ECGR 4105 - HW 6
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https://github.com/Edward-Cloud9/HW6.git

1. Part I. The results after 300 epochs at about 5990 seconds gave a result of 46.9% accuracy. The training model decreased when increasing the batch size down to 19 seconds average while lower sizes increased the time to about 21 to 25 seconds. This was done on Google Collab environment.
   ```
   Total Time: 5990.5077 seconds
   Accuracy: 0.469, Time: 3.279 seconds
   ```

2. Part II. The results after 300 epochs at about 6340 seconds gave a result of 44.8% accuracy. The training model did not improve the newer initial values therefore the accuracy suffered likely from overfitting. The loss over time had periods where the loss increased.
   ```
   Total Time: 6340.0617 seconds
   Accuracy: 0.448, Time: 4.444 seconds
   ```

3. Part III. The accuracy for the training model after 11099 seconds produced 68.4%. A better improvement from part 1 accuracy of 46.9%. The training model did take longer at 35 seconds for each epoch but the results improved using the example values provided.
   ```
   Total Time: 11099.2155 seconds
   Type: train, Accuracy: 0.684, Time: 30.26 seconds
   Type: val, Accuracy: 0.655, Time: 5.6859 seconds
   ```

4. Part IV. The accuracy did not improve as the previous one but that is likely how the convolutional values used for the pooling. Another factor that likely worsened the accuracy and run of this was Google Collab using CPU instead of Cuda for faster computation. The time also doubled as a result of the value changes and creating a smaller batch size did not seem to improve the accuracy in the end.
   ```
   Total Time: 24196.7551 seconds
   Type: train, Accuracy: 0.597, Time: 61.2107 seconds
   Type: val, Accuracy: 0.564, Time: 5.1771 seconds
   ```

Upon further free roam of Google Collabs, I found that runtime was not set to anything by default, therefore gpu was not given during the duration of the code run. A quick rerun of the fourth part is giving better results in time per epoch. The rest would likely improve in time also.