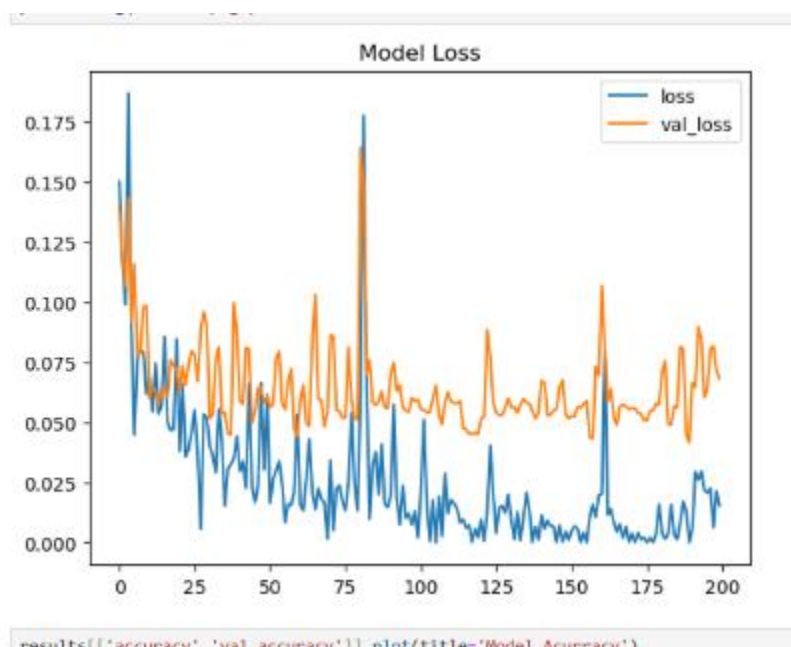


Image Number	Model Guess
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	3
Accuracy	90 percent

I didn't write any letters but I was surprised it got seven correct because I draw a line through the middle of my sevens. I wonder if this caused some of the confusion with the number 9.

I tried 1, 5, 10, 50, and 100 epochs. I was still not reaching convergence. So then I tried 200 and it took my computer a while but I think I am getting closer to convergence. If I am understanding correctly, I would actually like the loss to be a little higher to prevent overfitting. I think I would need to increase the number of epochs for this to occur. So far, I believe my model has been improving when I increased the epochs. Looking at my confusion matrix, I am pretty happy with the accuracy.

Epoch	Accuracy	Loss	Val_accuracy	Val_loss
200	96.875	.0154	83.929	.0682





Three ideas for use of GANs in weather prediction before searching internet.

1. Tornadoes are notoriously hard to predict. You could take photos of the sky in areas known for tornadoes on a daily basis. Record which days tornadoes appear. Then you the images from earlier in the day to train the GAN to find the early warning signs of tornado formation.
  - a. <https://journals.ametsoc.org/view/journals/aies/3/2/AIES-D-23-0094.1.xml>
2. Air quality is huge for people with breathing difficulties. GANs could be used to determine air quality. You could take images of the sky and tell the model how many people were admitted to hospitals that day for breathing issues. You could then use the model to predict whether the air quality on future days was safe for people with breathing issues.
  - a. <https://www.sciencedirect.com/science/article/abs/pii/S156849462300741X>
3. Less seriously, you could feed images of a snow sledding hill into GAN and have it predict from new images if it will be a good day/bad day/crowded day for sledding.