On Neural Networks and defending against attacks :

I. Studied variables:

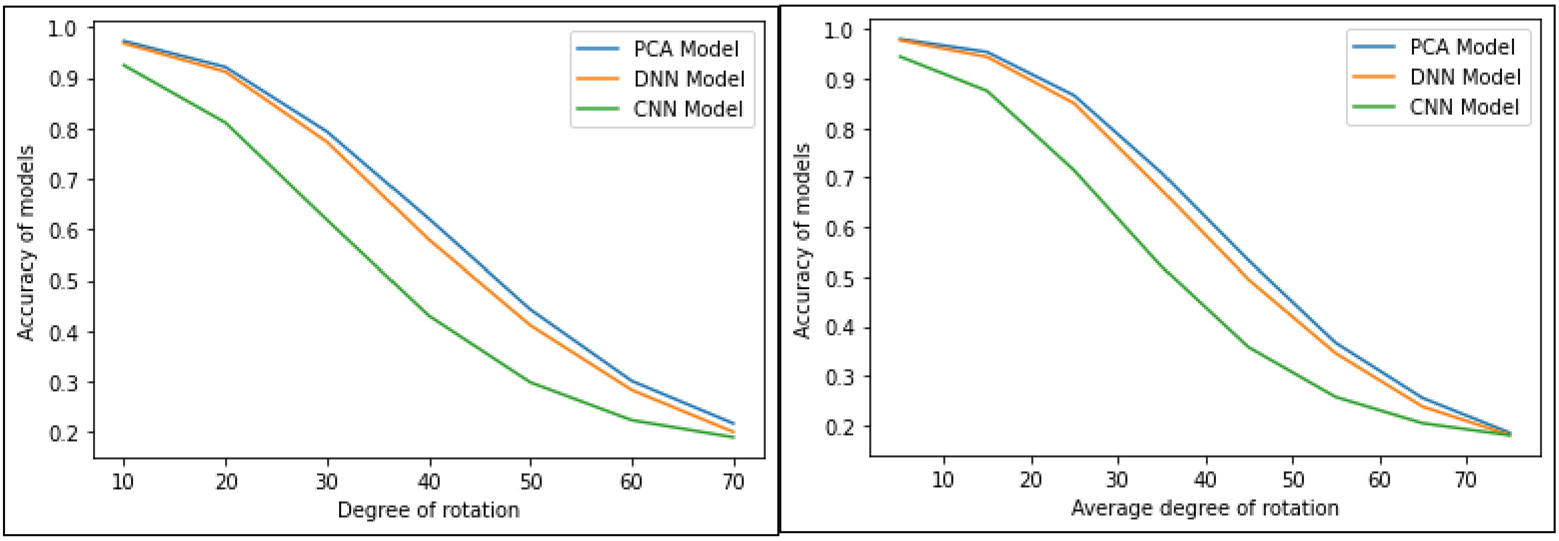
- Type of model (CNN vs DNN vs PCA)
- Database of model

II. Types of attacks :

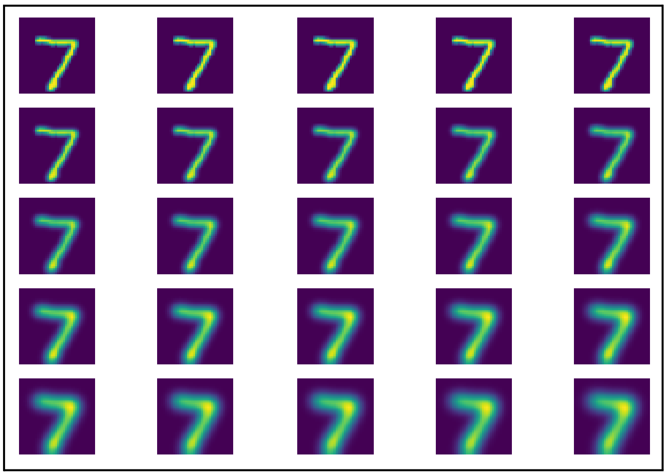
-Specifically tailored adversarial attack (https://arxiv.org/pdf/1412.6572.pdf).
-Rotation
-Gaussian Blur
-Box Blur
-Uniform Noise
-Perlin Noise
-Color Inversion

