Exploring Trends Throughout Movements in Art History

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Abstract

For our final project, we attempt to tackle the problem of identifying unknown art by predicting the original artist. To do so, we explored how the characteristics of a piece of art can be utilized to determine its original artist. By analyzing a dataset of diverse art pieces depicting various subjects and from a wide array of art movements and artists, we discovered trends that helped us contextualize art history. We then went on to investigate the potential correlation between specific artistic features and artist attribution. Using classification, we can use our machine learning model to predict the artist of a piece of art, given certain characteristics. This project has allowed us to explore the intersection of art and technology, paving the way for new approaches to art authentication and attribution.

Research Question

How has art evolved over time as it traversed different movements?

Can we utilize the characteristics of a piece of art to determine its original artist?

Data Collection

We found a collection of datasets from WikiArt, a virtual art encyclopedia, that consisted of around 13,000 works by thirty artists. This data consisted of multiple files, separated by the data and its classification.

We webscraped the origin of artists, and also found a separate dataset on specifically modern artists and their works. We merged these two datasets with our original dataset.

Data Exploration

Machine Learning (Application of Project)

We created a model trained on the movement, subject of the work, year, and origin to predict the artist. After preprocessing the categorical variables using One Hot Encoder, we ran Grid Search on various k values to determine the most optimal k for our K Nearest Neighbors model for classification. As can be seen in the graph to the right, we achieved the highest accuracy when k = 6 neighbors.

Our model achieved a mean accuracy of 0.849 using cross validation.
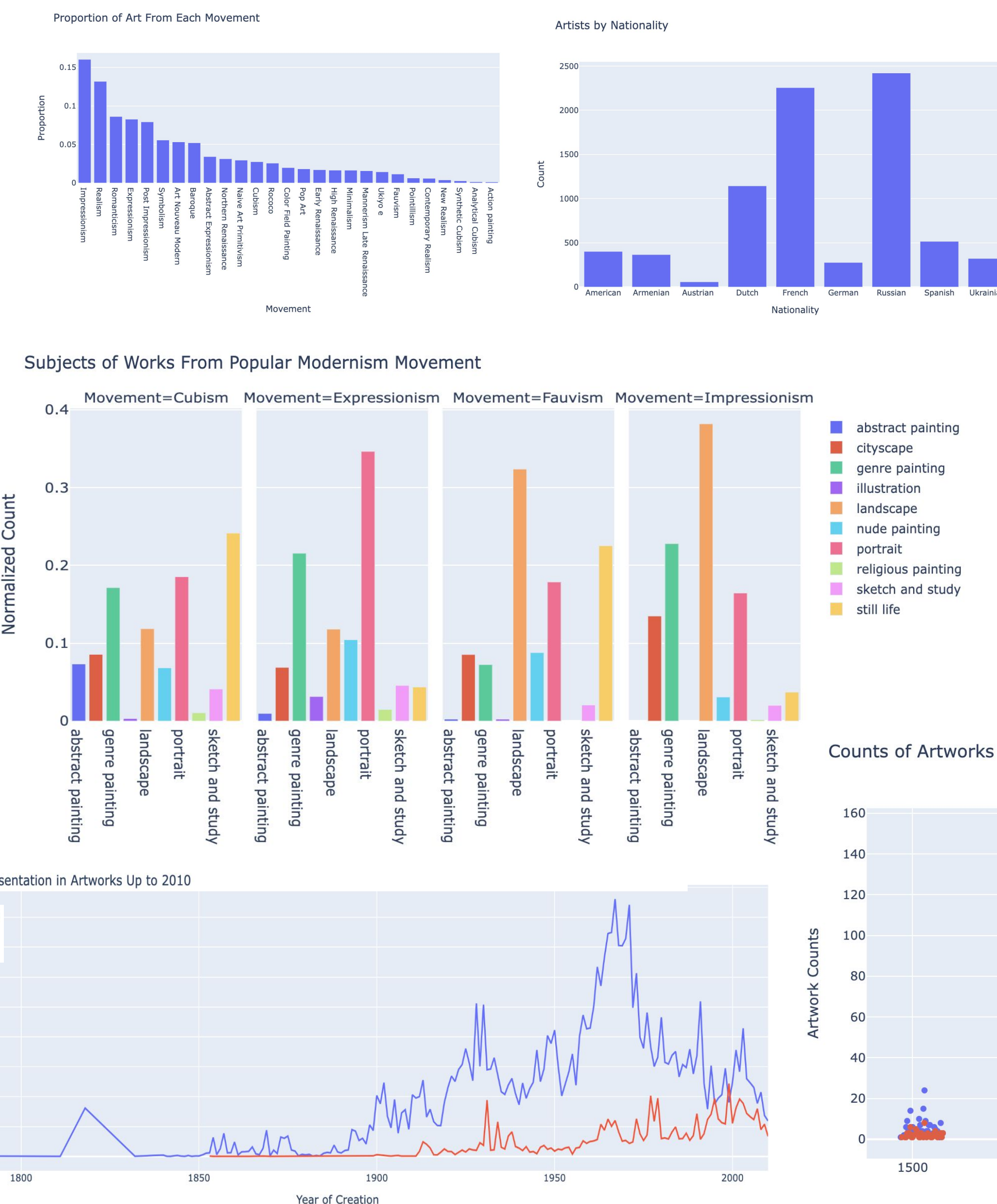
Data Analysis

