

The Evolution of the Olympics: A Statistical Analysis of Athletes and Nations (1896-2016)

2024-25 Group Artefact

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Link to GitHub

The complete repository for this project, including the source code and dataset, is available at the following link (QR code created below):

[<https://github.com/FatehAayan/MN5813-20-Group-Project-Group-1-.git>]

Project summary

Summary

The projects used data set of over 270,000 athlete events, to showcase rich history of Olympics games from Athens 1896. In this project we are aiming to visualize how games have evolved socially.

Key activities included:

1. ****We have adjusted missing values in age, weight and height, along with removing duplicate entries for accuracy.**
2. **Feature Engineering:** We have created age categories for different age groups as well as centuries to visualize trends better.
3. **Visualization:** We have utilized Plotly for interactive charts, comprising of Chloropleth map to show case gold medals won as well as Sunburst chart to showcase medal distribution and a Bar Chart Race, which shows the dominance of nations, with an analysis for equality in terms of genders.

Key Findings: The analysis showcase the historical dominance of soviet union as well as USA, diversification within sports and rise of female participating in games.

Generative AI

Declaration of Generative AI Use

I/We declare that Generative AI tools (specifically ChatGPT/Gemini) were used in this project for the following purposes:

- **Code Debugging:** To troubleshoot errors in the Plotly animation frames and data merging logic.

- **Syntax Assistance:** To generate the correct syntax for the Sunburst and Choropleth chart parameters.
- **Text Refinement:** To check the grammar and flow of the written report sections.

The core logic, data analysis decisions, and final conclusions remain the original work of the group members.

Introduction

Olympics are a reflection of global history, geopolitics, and social change. From the modest gathering in 1896 to the massive global spectacles of the 21st century, the data generated by these games offers a unique window into human achievement.

Project Aim: The aim of our project is to perform a comprehensive statistical analysis of Olympic history, so we can understand and evaluate the changes in athletic participation and national performance.

Objectives:

1. **Data Management:** To ingest, clean, and structure raw historical data into useful information that we can use for analytics.
2. **Demographic Analysis:** To learn how age and gender profiles of athletes have shifted over 120 years.
3. **Geospatial & Temporal Analysis:** To visualize which nations have dominated the medal podiums and how this leaderboard has changed over time.
4. **Interactive Visualization:** To produce engaging, interactive charts that allow users to explore the data dynamically and in a fun way :)

Setup

In this section, we set up our environment. We import the necessary Python libraries: `pandas` for data manipulation and `plotly.express` for creating interactive visualizations. We also define a custom function `load_olympic_data` to handle the downloading and local storage of the dataset to ensure reproducibility.

Import necessary libraries

```
!pip install -r requirements.txt

import pandas as pd
import plotly.express as px
import os
import qrcode
from IPython.display import display

link = "https://github.com/FatehAayan/MN5813-20-Group-Project-Group-1-.git"

# Create QR code
qr = qrcode.QRCode(
```

```
        version=1,  
        box_size=10,  
        border=5  
    )  
    qr.add_data(link)  
    qr.make(fit=True)  
  
    # Save as image  
    img = qr.make_image()  
    img.save("qr_code.png")  
  
    print("QR code saved as qr_code.png")  
    display(img)  
  
QR code saved as qr_code.png
```



Load data

```
def load_olympic_data(url=None):  
    """  
    Downloads the dataset for your group project  
    and saves it locally (requires Internet connection!).  
  
    Source: https://github.com/rgriff23/Olympic\_history  
  
    Background on how the dataset was compiled:  
    https://www.randigriffin.com/2018/05/27/olympic-history-1-web-scraping.html  
    """
```

Note: The source repository includes other datasets you may find useful, including, for example, the National Olympic Committee region mappings (noc_regions.csv).

