# Data Visualization – Project 2 Report: MoMA on Tour

**Group X**

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*Abstract— Data Visualization is a very important tool these days. With so much information being collected through data analysis, visualizations are the most efficient way to deliver data insights. In this project, we elaborated a dashboard, an interactive visualization, about MoMA's growth in different aspects. The dashboard is available in* https://moma-on-tour.herokuapp.com/ *and the code repository in* https://github.com/svasylyeva/DVproject.

**Keywords: Data Visualization, Data Analysis, Dashboard.**

## Dataset Description

To extract our dataset, we used the git hub repository from MoMA's collection [1] and started preprocessing the Artworks csv file.

The final dataset used contains 81803 artworks, representing all works made by a singular artist that have been accessioned into MoMA's collection and correctly catalogued in the database, until 2020. Along with the 81803 records of artworks 7 features were selected to describe them. This includes the name of the artist, their nationality, and gender. It also contains the date at which the artwork was acquired by MoMA, the classification of the artwork, its assigned department, and used techniques.

## Visualization and interaction choices

- **Inspiration**

The idea of using a dataset about artists was inspired by the amazing data artist Georgia Lupi as she is very interested in visualizing artists and painters. She created the piece *Visualizing Painters' I=Lives* [2] which uses the elements and styles of paintings to tell the life story of painters like Picasso etc. Unfortunately, we were not able to find such a rich dataset which allows us to tell such a deep story. Thus, using the MoMA dataset and inspiration from the following article: 10 Amazing Data Visualizations of Creativity and Art History [3], we created our final dashboard.

The graph, Investigating the Myth of the Avant-Garde, by Loren Munk inspired the sunburst graph which we created for the classification of artworks. Moreover, the Autonomous Art V.1 piece by Ward Shelley which shows the evolution of art periods by looking at different events over the years inspired our years slider or time dimension. In our case, we wanted to show how the nationalities and genders of artists changed over the years at MoMA museums as well as the type of artworks displayed. Finally, the purple-green colour palette, it was inspired by Sonja Kuijpers' visualization known as A View on Despair [4].

- **Graphics description and available interactions**

In this dashboard, viewers can take advantage of interactive aspects such as hovers, sliders and dropdown menus for filters.

**Line Chart – Diversity of Artists' Origin Over Time**

MoMA has been increasing its nationality's diversity worldwide by acquiring artworks from a large range of artists. This line chart can show the number of the artwork's nationalities acquired by year and the number of different nationalities MoMa already presented until a specific year.
The user is able to select a shorter window for both axis so he can analyse the lines more detailed, working as a zoom. Furthermore, the user can also see the hover, with the y axis value, from both lines at the same time for the year that his mouse is pointing.

**Choropleth Map – Artwork's Nationality Evolution**

This animated choropleth map illustrates more detailed the previous growth, showing the magnitude of acquired artworks by nationality until the selected year.

The user can click on play to see this evolution through the years and pause whenever he wants. Inside the map square we are able to move and zoom it. Additionally, passing the mouse on top of each country the user can see the exact number of artworks acquired, since the colour bar is in logarithm scale.

**Stacked Area Chart – Gender of Artists Over Time**

This chart shows the gender dispersion of the artworks acquired by MoMA over the years. It is split between percentages of artworks made by male vs female artists. The audience can interact with this graph using the hover option which gives information about the year and the associated proportions of artworks acquired by MoMA in that year as the user moves their cursor on different points of the graph. Additionally, the legend is interactive since the user can click on Male and see only the proportion of artworks made by male artists over the years and/or click on the alternate category to see the female proportions.

**Bar Chart – Classification of Acquired Artworks**

This bar graph includes a slider for the years dimension to demonstrate how the type of artworks displayed at MoMA changed over the years.

**Analysis by Country**

The second part of the dashboard includes visualizations and statistics that can be filtered by country (or group of countries) and represent statistics from all MoMA's history.

1. **Sunburst Chart – Artworks Classification Arranged by Department**

The inner ring of this sunburst chart includes the top-level categories corresponding to Department, the outer rings plot the sub-categories which present the Classification of artworks inside every Department. The size of the segments is proportional to the corresponding counts.

2. **Donut Chart – Most Popular Painting Techniques**

This donut chart shows the variety of painting styles and techniques that were used by artists. The user can interact with a chart using a dropout menu with the list of the countries to see techniques used in each country. Hovering allows to find out the number of artworks that are done using chosen by user painting technique.