Investigating relationships between art movements, time periods, gender, and art genre was what motivated our analyses. While exploring our dataset, we learned that impressionism was the most popular movement. Our dataset spanned the works of artists belonging to 9 different nationalities and 27 different movements. Among these movements, we chose to specifically investigate modernism to conduct a more detailed analysis, through which we learned that landscape, portrait, and still life were the the the most popular subjects. Our analysis revealed that modernism has been dominated by males, with the greatest disparity between the 1950s and 2000s. Evaluating the counts of artworks over time, we see that the movements fed into each other with spikes in similar periods; however, modernism seems to rise from the 1850s to the 2000s, which corresponds to the most popular time of the movement (1950s).
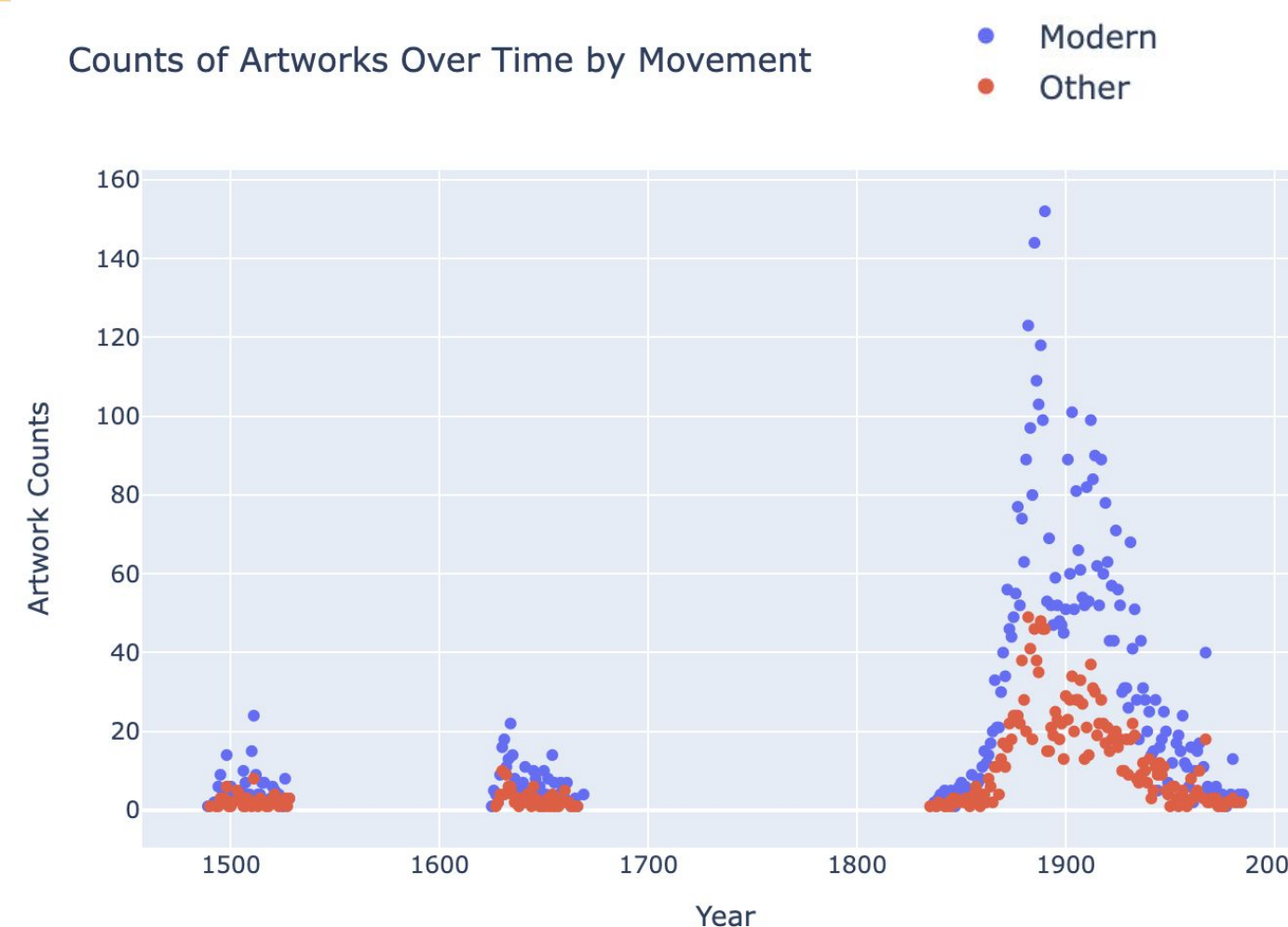
Conclusion

There are well-defined periods that have propelled progress in art. While there are many movements, they seem to inspire each other; yet, each movement retained its characteristic genre and style. With this understanding, it is possible to predict ownership of historically unclaimed and "lost" artworks.

We acknowledge the limitations of our project. As our model was only trained on around thirty artists, our prediction could only lend itself to one of these thirty artists. Additionally, in order to run our machine learning model, we assume that it is possible to retrieve the movement, year, and origin of the artworks with missing artists.

Future research includes specific patterns between artists within movements, such as identifying trends in the subjects of the pieces, and their origin. Lastly, deep learning can be used to detect counterfeit art.