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# Assignment 3

Problem 1: Create a neural network that learns to identify sunglasses on a picture.

 To do this the only code needed for modification was the imagenet.c file in order to change the target from glickman to sunglasses. As this was a binary comparison it was rather easy to implement. The maximum classification was 100% on the 40th epoch for the training set. This was followed by close to 100% on the test sets. The exact outputs were 97.05% on the 75th epoch and 96.15% on the 75th epoch as well.

Problem 2: Create a neural network that learns to identify whether a person is looking up, straight, left, or right.

 For the pose detection it was much more brutal to get even a good identification rate as the outputs where no longer binary. To compensate for this we had to spread the weights around for the poses, with straight and up having higher weights than lateral movement. By doing this classification appeared to be a little better due to those images being closer to each other as opposed to the left and right photos. The classification rates for this were 35% on the training set on the 100th epoch, 31.6% on the first test set on the 100th epoch, and 35.5% on the second test set on the 100th epoch.

Problem 3: Do the hidden units seem to weight particular regions of the image greater than others? Do particular hidden units seem to be tuned to diﬀerent features of some sort?

 For the images, it was defiantly required to run facetrain\_init0 to get a cleaner image. With just facetrain the image was just noise. After looking into using facetrain\_init0 it was easier to see almost the outline of the head. This seems to correspond to where the weights are going to focus on to determine face location. By having the background be relatively unimportant and the center of the face being so unique, especially with the expressions, it makes sense that the weights would focus on face outlines.