Parameters:

*url: [optional] url of the data file.
(uses 'athlete_events.csv' if none specified.)*

Returns:

*str: Path to the downloaded CSV file
(assets/data/athlete_events.csv)*

```
"""
import urllib.request
from pathlib import Path

# Verifies if url given or default
if not url:
    # Use original data source
    url =
"https://raw.githubusercontent.com/rgriff23/Olympic_history/refs/heads
/master/data/athlete_events.csv"

# Define default output path
output_dir = Path("assets/data")
output_name = url.split('/')[-1]
output_path = output_dir / output_name

# Skip download if file already exists
if output_path.exists():
    print(f"File already exists: {output_path}")
    print("Will not proceed with downloading this file!")
    return str(output_path)

# Create directory structure
print(f"Creating directory: {output_path}")
output_dir.mkdir(
    parents=True,
    exist_ok=True)

print(f"Downloading dataset ... \n{output_path}")
req = urllib.request.Request(url, headers={'User-Agent':
'Mozilla/5.0'})

with urllib.request.urlopen(req, timeout=60) as response:
    data = response.read()
    with open(output_path, 'wb') as f:
        f.write(data)
    print(f"Dataset saved as: {output_path}")
```

```

        return str(output_path)

# Test the default (athlete_events.csv)
filepath = load_olympic_data()

Creating directory: assets/data/athlete_events.csv
Downloading dataset ...
assets/data/athlete_events.csv
Dataset saved as: assets/data/athlete_events.csv

# Test with a different file
# filepath = load_olympic_data(
#
# url='https://github.com/rgriff23/Olympic_history/blob/master/data/
# host_city_locations.csv')

```

Convert into DataFrame

```

csv_file = 'athlete_events.csv'
temp_df = pd.read_csv(csv_file)

json_file = 'athlete_events.json'
temp_df.to_json(json_file, orient='records', indent=4)

print(f"Successfully converted {csv_file} to {json_file}! 🎉")

df = pd.read_json(json_file, orient='records')

print("\nHere is the data loaded into 'df':")
print(df.head())

Successfully converted athlete_events.csv to athlete_events.json! 🎉

```

Here is the data loaded into 'df':

	ID	Name	Sex	Age	Height	Weight
Team \						
0	1	A Dijiang	M	24.0	180.0	80.0
China						
1	2	A Lamusi	M	23.0	170.0	60.0
China						
2	3	Gunnar Nielsen Aaby	M	24.0	NaN	NaN
Denmark						
3	4	Edgar Lindenau Aabye	M	34.0	NaN	NaN
Denmark/Sweden						
4	5	Christine Jacoba Aaftink	F	21.0	185.0	82.0
Netherlands						

	NOC	Games	Year	Season	City	Sport	\
0	CHN	1992 Summer	1992	Summer	Barcelona	Basketball	
1	CHN	2012 Summer	2012	Summer	London	Judo	

2	DEN	1920	Summer	1920	Summer	Antwerpen	Football
3	DEN	1900	Summer	1900	Summer	Paris	Tug-Of-War
4	NED	1988	Winter	1988	Winter	Calgary	Speed Skating

	Event	Medal
0	Basketball Men's Basketball	None
1	Judo Men's Extra-Lightweight	None
2	Football Men's Football	None
3	Tug-Of-War Men's Tug-Of-War	Gold
4	Speed Skating Women's 500 metres	None

SUGGESTION: Merge data from multiple files into a single DataFrame

Display the first few rows and basic information about the DataFrame `df` you have created from `data_source`.

```
print(df.head())
```

ID	Name	Sex	Age	Height	Weight
Team \					
0 1	A Dijiang	M	24.0	180.0	80.0
China					
1 2	A Lamusi	M	23.0	170.0	60.0
China					
2 3	Gunnar Nielsen Aaby	M	24.0	NaN	NaN
Denmark					
3 4	Edgar Lindenau Aabye	M	34.0	NaN	NaN
Denmark/Sweden					
4 5	Christine Jacoba Aaftink	F	21.0	185.0	82.0
Netherlands					

NOC	Games	Year	Season	City	Sport
0 CHN	1992 Summer	1992	Summer	Barcelona	Basketball
1 CHN	2012 Summer	2012	Summer	London	Judo
2 DEN	1920 Summer	1920	Summer	Antwerpen	Football
3 DEN	1900 Summer	1900	Summer	Paris	Tug-Of-War
4 NED	1988 Winter	1988	Winter	Calgary	Speed Skating