Graphs obtained so far:

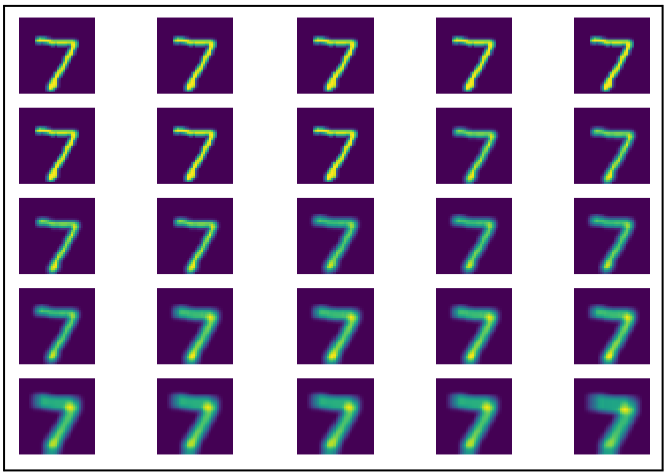
- Rotation (left is deterministic rotation angle, right is slightly random rotation)
  note: the numbers 6 and 9 were removed from the dataset for rotation tests/measurements



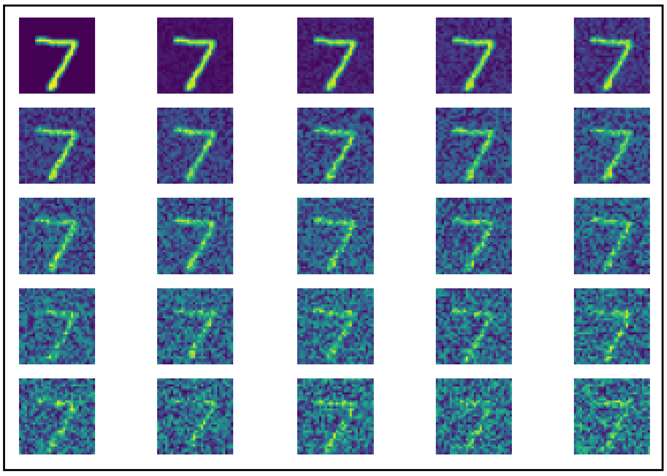
- Different levels of gaussian blur visualized (first image = 0 blur, sigma increases by 1/10 with each image)



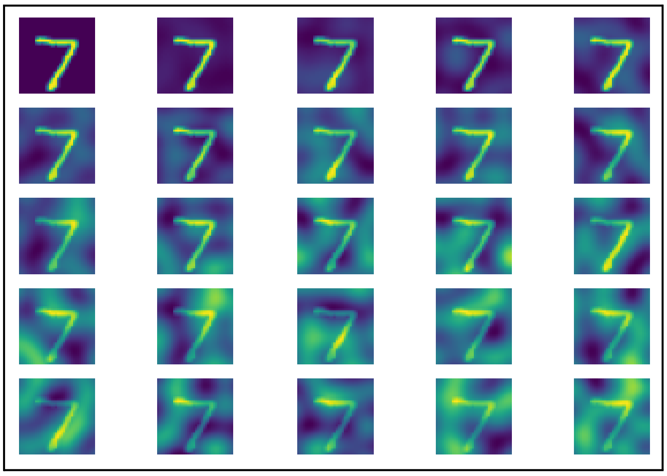
- Different levels of box blur visualized (box blur blurs less than gaussian blur for a given sigma), first image = 0 blur, sigma increases by ¼ with each image :



