

Anton Clayton

CS171

Professor Wood

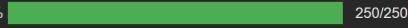
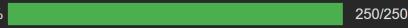
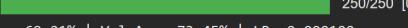
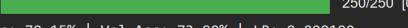
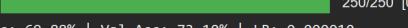
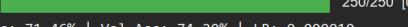
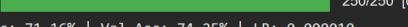
December 2, 2025

## CS171 Project Visuals

**Many of my charts and visuals were cut off in my PDF download of my Colab notebook. I wanted to provide all the visuals just in case. Text based outputs should be rendered without issues on the PDF.**

### 3.2 Training and Validation

```
Starting Training Loop...
Epoch 1/50 [Train]: 100% 250/250 [00:44<00:00, 5.31batch/s, loss=2.19]
Epoch [1/50] Train Acc: 15.55% | Val Acc: 21.20% | LR: 0.001000
Epoch 2/50 [Train]: 100% 250/250 [00:43<00:00, 8.17batch/s, loss=1.94]
Epoch [2/50] Train Acc: 20.89% | Val Acc: 27.70% | LR: 0.001000
Epoch 3/50 [Train]: 100% 250/250 [00:43<00:00, 7.21batch/s, loss=1.82]
Epoch [3/50] Train Acc: 24.11% | Val Acc: 29.75% | LR: 0.001000
Epoch 4/50 [Train]: 100% 250/250 [00:43<00:00, 6.61batch/s, loss=2]
Epoch [4/50] Train Acc: 25.93% | Val Acc: 36.55% | LR: 0.001000
Epoch 5/50 [Train]: 100% 250/250 [00:43<00:00, 7.16batch/s, loss=1.94]
Epoch [5/50] Train Acc: 29.21% | Val Acc: 40.75% | LR: 0.001000
Epoch 6/50 [Train]: 100% 250/250 [00:45<00:00, 5.81batch/s, loss=1.97]
Epoch [6/50] Train Acc: 30.43% | Val Acc: 39.20% | LR: 0.001000
Epoch 7/50 [Train]: 100% 250/250 [00:43<00:00, 7.03batch/s, loss=2.27]
Epoch [7/50] Train Acc: 32.24% | Val Acc: 37.30% | LR: 0.001000
Epoch 8/50 [Train]: 100% 250/250 [00:43<00:00, 5.44batch/s, loss=1.86]
Epoch [8/50] Train Acc: 34.20% | Val Acc: 43.80% | LR: 0.001000
Epoch 9/50 [Train]: 100% 250/250 [00:43<00:00, 7.85batch/s, loss=2.08]
Epoch [9/50] Train Acc: 35.16% | Val Acc: 46.15% | LR: 0.001000
Epoch 10/50 [Train]: 100% 250/250 [00:43<00:00, 5.12batch/s, loss=1.78]
Epoch [10/50] Train Acc: 36.79% | Val Acc: 46.85% | LR: 0.001000
Epoch 11/50 [Train]: 100% 250/250 [00:45<00:00, 7.94batch/s, loss=1.5]
Epoch [11/50] Train Acc: 38.01% | Val Acc: 50.75% | LR: 0.001000
Epoch 12/50 [Train]: 100% 250/250 [00:43<00:00, 6.80batch/s, loss=1.51]
Epoch [12/50] Train Acc: 40.48% | Val Acc: 51.45% | LR: 0.001000
Epoch 13/50 [Train]: 100% 250/250 [00:45<00:00, 6.55batch/s, loss=1.7]
Epoch [13/50] Train Acc: 41.86% | Val Acc: 52.15% | LR: 0.001000
Epoch 14/50 [Train]: 100% 250/250 [00:51<00:00, 6.04batch/s, loss=1.56]
Epoch [14/50] Train Acc: 43.26% | Val Acc: 52.80% | LR: 0.001000
Epoch 15/50 [Train]: 100% 250/250 [00:46<00:00, 7.80batch/s, loss=1.32]
```

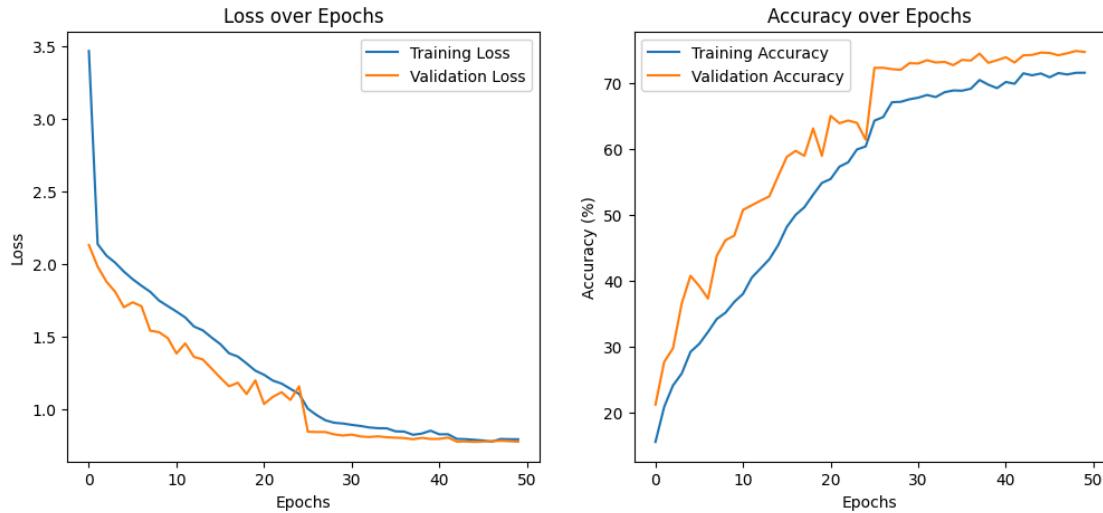
Epoch [15/50] Train Acc: 45.38%   Val Acc: 55.85%   LR: 0.001000
Epoch 16/50 [Train]: 100%  250/250 [00:44<00:00, 7.10batch/s, loss=1.55]
Epoch [16/50] Train Acc: 48.17%   Val Acc: 58.80%   LR: 0.001000
Epoch 17/50 [Train]: 100%  250/250 [00:44<00:00, 5.33batch/s, loss=1.29]
Epoch [17/50] Train Acc: 49.99%   Val Acc: 59.70%   LR: 0.001000
Epoch 18/50 [Train]: 100%  250/250 [00:44<00:00, 6.81batch/s, loss=1.52]
Epoch [18/50] Train Acc: 51.15%   Val Acc: 58.95%   LR: 0.001000
Epoch 19/50 [Train]: 100%  250/250 [00:44<00:00, 6.82batch/s, loss=1.01]
Epoch [19/50] Train Acc: 53.05%   Val Acc: 63.10%   LR: 0.001000
Epoch 20/50 [Train]: 100%  250/250 [00:45<00:00, 7.42batch/s, loss=1.29]
Epoch [20/50] Train Acc: 54.84%   Val Acc: 58.95%   LR: 0.001000
Epoch 21/50 [Train]: 100%  250/250 [00:44<00:00, 6.90batch/s, loss=1.05]
Epoch [21/50] Train Acc: 55.44%   Val Acc: 65.00%   LR: 0.001000
Epoch 22/50 [Train]: 100%  250/250 [00:44<00:00, 5.52batch/s, loss=1.15]
Epoch [22/50] Train Acc: 57.30%   Val Acc: 63.90%   LR: 0.001000
Epoch 23/50 [Train]: 100%  250/250 [00:43<00:00, 6.88batch/s, loss=0.946]
Epoch [23/50] Train Acc: 57.96%   Val Acc: 64.30%   LR: 0.001000
Epoch 24/50 [Train]: 100%  250/250 [00:44<00:00, 6.29batch/s, loss=1.36]
Epoch [24/50] Train Acc: 59.91%   Val Acc: 63.95%   LR: 0.001000
Epoch 25/50 [Train]: 100%  250/250 [00:45<00:00, 6.96batch/s, loss=0.954]
Epoch [25/50] Train Acc: 60.38%   Val Acc: 61.40%   LR: 0.000100
Epoch 26/50 [Train]: 100%  250/250 [00:43<00:00, 7.94batch/s, loss=1.04]
Epoch [26/50] Train Acc: 64.29%   Val Acc: 72.30%   LR: 0.000100
Epoch 27/50 [Train]: 100%  250/250 [00:44<00:00, 7.43batch/s, loss=1]
Epoch [27/50] Train Acc: 64.83%   Val Acc: 72.30%   LR: 0.000100
Epoch 28/50 [Train]: 100%  250/250 [00:44<00:00, 7.19batch/s, loss=0.816]
Epoch [28/50] Train Acc: 67.08%   Val Acc: 72.10%   LR: 0.000100
Epoch 29/50 [Train]: 100%  250/250 [00:44<00:00, 4.63batch/s, loss=1.43]
Epoch [29/50] Train Acc: 67.14%   Val Acc: 72.00%   LR: 0.000100
Epoch 30/50 [Train]: 100%  250/250 [00:45<00:00, 6.47batch/s, loss=0.887]
Epoch [30/50] Train Acc: 67.53%   Val Acc: 73.00%   LR: 0.000100
Epoch 31/50 [Train]: 100%  250/250 [00:44<00:00, 7.80batch/s, loss=0.912]
Epoch [31/50] Train Acc: 67.76%   Val Acc: 72.95%   LR: 0.000100
Epoch 32/50 [Train]: 100%  250/250 [00:43<00:00, 7.79batch/s, loss=0.846]
Epoch [32/50] Train Acc: 68.17%   Val Acc: 73.45%   LR: 0.000100
Epoch 33/50 [Train]: 100%  250/250 [00:44<00:00, 5.93batch/s, loss=0.881]
Epoch [33/50] Train Acc: 67.86%   Val Acc: 73.10%   LR: 0.000100
Epoch 34/50 [Train]: 100%  250/250 [00:44<00:00, 4.12batch/s, loss=0.885]
Epoch [34/50] Train Acc: 68.59%   Val Acc: 73.20%   LR: 0.000100
Epoch 35/50 [Train]: 100%  250/250 [00:45<00:00, 6.08batch/s, loss=0.688]
Epoch [35/50] Train Acc: 68.86%   Val Acc: 72.70%   LR: 0.000100
Epoch 36/50 [Train]: 100%  250/250 [00:44<00:00, 3.82batch/s, loss=1.2]
Epoch [36/50] Train Acc: 68.83%   Val Acc: 73.50%   LR: 0.000100
Epoch 37/50 [Train]: 100%  250/250 [00:44<00:00, 6.54batch/s, loss=0.687]
Epoch [37/50] Train Acc: 69.12%   Val Acc: 73.40%   LR: 0.000100
Epoch 38/50 [Train]: 100%  250/250 [00:43<00:00, 3.62batch/s, loss=1.36]
Epoch [38/50] Train Acc: 70.45%   Val Acc: 74.45%   LR: 0.000100
Epoch 39/50 [Train]: 100%  250/250 [00:43<00:00, 7.46batch/s, loss=0.927]
Epoch [39/50] Train Acc: 69.74%   Val Acc: 73.05%   LR: 0.000100
Epoch 40/50 [Train]: 100%  250/250 [00:45<00:00, 7.70batch/s, loss=0.907]
Epoch [40/50] Train Acc: 69.21%   Val Acc: 73.45%   LR: 0.000100
Epoch 41/50 [Train]: 100%  250/250 [00:44<00:00, 4.83batch/s, loss=0.602]
Epoch [41/50] Train Acc: 70.15%   Val Acc: 73.90%   LR: 0.000100
Epoch 42/50 [Train]: 100%  250/250 [00:44<00:00, 6.93batch/s, loss=0.681]
