

Classifying Art Images Using Computer Vision



Daniel Merchant danmerch@uw.edu

Bum Mook Oh bmo5@uw.edu

Sean Yang sean38@uw.edu

Jevin D. West jevind@uw.edu

Bill Howe billhowe@uw.edu

Purpose

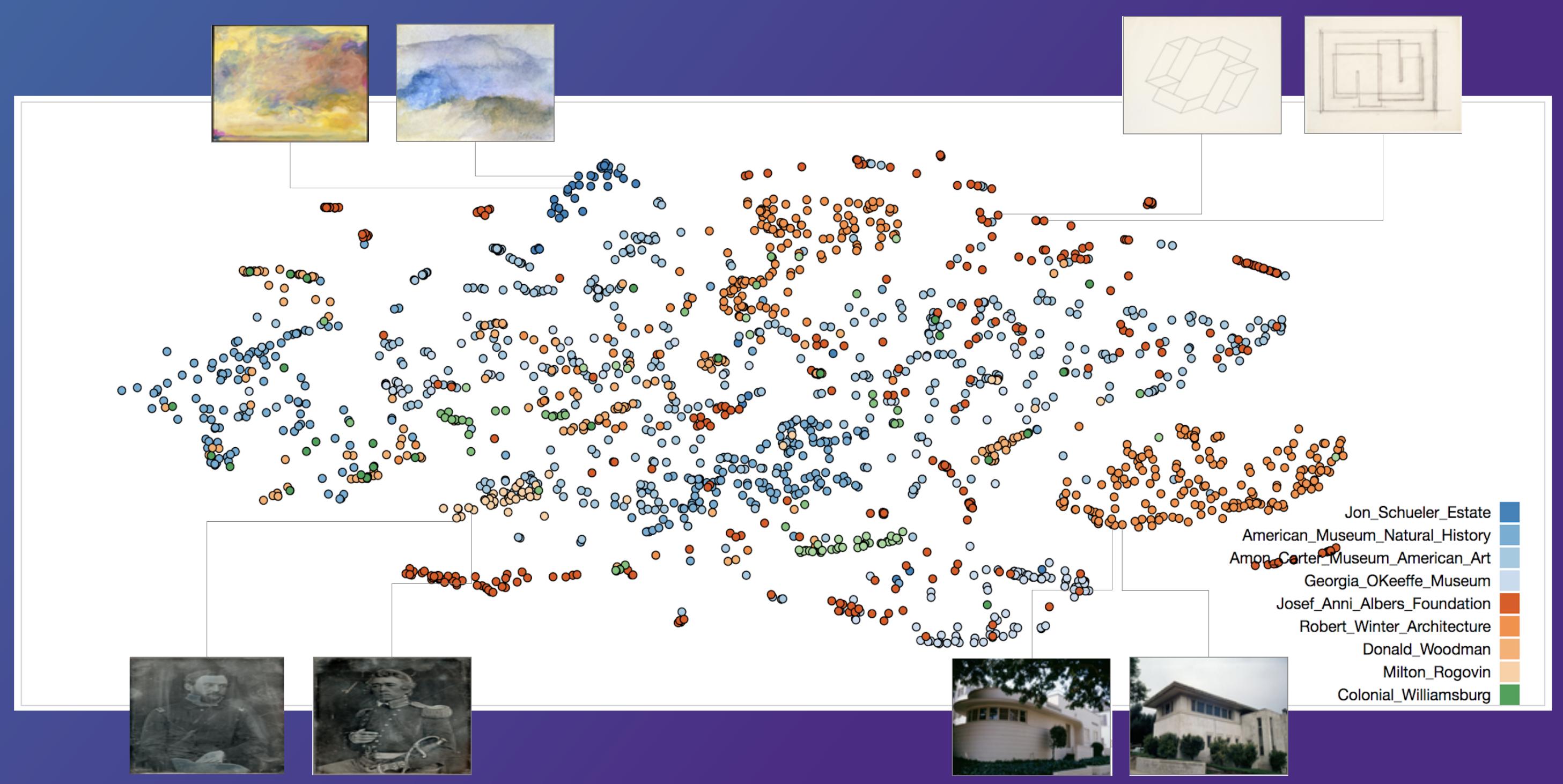
The digitization of art images has created new opportunities for research and exploration by scholars, historians, and artists. However, the scarcity of the metadata and contextual information used to describe these images makes finding them difficult. Our goal is to use a convolutional neural network-based approach to enrich art image metadata for better search and navigation of digital art libraries.

Methods

The ResNet50 deep residual network model performed best for identifying similarities between images in our experiments, so we used that approach.

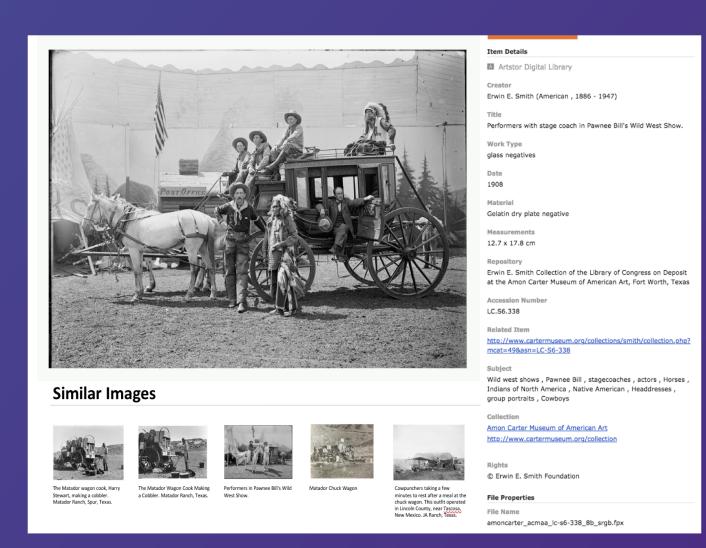
The model was trained using approximately 750,000 images taken from the ImageNet dataset.

Deep Mapping of Art Images with T-SNE Dimensionality Reduction



To highlight the classifier's ability to recognize similarities between images, we created a deep mapping visualization using the T-Distributed Stochastic Neighbor Embedding (T-SNE) dimensionality reduction technique. Images with similar artistic features create clusters among each other.

Applications



Using the art image clusters generated from the neural network, we created a prototype for an image recommendation system. Because the image clusters are generated using visual qualities of the art images, the recommendation system can show users images from different collections and artists. The mockup shown on the left is based on Artstor's image viewer, with an additional "Similar Images" section added below.

Future Directions

Object recognition is one of the most widely covered topics in computer vision, but there is little research into classifying images by other features. Some examples for our dataset:

Material - identifying an artwork as a drawing, painting, sculpture, or photograph.

Style - identifying the artistic school or style of an art image, i.e. impressionism, cubism, fauvism, baroque, etc.

Age - identifying an age range for the art image's creation.