## Technical Aspects

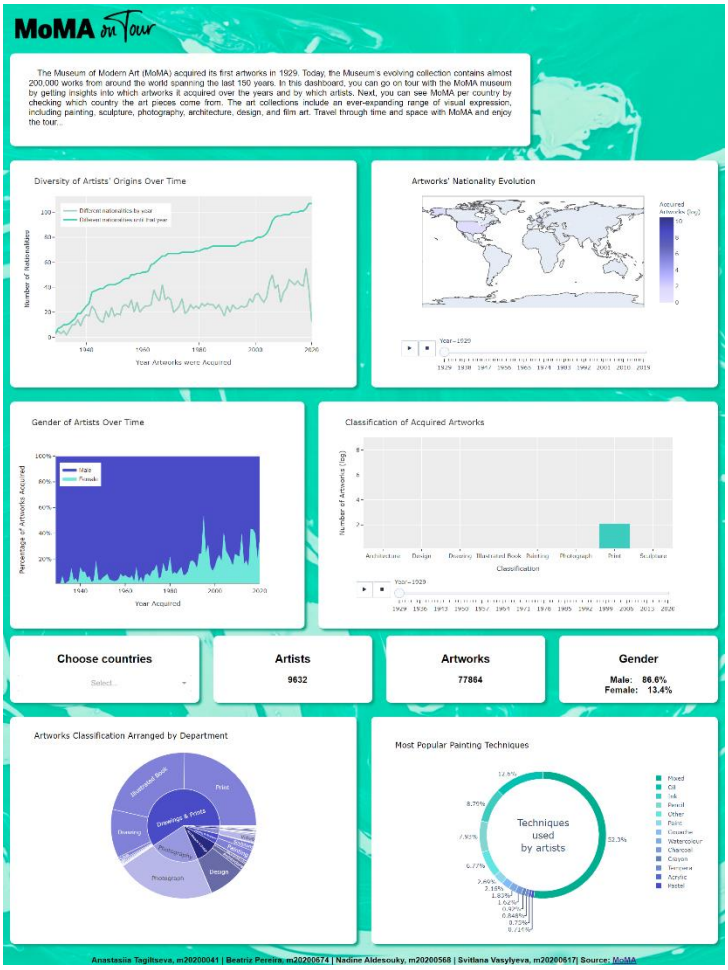
For this project, all graphs were built using Plotly and Dash software. Indeed, the original dataset was pre-processed to essentially clean it and select the columns used for our dashboard. To obtain only correct data we deleted all records with any empty space and dropped duplicated rows with the same tittle and artist. Since the dataset had artworks made by more than one artist, we had variables with more than one information, with this format – (info1, info2, …). For our visualizations we opted to select only artworks made by one singular artist, and we needed to clean this parenthesis. Additionally, the variable Country was extracted from the Nationality column to build the choropleth map.

After this, basing our code on the practical classes we used PyCharm as our main tool. The code is available on this GitHub page: https://github.com/svasylyeva/DVproject

## Discussion

In this project, we provided an overview of the MoMA collections across time, geography, classification and techniques. This allowed us to accomplish a well-rounded tour of the MoMA artwork repository for the audience to be able to travel in time and space with MoMA. Since we did not have information about the year the paintings were made and/or the art period to which they belong, this limited our analysis and potential insights. It would have been very interesting to see which paintings belong to which art period and which art period MoMA acquired the most artworks from. Moreover, if we decided to choose a narrower topic, for example, explore contemporary and new media art. In this case, it might be interesting to see the evolution of contemporary art in the MoMA collections. As alternative visualization options for future work, we could create a cloud of words for understanding the artists and the names of paintings, which may possibly show some insights. As Alberto Cairo wrote, “As we encouraged designers not to fear experimentation, and even make mistakes, they could push the boundaries of what is acceptable and orthodox in visualization.”

## Dashboard Preview




## References


[1] "The Museum of Modern Art (MoMA) collection data," 2020. https://github.com/MuseumofModernArt/collection.

[2] G. Lupi, "Visualizing Painters' Lives," 2020. http://giorgialupi.com/visualizing-painters-lives.

[3] R. Cembalest, "10 Amazing Data Visualizations of Creativity and Art History – ARTnews.com," 2014. https://www.artnews.com/art-news/news/artists-data-visualizations-of-creativity-and-art-history-2396/.

[4] S. Kuijpers, "A view on despair, a datavisualization project by STUDIO TERP," 2017. https://www.studioterp.nl/a-view-on-despair-a-datavisualization-project-by-studio-terp/.