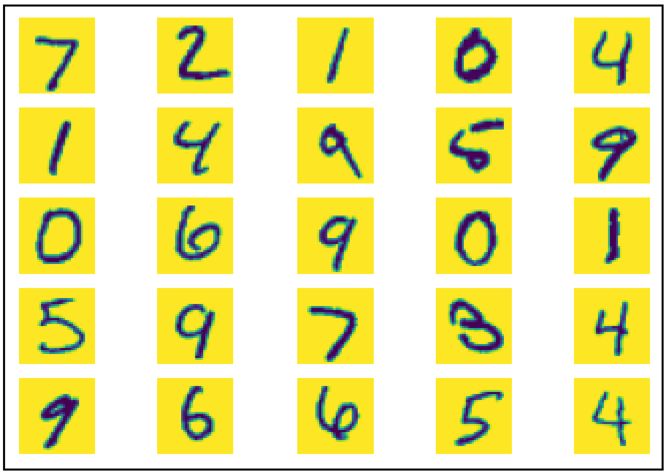
- Effect of uniform noise, increase of 1/20 with each image:



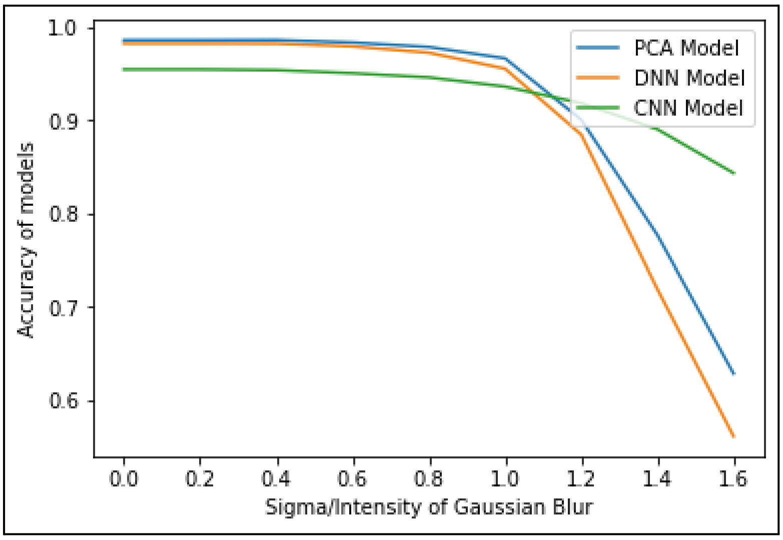
- Effect of perlin noise on image, increase of 1/20 per image :



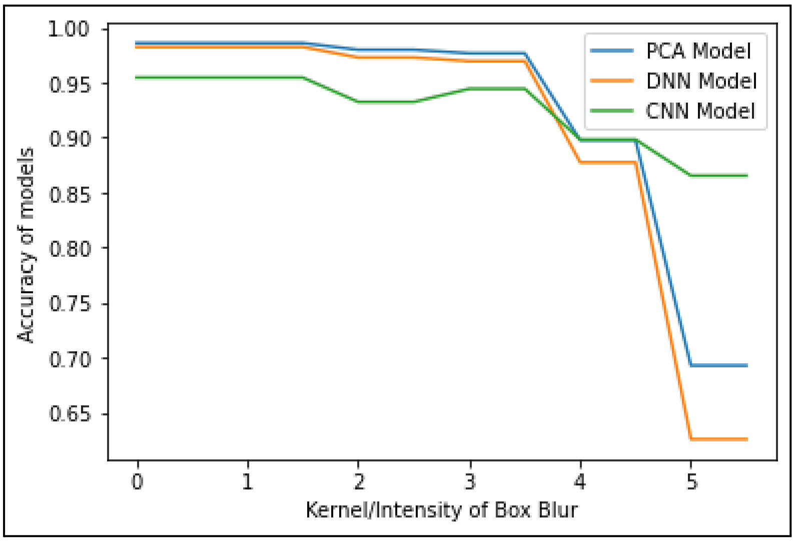
- Examples of multiple color flipped / inverted image :



