Mini Project 3 – Art Analysis

Md Zahid (2302302)

Introduction:

In recent years, the cultural world—museums, galleries, libraries—has been digitizing collections, making art more accessible. But just putting collections online doesn't truly capture the connections between artists. This project aims to create a network of these influences, highlighting the connections between artists, movements, and institutions. The main goals are to:

1. Identify the most influential artists.
2. See which art movements had the biggest impact.
3. Discover the role of major institutions in shaping art.
4. Look at which nationalities are most represented among artists.
5. Find groups of artists who are closely connected.

By answering these questions, we hope to gain a better understanding of how influence flows through the art world.

Methodology:

Data Preparation and Analysis:

We started with four datasets: artists, relationships, institutions, and schools. First, we cleaned the data by handling missing values and looking at the distributions of key factors, like:

- **Nationality**: How many artists come from each country.
- **Total Artworks**: How many artworks are associated with each artist.
- **Institutions and Schools**: Where they're located and their impact.

We also converted relationship data (like who influenced whom) into a form that could be used in a network.

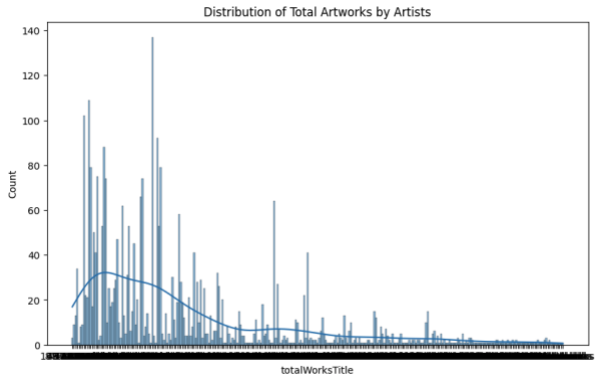

Fig: Total Artworks by Artist

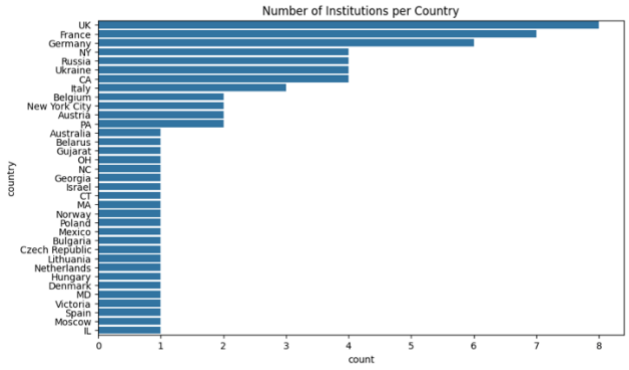

Fig : Number of Institutions Per Country

Creating and Analyzing the Network

Building the Network

Using NetworkX (a Python library for network analysis), we set up a graph where:

- **Nodes** (dots) represent artists, institutions, or schools.

- **Edges** (lines) represent influence, showing which artists influenced others.

Analysis Techniques

To understand the network better, we used different measures:

1. **Degree Centrality**: Counts how many direct connections an artist has, showing the most connected and influential artists.
2. **Betweenness Centrality**: Finds artists that act as "bridges" between groups, connecting different clusters.
3. **Closeness Centrality**: Highlights artists who are central, with short paths to others in the network.
4. **Eigenvector Centrality**: Identifies artists connected to other important artists.
5. **Community Detection**: Groups artists into clusters of close connections, often linked by style or geography.

Visualizing the Network

We used Plotly for interactive visualizations (so we could zoom in on details) and NetworkX for a simpler overview. Visualizations included:

- **Centrality-based views** to show the most influential artists.
- **Community-based views** to reveal clusters of artists connected by influence or style.

Fig: Top Influential Artists Network (Top 50 by Degree Centrality)

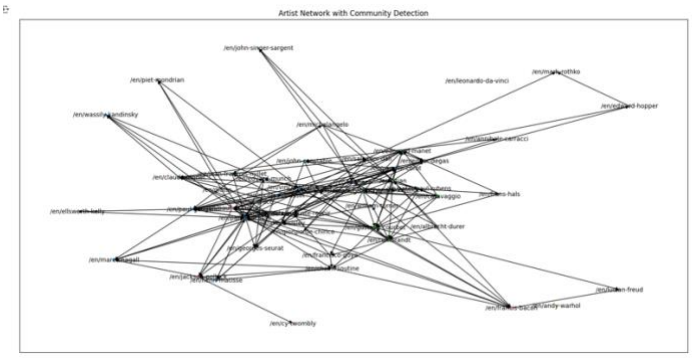

Fig: Community Detection & Coloring

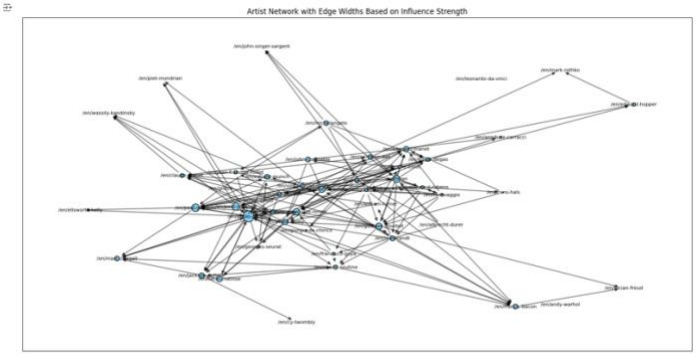

Fig: **Use Edge Widths Based on Connection Strength**

```
Most Influential Artists by Degree Centrality:
/en/pablo-picasso: 0.011686143572621035
/en/paul-cezanne: 0.01001669449081803
/en/rembrandt: 0.007679465776293823
/en/gustave-courbet: 0.007345575959933222
/en/caravaggio: 0.007345575959933222
/en/titian: 0.00667779632721202
/en/paul-gauguin: 0.00667779632721202
/en/henri-matisse: 0.00667779632721202
/en/vincent-van-gogh: 0.00667779632721202
/en/pierre-auguste-renoir: 0.006343906510851419
```

Fig: Most Influenced Artists

Results

With this analysis, we answered the key questions:

1. **Most Influential Artists**: Artists like Pablo Picasso and Paul Cézanne stood out as the most connected, meaning they had the greatest influence on others.
2. **Influential Movements**: Using community detection, we found that movements like Impressionism and Modernism formed distinct groups with strong internal connections.
3. **Influential Institutions**: Institutions such as the École des Beaux-Arts had a major impact, with many influential artists connected to them.
4. **Most Represented Nationalities**: The largest groups of artists came from the USA, France, and Italy, reflecting these countries' historical importance in art.
5. **Biggest Communities**: Community detection revealed groups of artists closely connected, usually by style or location.

Visuals

- We created visualizations highlighting the top artists by degree centrality, betweenness, and other centrality measures.
- Community detection was shown with color-coded clusters, making it easy to see groups of connected artists.

Conclusion

This project gave us useful insights into how influence flows in the art world. Degree centrality showed us the most influential artists, while community detection revealed close-knit groups of artists with similar styles or backgrounds.

Challenges

- The network was large, making it visually cluttered. To solve this, we focused on the top artists by centrality measures.
- Choosing the right centrality measure wasn't always straightforward since each measure tells a different story.