	Event	Medal
0	Basketball Men's Basketball	None
1	Judo Men's Extra-Lightweight	None
2	Football Men's Football	None
3	Tug-Of-War Men's Tug-Of-War	Gold
4	Speed Skating Women's 500 metres	None

```
print(df.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 271116 entries, 0 to 271115
Data columns (total 15 columns):
```

#	Column	Non-Null	Count	Dtype
0	ID	271116	non-null	int64
1	Name	271116	non-null	object
2	Sex	271116	non-null	object
3	Age	261642	non-null	float64
4	Height	210945	non-null	float64
5	Weight	208241	non-null	float64
6	Team	271116	non-null	object
7	NOC	271116	non-null	object
8	Games	271116	non-null	object
9	Year	271116	non-null	int64
10	Season	271116	non-null	object
11	City	271116	non-null	object
12	Sport	271116	non-null	object
13	Event	271116	non-null	object
14	Medal	39783	non-null	object

dtypes: float64(3), int64(2), object(10)
memory usage: 31.0+ MB
None

Data management

Data cleaning

```
# TODO: Handle missing values
print(df.isna().sum())      # missing values per column
```

ID	0
Name	0
Sex	0
Age	9474
Height	60171
Weight	62875
Team	0
NOC	0
Games	0
Year	0
Season	0
City	0
Sport	0
Event	0
Medal	231333

```
dtype: int64

# Critical columns must not be null
critical_cols = ["Name", "Sex", "Age", "Year", "Sport", "Event"]

# Drop rows where any critical column is NaN
```



```

df = df.dropna(subset=critical_cols)

# Impute non-critical numeric columns with median
for col in ["Height", "Weight"]:
    if col in df.columns:
        median_val = df[col].median()
        df[col] = df[col].fillna(median_val)

# For Medal, fill missing with the string "None"
if "Medal" in df.columns:
    df["Medal"] = df["Medal"].fillna("None")

# Check remaining missing values
print("Missing values after cleaning:")
print(df.isna().sum())

Missing values after cleaning:
ID          0
Name        0
Sex          0
Age          0
Height       0
Weight       0
Team         0
NOC          0
Games        0
Year         0
Season       0
City         0
Sport        0
Event        0
Medal        0
dtype: int64

df

{"type": "dataframe", "variable_name": "df"}

# TODO: Convert data types where necessary
# Convert Year to datetime (year-only)
df["Year"] = pd.to_datetime(df["Year"].astype(int), format="%Y",
errors="coerce")

# Optionally convert Age to integer if currently float
if pd.api.types.is_float_dtype(df["Age"]):
    df["Age"] = df["Age"].astype("Int64") # nullable integer

print(df.dtypes)

ID          int64
Name        object

```

```
Sex            object
Age            Int64
Height         float64
Weight         float64
Team           object
NOC            object
Games          object
Year           datetime64[ns]
Season         object
City           object
Sport          object
Event          object
Medal          object
dtype: object
```

```
# TODO: Remove any duplicate entries
```

```
# 5. Remove exact duplicate rows
```

```
before_dups = len(df)
```

```
df = df.drop_duplicates()
```

```
after_dups = len(df)
```

```
print(f"Removed {before_dups - after_dups} duplicate rows")
```

```
Removed 1226 duplicate rows
```

Data wrangling

```
# Create Age_Group column with custom bins
```

```
age_bins = [0, 18, 25, 35, 100]
```

```
age_labels = ['0-18', '19-25', '26-35', '36+']
```

```
df['Age_Group'] = pd.cut(df['Age'], bins=age_bins, labels=age_labels,  
right=True)
```

```
/tmp/ipython-input-2869516172.py:4: SettingWithCopyWarning:
```

```
A value is trying to be set on a copy of a slice from a DataFrame.
```

```
Try using .loc[row_indexer,col_indexer] = value instead
```

```
See the caveats in the documentation:
```

```
https://pandas.pydata.org/pandas-docs/stable/user\_guide/indexing.html#  
returning-a-view-versus-a-copy
```

```
df['Age_Group'] = pd.cut(df['Age'], bins=age_bins,  
labels=age_labels, right=True)
```

```
df['Age_Group'].value_counts().sort_index()
```

```
Age_Group
```

```
0-18      20656
```

```
19-25     130126
```

```
26-35      94220
```

```
36+       15414
```

```
Name: count, dtype: int64
```

```
# Create Century column from Year
df['Century'] = (df['Year'].dt.year // 100 + 1).astype(str) + 'th'

/tmp/ipython-input-1037988497.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
df['Century'] = (df['Year'].dt.year // 100 + 1).astype(str) + 'th'
```

Data analysis

Here, we perform aggregation to understand the data better. We calculate the average age of athletes per event, identify the most decorated athletes in each sport, and summarize the total Gold medal count by nation. This creates the foundation for our visualizations.

```
avg_age_per_event = df.groupby("Event")["Age"].mean().reset_index()
avg_age_per_event.head()

{"summary": "{\n  \"name\": \"avg_age_per_event\",\n  \"rows\": 757,\n  \"fields\": [\n    {\n      \"column\": \"Event\",\n      \"properties\": {\n        \"dtype\": \"string\",\n        \"num_unique_values\": 757,\n        \"samples\": [\n          \"Luge Men's Singles\",\n          \"Athletics Men's 800 metres\",\n          \"Cycling Women's BMX\",\n          \"\n        ],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n      }\n    },\n    {\n      \"column\": \"Age\",\n      \"properties\": {\n        \"dtype\": \"Float64\",\n        \"num_unique_values\": 729,\n        \"samples\": [\n          28.754545454545454,\n          25.062091503267975,\n          37.86821705426357\n        ],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n      }\n    }\n  ],\n  \"type\": \"dataframe\", \"variable_name\": \"avg_age_per_event\"}", "type": "dataframe", "variable_name": "avg_age_per_event"}

athlete_medal_counts = (
    df[df["Medal"].notna()] # count only medal-winning
    .groupby(["Sport", "Name"])
    .size()
    .reset_index(name="Medal_Count")
)

# For each sport, keep the athlete with the max medals
top_athlete_per_sport = (
    athlete_medal_counts
    .sort_values(["Sport", "Medal_Count"], ascending=[True, False])
    .groupby("Sport")
```

```

        .first()
        .reset_index()
    )

top_athlete_per_sport

{"summary":{"\n  \"name\": \"top_athlete_per_sport\",\n  \"rows\": 66,\n  \"fields\": [\n    {\n      \"column\": \"Sport\",\n      \"properties\": {\n        \"dtype\": \"string\",\n        \"num_unique_values\": 66,\n        \"samples\": [\n          \"Swimming\",\n          \"Volleyball\",\n          \"Aeronautics\"\n        ],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n      }\n    },\n    {\n      \"column\": \"Name\",\n      \"properties\": {\n        \"dtype\": \"string\",\n        \"num_unique_values\": 66,\n        \"samples\": [\n          \"Michael Fred Phelps, II\",\n          \"Sergey Yuryevich Tetyukhin\",\n          \"Hermann Schreiber\"\n        ],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n      }\n    },\n    {\n      \"column\": \"Medal_Count\",\n      \"properties\": {\n        \"dtype\": \"number\",\n        \"std\": 8,\n        \"min\": 1,\n        \"max\": 39,\n        \"num_unique_values\": 24,\n        \"samples\": [\n          26,\n          3,\n          1\n        ],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n      }\n    }\n  ]\n}, \"type\": \"dataframe\", \"variable_name\": \"top_athlete_per_sport\"}

gold_medals = (
    df[df[\"Medal\"] == \"Gold\"]
    .groupby(\"Team\")
    .size()
    .sort_values(ascending=False)
    .head(10)
    .reset_index(name=\"Gold_Count\")
)

gold_medals

{"summary":{"\n  \"name\": \"gold_medals\",\n  \"rows\": 10,\n  \"fields\": [\n    {\n      \"column\": \"Team\",\n      \"properties\": {\n        \"dtype\": \"string\",\n        \"num_unique_values\": 10,\n        \"samples\": [\n          \"Canada\",\n          \"Soviet Union\",\n          \"France\"\n        ],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n      }\n    },\n    {\n      \"column\": \"Gold_Count\",\n      \"properties\": {\n        \"dtype\": \"number\",\n        \"std\": 641,\n        \"min\": 369,\n        \"max\": 2472,\n        \"num_unique_values\": 10,\n        \"samples\": [\n          421,\n          1058,\n          453\n        ],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n      }\n    }\n  ]\n}, \"type\": \"dataframe\", \"variable_name\": \"gold_medals\"}

```

Data visualisation

In this section, we bring the data to life using **Plotly**.

1. **Choropleth Map:** A global view of Gold Medal distribution.
2. **Sunburst Chart:** A hierarchical breakdown of medals by Sport and type (Gold/Silver/Bronze).
3. **Bar Chart Race:** An animated timeline showing how the top 10 nations have competed for total medal dominance from 1896 to 2016.
4. **Area Chart:** A visualization of the gender gap in the Summer Olympics, showing the growth of female participation.

```
gold = (
    df[df["Medal"] == "Gold"]
      .groupby("Team")
      .size()
      .sort_values(ascending=False)
      .head(10)
      .reset_index(name="Gold_Count")
)

fig = px.choropleth(
    gold,
    locations="Team",
    locationmode="country names",
    color="Gold_Count",
    hover_name="Team",
    color_continuous_scale="sunset",
)

fig.update_geos(
    projection_type="orthographic",    # ROUND GLOBE
    showcoastlines=True,
    showcountries=True,
    showland=True,
    landcolor="lightgray",
    showocean=True,
    oceancolor="lightblue"
)

fig.update_layout(
    title="Countries and their Gold medal counts",
    template="plotly_white",
    height=700,
    paper_bgcolor="white",    # make the background blue too
)

fig
```

```

# 1. Filter for actual medals (excluding 'None')
medal_winners = df[df['Medal'] != 'None']

# 2. Group by Sport and Medal to count occurrences
medal_breakdown = medal_winners.groupby(['Sport',
'Medal']).size().reset_index(name='Count')

# 3. Define the medal hierarchy starting point
medal_breakdown['All'] = 'Medal Count'

fig_sunburst = px.sunburst(
    medal_breakdown,
    path=['All', 'Sport', 'Medal'],
    values='Count',
    color='Medal',
    color_discrete_map={
        'Gold': 'gold',
        'Silver': 'silver',
        'Bronze': '#CD7F32',
        'All': 'lightgray'
    },
    title='Medal Breakdown by Sport and Medal Type ☐☐☐'
)

fig_sunburst.update_traces(
    sort=True,
    hovertemplate='<b>%(label)</b><br>Medals: %(value)<extra></extra>'
)

fig_sunburst.show()

country_medals_yearly = (
    df[df['Medal'] != 'None']
    .groupby(['Year', 'Team'])['Medal']
    .count()
    .reset_index(name='Total_Medals')
)

country_medals_yearly['Year_Int'] =
country_medals_yearly['Year'].dt.year

# 2. Fill missing years to ensure smooth cumulative calculation
all_years = sorted(country_medals_yearly['Year_Int'].unique())
all_teams = country_medals_yearly['Team'].unique()
skeleton = pd.MultiIndex.from_product([all_years, all_teams],
names=['Year_Int', 'Team']).to_frame(index=False)
country_medals_filled = skeleton.merge(country_medals_yearly,
on=['Year_Int', 'Team'], how='left').fillna(0)

# 3. Calculate Cumulative Medals
country_medals_filled['Cumulative_Medals'] =

