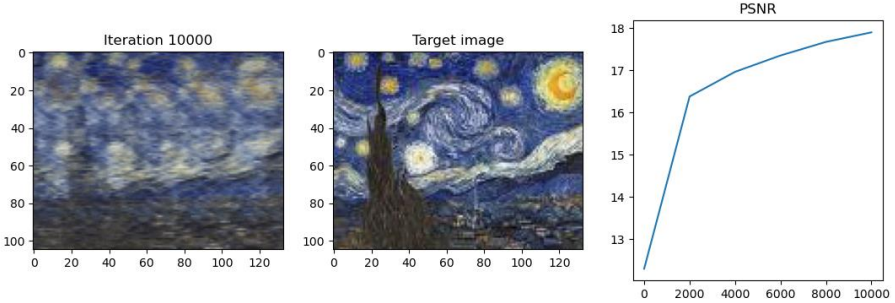
ayamamura6

904154249

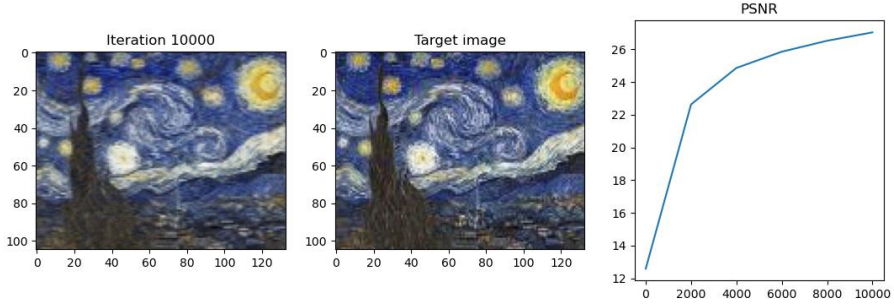
Part 1: 2D image representation



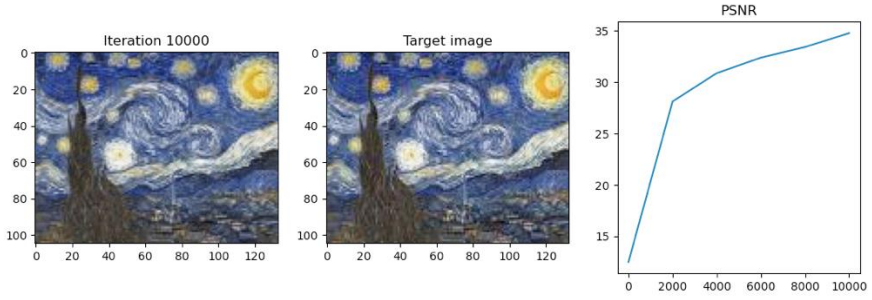
num_frequencies=0



num_frequencies=2



num_frequencies=4



num_frequencies=6

Part 1: 2D image representation

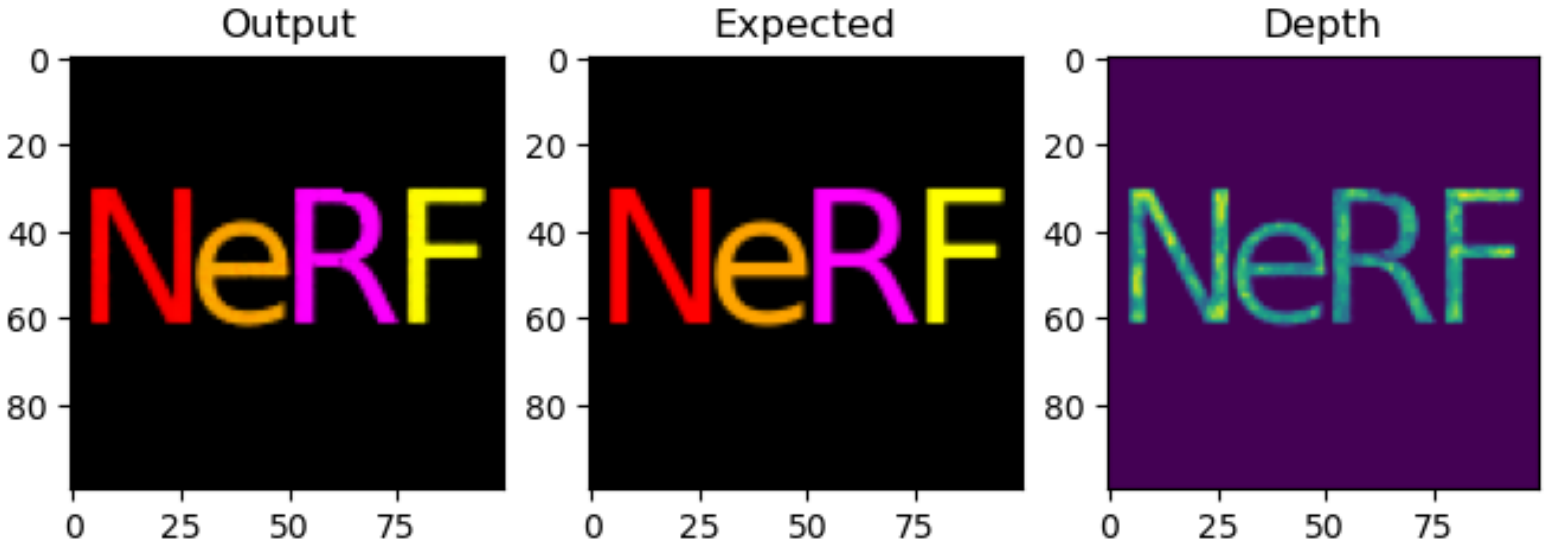
[Explain the impact of positional encoding and how varying the number of frequencies affects the results.]

