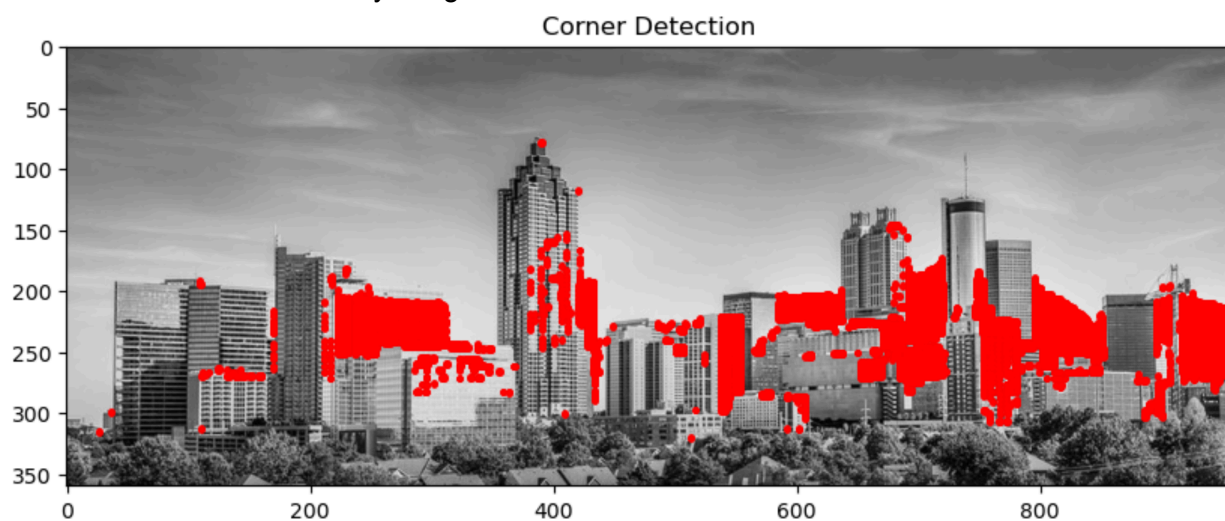


A2: CNNs Report

Part 1: Image Filtering

- The manual kernel convolution practice was fine and implemented as normal.
 - The Sobel edge detection kernels were implemented like the normal edge detection kernels.
 - A test on doubling the sobel kernel values led to more vertical edges found.
 - Corner detection was used via the example corner kernels, but the building jpeg given had a lot of corners in the image and probably wasn't the best quality. This led to a messy image:



- I tried using a different image as a test to see if it could clearly identify some corners:



- For downscaling, I just took every 2nd or 4th pixel and for the series of filters I just blurred and used the sobel kernels.

Part 2: Build CNN:

- This part of the assignment was run on a workstation with CUDA (T4 Gpu), which allowed for much faster training and testing times.
- In terms of optimizers, Adam was much better than SGD, with SGD taking 25.8s at 5 epochs with an accuracy of 62%, while Adam took 29s at 5 epochs and had a test accuracy of 75%
 - In terms of epochs, Adams at 12 epochs took 1min10s for training and had an accuracy of 74%
 - But increasing the dropout to 0.5 and the epochs to 20 gave a test accuracy of 76%
- Although increasing epochs and dropout helped, the improvements were only by 1%, any larger improvements would be done through the model architecture or the optimizer.
- The total number of parameters for the trained model was 1,147,466.
- Model graph visualization via torchviz:

