

# CSE 144 Final Project

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# Network Backbone

- Model:
  - Vision transformer L16 (ViT-L16)
    - L: large model size (24 transformer layers)
    - 16: uses 16x16 patch sizes for tokenization
    - Pretrained on ImageNet-21k
- Modifications:
  - replaced last layer to output 100 classes

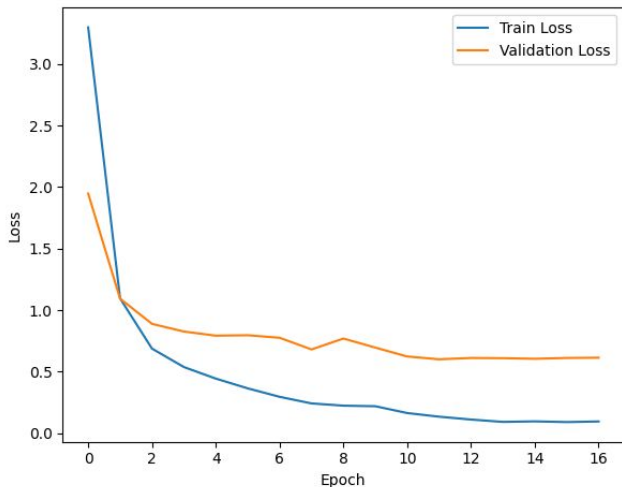
# Training Pipeline

- Data Preparation:
  - Split data into training and validation
- Augmentation:
  - Horizontal and Vertical Flip, ColorJitter, GaussianBlur, GreyScale
- Training Loop:
  - Step LR scheduler
  - Early stopping
  - AdamW optimizer

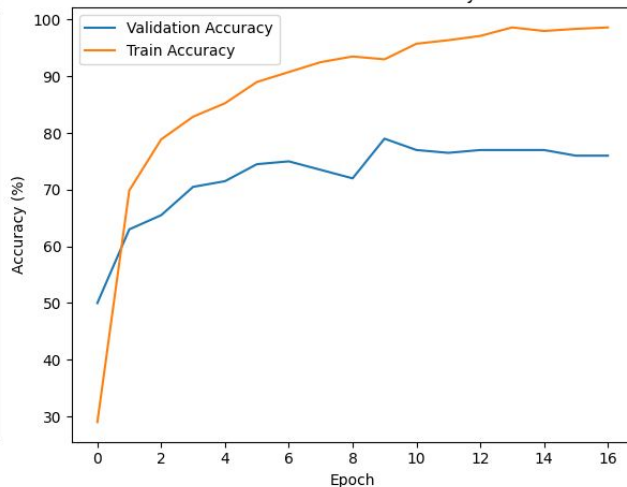
# Current Results

- **Train loss: 0.0973    Train acc: 98.25%**
- **Validation loss: 0.5717    Validation acc: 81.50%**
- **Kaggle: 0.81939**
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Train vs Validation Loss



Train vs Validation Accuracy



Epoch 1/17  
Train Loss: 3.3887, Train Accuracy: 28.12%  
Validation Loss: 1.8935, Validation Accuracy: 54.00%  
Epoch 2/17  
Train Loss: 1.1739, Train Accuracy: 67.75%  
Validation Loss: 1.1245, Validation Accuracy: 67.00%  
Epoch 3/17  
Train Loss: 0.8066, Train Accuracy: 73.75%  
Validation Loss: 0.9091, Validation Accuracy: 71.50%  
Epoch 4/17  
Train Loss: 0.5458, Train Accuracy: 82.12%  
Validation Loss: 0.7358, Validation Accuracy: 79.50%  
Epoch 5/17  
Train Loss: 0.4643, Train Accuracy: 86.25%  
Validation Loss: 0.7396, Validation Accuracy: 75.50%  
Epoch 6/17  
Train Loss: 0.3868, Train Accuracy: 87.50%  
Validation Loss: 0.6932, Validation Accuracy: 73.50%  
Epoch 7/17  
Train Loss: 0.3353, Train Accuracy: 88.75%  
Validation Loss: 0.7790, Validation Accuracy: 77.50%  
Epoch 8/17  
Train Loss: 0.2935, Train Accuracy: 90.00%  
Validation Loss: 0.7607, Validation Accuracy: 76.00%  
Epoch 9/17  
Train Loss: 0.2426, Train Accuracy: 92.25%  
Validation Loss: 0.7385, Validation Accuracy: 77.50%  
Epoch 10/17  
Train Loss: 0.2362, Train Accuracy: 92.38%  
Validation Loss: 0.6409, Validation Accuracy: 81.00%  
Epoch 11/17  
Train Loss: 0.1437, Train Accuracy: 96.62%  
Validation Loss: 0.6128, Validation Accuracy: 81.00%  
Epoch 12/17  
Train Loss: 0.1218, Train Accuracy: 97.62%  
Validation Loss: 0.5761, Validation Accuracy: 81.50%  
Epoch 13/17  
Train Loss: 0.1134, Train Accuracy: 97.50%  
Validation Loss: 0.5608, Validation Accuracy: 80.50%  
Epoch 14/17  
Train Loss: 0.1142, Train Accuracy: 97.00%  
Validation Loss: 0.5714, Validation Accuracy: 80.50%  
Epoch 15/17  
Train Loss: 0.1101, Train Accuracy: 97.62%  
Validation Loss: 0.5545, Validation Accuracy: 80.00%  
Epoch 16/17  
Train Loss: 0.0985, Train Accuracy: 98.50%  
Validation Loss: 0.5565, Validation Accuracy: 82.00%  
Epoch 17/17  
Train Loss: 0.0973, Train Accuracy: 98.25%  
Validation Loss: 0.5717, Validation Accuracy: 81.50%

# What's Next?

- Increase model accuracy
  - More augmentations
  - Generate more training data
  - Add fine-tuning