Epoch [42/50] Train Acc: 69.88%   Val Acc: 73.10%   LR: 0.000010
Epoch 43/50 [Train]: 100%  250/250 [00:43<00:00, 4.25batch/s, loss=0.706]
Epoch [43/50] Train Acc: 71.46%   Val Acc: 74.20%   LR: 0.000010
Epoch 44/50 [Train]: 100%  250/250 [00:43<00:00, 8.08batch/s, loss=0.739]
Epoch [44/50] Train Acc: 71.16%   Val Acc: 74.25%   LR: 0.000010

```

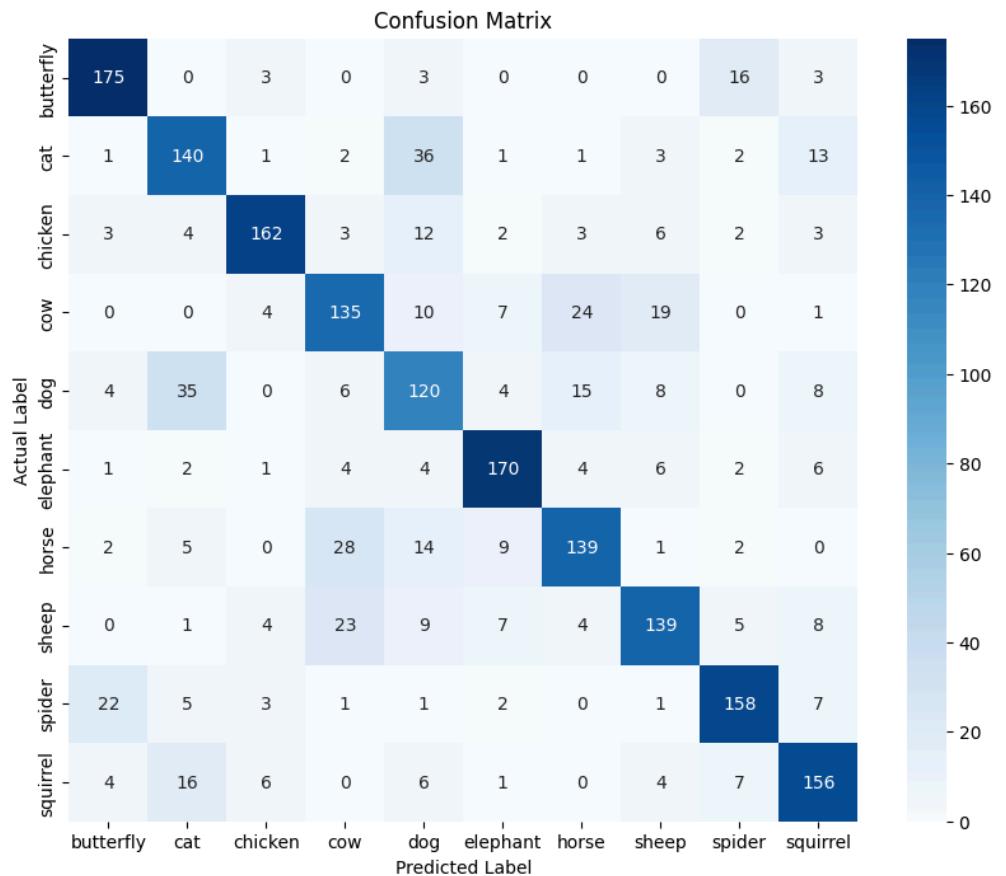
Epoch 45/50 [Train]: 100% 250/250 [00:45<00:00, 4.88batch/s, loss=0.859]
Epoch [45/50] Train Acc: 71.44% | Val Acc: 74.60% | LR: 0.000010
Epoch 46/50 [Train]: 100% 250/250 [00:44<00:00, 6.50batch/s, loss=0.911]
Epoch [46/50] Train Acc: 70.86% | Val Acc: 74.55% | LR: 0.000010
Epoch 47/50 [Train]: 100% 250/250 [00:43<00:00, 7.50batch/s, loss=0.984]
Epoch [47/50] Train Acc: 71.50% | Val Acc: 74.20% | LR: 0.000010
Epoch 48/50 [Train]: 100% 250/250 [00:43<00:00, 7.81batch/s, loss=1.15]
Epoch [48/50] Train Acc: 71.29% | Val Acc: 74.50% | LR: 0.000010
Epoch 49/50 [Train]: 100% 250/250 [00:43<00:00, 7.43batch/s, loss=0.873]
Epoch [49/50] Train Acc: 71.54% | Val Acc: 74.85% | LR: 0.000010
Epoch 50/50 [Train]: 100% 250/250 [00:44<00:00, 7.34batch/s, loss=0.767]
Epoch [50/50] Train Acc: 71.55% | Val Acc: 74.70% | LR: 0.000010
Training Complete!

```

## 4.1 Loss and Accuracy Plots



### 4.3 Confusion Matrix (testing my hypothesis)



--- Classification Report ---					
	precision	recall	f1-score	support	
butterfly	0.83	0.88	0.85	200	
cat	0.67	0.70	0.69	200	
chicken	0.88	0.81	0.84	200	
cow	0.67	0.68	0.67	200	
dog	0.56	0.60	0.58	200	
elephant	0.84	0.85	0.84	200	
horse	0.73	0.69	0.71	200	
sheep	0.74	0.69	0.72	200	
spider	0.81	0.79	0.80	200	
squirrel	0.76	0.78	0.77	200	
accuracy			0.75	2000	
macro avg	0.75	0.75	0.75	2000	
weighted avg	0.75	0.75	0.75	2000	

## 4.4 Fun Visual Check of misclassified dogs



## 4.5 Visually check other animals (sheep, cow, horse, butterfly)

