Classifying Art Styles with Transfer Learning

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Goal

- Use transfer learning to classify artworks into 25 style classes
- Based on this previous work: http://proceedings.mlr.press/v77/lecoutre17a/lecoutre17a.pdf

  (AlexNet, ResNet-50)

Transfer learning

Models:

- VGG-19
- ResNet-34
- ViT-B/16 (Visual Transformer)

Freeze body of models, update head/classifier.

Data

- WikiArt dataset
- Data acquired directly from webpage, 72k images
- Somewhat balanced dataset ~1,500 - 3,600 artworks per style

Styles classified

Abstract Art, Abstract Expressionism, Art Informel, Art Nouveau (Modern), Baroque, Color Field Painting, Cubism, Early Renaissance, Expressionism, High Renaissance, Impressionism, Magic Realism, Mannerism (Late Renaissance), Minimalism, Naive Art (Primitivism), Neoclassicism, Northern Renaissance, Pop Art, Post-Impressionism, Realism, Rococo, Romanticism, Surrealism, Symbolism and Ukiyo-e.

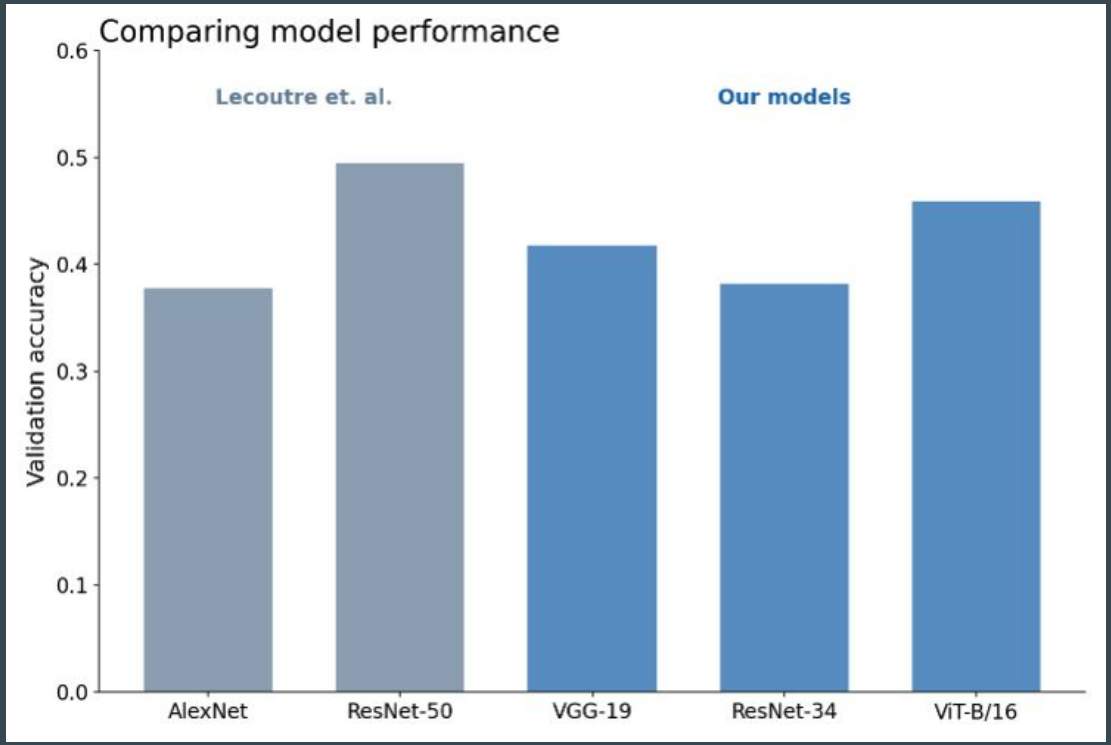
What went well...

- Decent results immediately
- Data acquisition was pretty easy
- PyTorch API made loading pretrained models very easy

What did not go well...

- Size of data posed challenges (35 GB)
  - Storage issues
  - Computational issues (GPUs)
- Preprocessing
  - Format issues - File extensions, Codec issues with Skimage/PIL
  - Number of channels- 1, 2, 3, 4
- Training
  - Very slow (~2.5-3 hours per epoch on GPUs for each model)
  - Couldn’t get everything we wanted to done

Performance



Future work

- Really enjoyed, might keep working on this!
- Train for more epochs
- Frozen v. fine-tuned models
- Train in cloud environment AWS or GCP

Thanks!