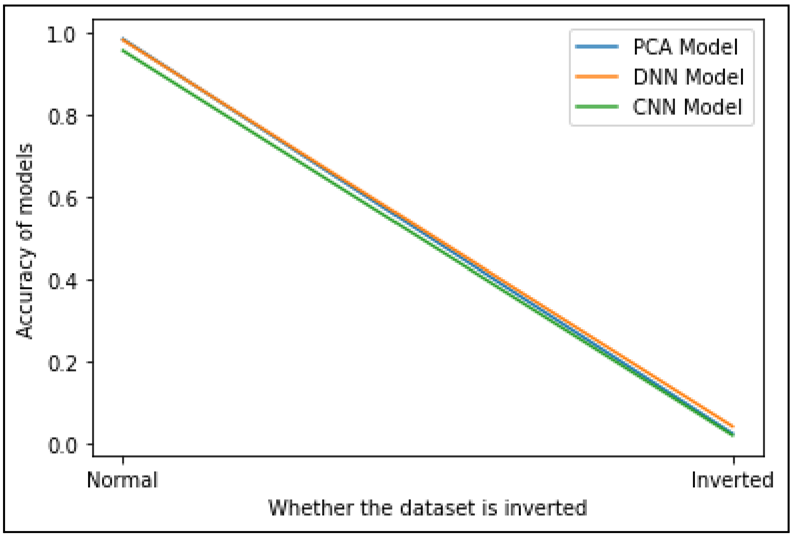
- Effect of gaussian blur on accuracy :



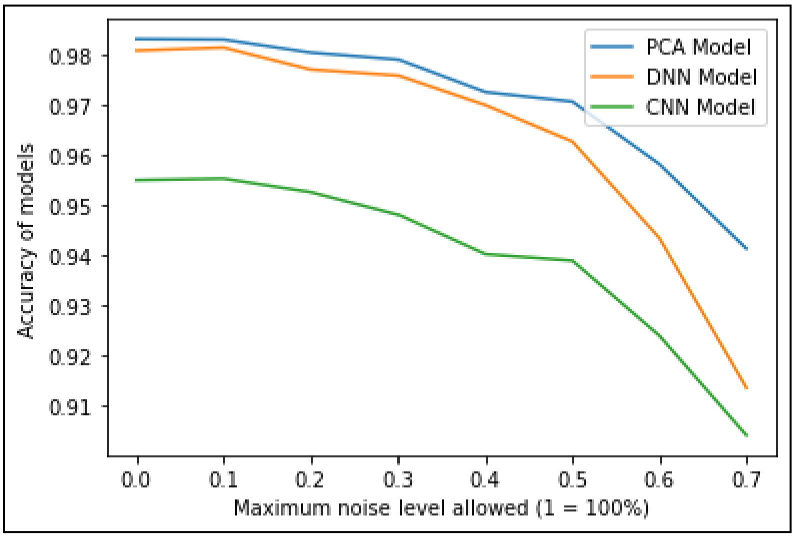
- Effect of box blur on accuracy :



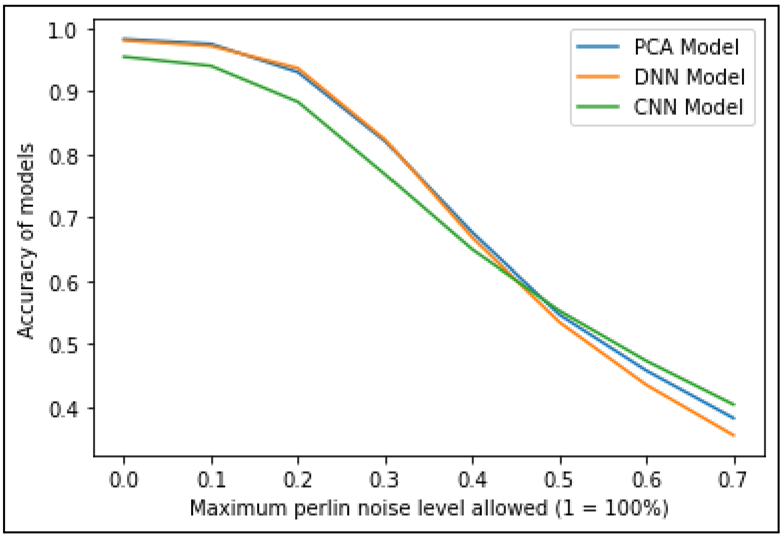
- Effect of flipping database on accuracy: (basically no differences, all models fail)



- Effect of uniform noise on accuracy :



-Effect of perlin noise on accuracy :


PCA Model
DNN Model
CNN Model
Accuracy of models
Maximum perlin noise level allowed (1 = 100%)