ReLU is biased towards low frequency functions, so a ReLU-activated neural network will have a hard time learning representations for high-frequency features. This is because there can be high-frequency changes with only small shifts in position, which makes it more difficult for the model to learn. We combat this issue with positional encodings: we use higher-frequency mappings of our coordinates (e.g. $\sin(2^k \pi x)$ and $\cos(2^k \pi x)$), potentially in addition to our original coordinates, as to force network to learn high frequency functions.

By adding a greater of frequencies, we provide the model with more dimensions to learn high-frequency functions from. Thus, our model will be able to better recreate the target images in more detail due to learning representations for higher frequencies.

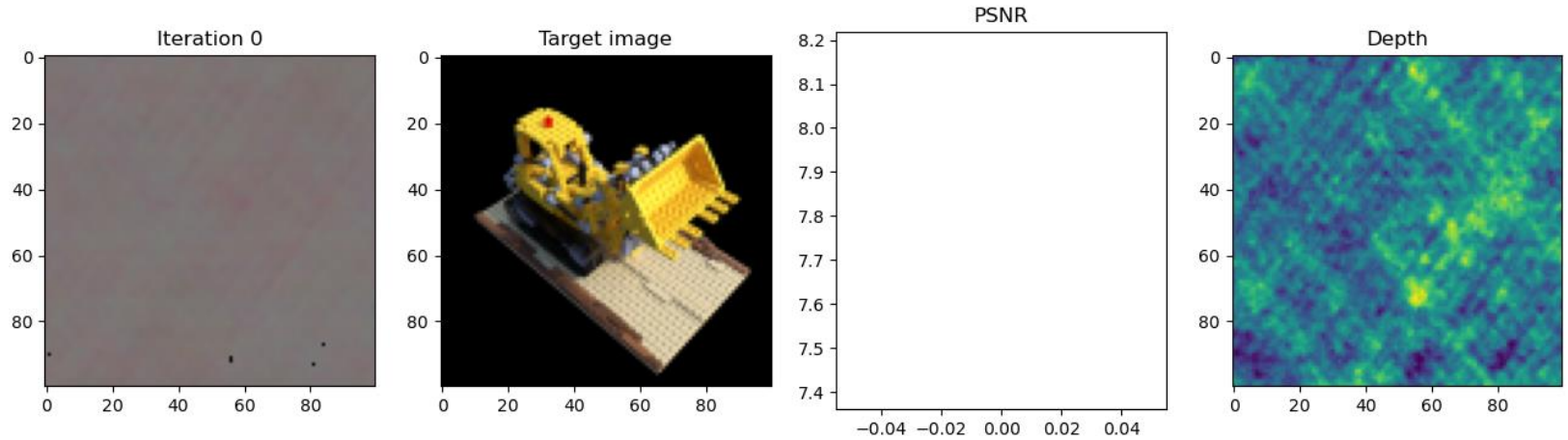
Part 2: Rendering Single Image with NeRF

[Paste the result of running render_image_test() in part 2(e), showing the output from your rendering code]



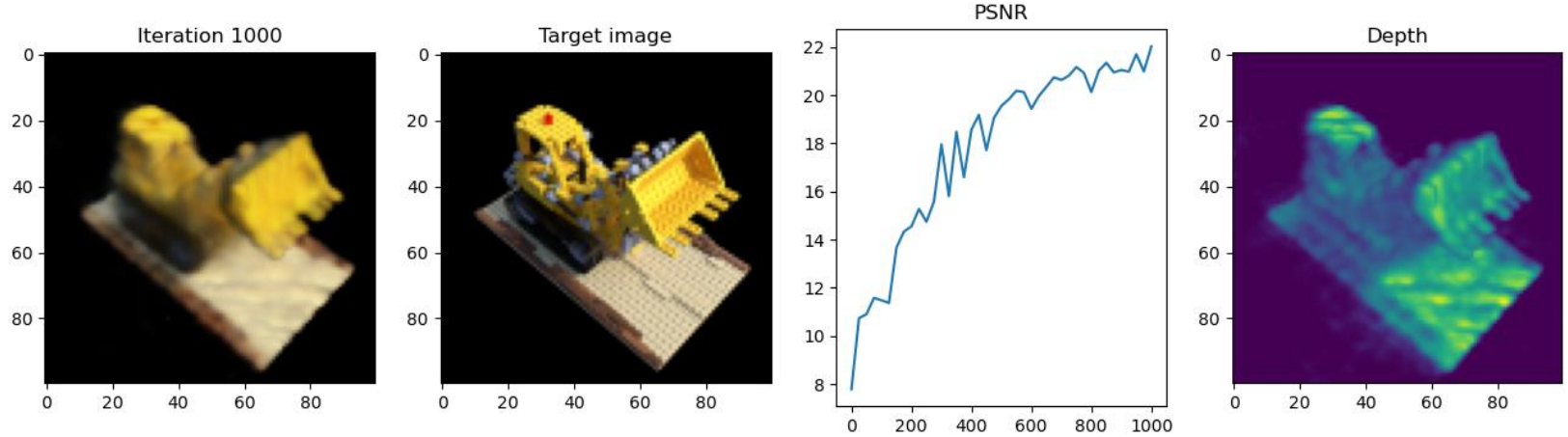
Part 3: Training NeRF

[Paste your outputs of the rendered RGB image and its depth map after one iteration of NeRF]



Part 3: Training NeRF

[Paste your outputs of the rendered RGB image and its depth map of the held-out view]



Part 3: Training NeRF

[Report your PSNR score after 1000 iterations]

After 1000 iterations, my PSNR score was 23.22.

Bells & Whistles (Additional EC)

I have nothing to add here – thanks for the semester! It was really fun!

[Add any additional extra credit or experiments you did here]