Artwork Classification with Convolutional Neural Network

Problem

Large art collections can contain hundreds of thousands of pieces, with more pieces being accumulated all the time. Cataloging incoming art pieces requires a museum employee to make a subjective call The classification of these pieces into correct departments and collections requires art historians and museum curators to assess and categorize each work, representing a huge labor cost to institutions that typically are run on small budgets. By automating the higher levels of classification (e.g what department a given piece should be sent to for further analysis), art historians can spend less time on the initial sorting of incoming pieces. Additionally, this model could be used in digitizing the back-catalog of an institution, as only images of each artwork will be needed to generate a classification

Client

The client for this model would be any institution that curates a large catalog of art work. These institutions could include: museums, auction houses, and even personal collectors. The model trained for this project will focus on classifying artworks into the departments used at the Metropolitan Museum of Art (MET), but it will be generalizable enough to re-train to meet the needs of other institutions. Additionally, the training catalog is so broad this model will likely give more granular classifications than is necessary for smaller institutions. These classifications can be grouped when fewer departments are involved, likely making the classifier more accurate as the more specific departments of the MET are grouped into larger classes at smaller museums and auction houses.

Data

For this project I propose to leverage the Metropolitan Museum of Art Collection API (https://metmuseum.github.io/#departments) to create a convolutional neural network (CNN) that can classify which department to send a piece of art to based only on a picture of said art. Using the MET RestAPI integration I will create my own dataset containing an image of each artwork along with the metadata associated with each work (including which department it was classified into).

Solution

To build the classifier I will create a convolutional neural network with PyTorch. PyTorch will be used because of its flexibility in use with distributed training, which will ultimately be helpful in training a classifier with hundreds of thousands of images. A CNN will be used as the basis for the classifier because of its power in making generalizations about images with minimal preprocessing steps. This image set will contain a wide variety of features, so generalizations about features will be important to creating a highly performing model. Additionally, TensorBoard will be used to visually monitor the tuning of this model.

Deliverables

The deliverables for this project will include a detailed report on the generation of the CNN, a slide deck detailing the project, and all of the code will be posted publicly to GitHub.