```

```

country_medals_filled.sort_values('Year_Int').groupby('Team')
['Total_Medals'].cumsum()

# 4. CRITICAL STEP: Calculate Rank for each year
# We rank by Cumulative Medals (descending). Method='first' ensures a
unique rank 1-10 even for ties.
country_medals_filled['Rank'] =
country_medals_filled.groupby('Year_Int')
['Cumulative_Medals'].rank(method='first', ascending=False)

# 5. Filter to Top 10 only
top_10_race = country_medals_filled[country_medals_filled['Rank'] <=
10].copy()

# Sort by Rank so the animation frame order is consistent (Rank 1 at
top)
top_10_race = top_10_race.sort_values(['Year_Int', 'Rank'])

fig_race = px.bar(
    top_10_race,
    x='Cumulative_Medals',
    y='Rank',
    orientation='h',
    text='Team',
    color='Team',
    animation_frame='Year_Int',
    animation_group='Team',
    hover_name='Team',
    title='Cumulative Medal Race: Top 10 Olympic Countries Over Time
σ',
    range_x=[0, top_10_race['Cumulative_Medals'].max() * 1.1],
    range_y=[10.5, 0.5],
    height=800
)

# Cosmetic Polish
fig_race.update_traces(textposition='inside', textfont_size=14)
fig_race.update_layout(
    template='plotly_white',
    yaxis={'visible': False, 'showticklabels': False},
    xaxis={'title': 'Cumulative Total Medals'},
    margin={'l': 20, 'r': 20, 't': 60, 'b': 40}
)

# Slow down animation
fig_race.layout.updatemenus[0].buttons[0].args[1]['frame']['duration']
= 1500
fig_race.layout.updatemenus[0].buttons[0].args[1]['transition']
['duration'] = 500

```

```

fig_race.show()

summer_df = df[df['Season'] == 'Summer']

gender_data = summer_df.groupby(['Year', 'Sex'])
['ID'].nunique().reset_index(name='Count')

# Visualization: Area Chart
fig_gender = px.area(
    gender_data,
    x='Year',
    y='Count',
    color='Sex',
    title='Evolution of Gender Participation in Summer Olympics *',
    labels={'Count': 'Number of Unique Athletes'},
    # Using pastel palette
    color_discrete_map={'M': '#BAE1FF', 'F': '#FFB3BA'}
)

fig_gender.update_layout(
    template='plotly_white',
    xaxis_title="Year",
    yaxis_title="Number of Unique Athletes",
    legend_title="Gender"
)

fig_gender.show()

```

Data export

```

df

{"type": "dataframe", "variable_name": "df"}

# TODO: Save the cleaned and wrangled DataFrame to a new CSV file
df.to_csv('olympics_cleaned.csv', index=False)

print("Export complete!")

Export complete!

# TODO: Ensure that you can successfully load the exported CSV file
# Tell Pandas that "None" is actual data, not a missing value
df_check = pd.read_csv('olympics_cleaned.csv', keep_default_na=False,
na_values=[''])

print("File loaded successfully! Here are the details:")
print(df_check.info())

```



```
print("\nFirst 5 rows:")
df_check.head()
```

File loaded successfully! Here are the details:

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 260416 entries, 0 to 260415
```

```
Data columns (total 17 columns):
```

#	Column	Non-Null Count	Dtype
0	ID	260416 non-null	int64
1	Name	260416 non-null	object
2	Sex	260416 non-null	object
3	Age	260416 non-null	int64
4	Height	260416 non-null	float64
5	Weight	260416 non-null	float64
6	Team	260416 non-null	object
7	NOC	260416 non-null	object
8	Games	260416 non-null	object
9	Year	260416 non-null	object
10	Season	260416 non-null	object
11	City	260416 non-null	object
12	Sport	260416 non-null	object
13	Event	260416 non-null	object
14	Medal	260416 non-null	object
15	Age_Group	260416 non-null	object
16	Century	260416 non-null	object

```
dtypes: float64(2), int64(2), object(13)
```

```
memory usage: 33.8+ MB
```

```
None
```

First 5 rows:

```
{"type": "dataframe", "variable_name": "df_check"}
```

```
# 1. Create the output directory if it doesn't exist
```

```
output_dir = "assets/images"
```

```
if not os.path.exists(output_dir):
```

```
    os.makedirs(output_dir)
```

```
    print(f"Created directory: {output_dir}")
```

```
figures_to_save = [
```

```
    ("map_gold_medals.html", "fig"),
```

```
    ("sunburst_medals_breakdown.html", "fig_sunburst"),
```

```
    ("bar_race_cumulative_medals.html", "fig_race"),
```

```
    ("area_gender_participation.html", "fig_gender")
```

```
]
```

```
print("Starting export to HTML... ")
```

```
# 3. Loop through and save
```

```

for filename, var_name in figures_to_save:
    if var_name in globals():
        try:
            # Get the actual figure object from the variable name
            fig_object = globals()[var_name]

            # Save it
            file_path = os.path.join(output_dir, filename)
            fig_object.write_html(file_path)

            print(f"☐ Saved: {filename}")
        except Exception as e:
            print(f"☐ Error saving {filename}: {e}")
    else:
        print(f"⚠ Skipped {filename}: Variable '{var_name}' not found.
        (Did you run that chart's cell?)")

```

```

print("\nAll done! Your interactive graphs are in the 'assets/images'
folder.")

```

```

Created directory: assets/images
Starting export to HTML... ☐
☐ Saved: map_gold_medals.html
☐ Saved: sunburst_medals_breakdown.html
☐ Saved: bar_race_cumulative_medals.html
☐ Saved: area_gender_participation.html

```

```

All done! Your interactive graphs are in the 'assets/images' folder.

```

```

import shutil
import os

```

```

# --- Step 1: Copy CSV and assets folder into repo ---
csv_source = '/content/olympics_cleaned.csv'
assets_source = '/content/assets'

```

```

repo_path = '/content/MN5813-20-Group-Project-Group-1-'
csv_dest = os.path.join(repo_path, 'olympics_cleaned.csv')
assets_dest = os.path.join(repo_path, 'assets')

```

```

# Copy CSV
shutil.copy(csv_source, csv_dest)

```

```

# Copy assets folder
if os.path.exists(assets_dest):
    shutil.rmtree(assets_dest) # remove if already exists
shutil.copytree(assets_source, assets_dest)

```

```

print("Files and folder copied to repo!")

```

```

# --- Step 2: Configure git ---

```

```

os.system('git config --global user.name "Fateh Aayan"')
os.system('git config --global user.email "your_email@example.com"')
# replace with your GitHub email

# --- Step 3: Commit changes ---
os.chdir(repo_path)
os.system('git add olympics_cleaned.csv assets')
os.system('git commit -m "Add cleaned CSV and assets folder"')

# --- Step 4: Push using new PAT ---
GITHUB_PAT =
"github_pat_11A2WC57Q0UoWedlaVMGG2_yREXYwy8SGd0IsbTx44dPga7Iq2vC0zscFL
EC1QZ7aaJZVLBCCJZEopweIj"
os.system(f'git push
https://{GITHUB_PAT}@github.com/FatehAayan/MN5813-20-Group-Project-
Group-1-.git main')

Files and folder copied to repo!

0

# notebook = "MN5813 20% Project.ipynb" # your filename

# os.system(f"jupyter nbconvert --to webpdf {notebook}")

65280

```

Conclusion

Conclusion

The analysis that we did of the Olympic Games (1896–2016) dataset reveals a clear narrative of expansion and inclusion.

1. The Geopolitics of Sport: Visualization of cumulative medals shows that the United States dominated most of history, followed by the Soviet Union and powerful European countries like Germany and Great Britain. The "Bar Chart Race" highlights how geopolitical events (like the Cold War era) influenced medal counts.

2. The Rise of Equality: The most significant trend according to us is visible in our Gender Participation Area Chart. In the early 20th century, there was very little female participation. However, a sharp increase is seen from the 1980s onwards, narrowing the gender gap significantly, though parity in participant numbers was still being chased as of 2016.

3. Evolution of the Athlete: By analyzing age and physical attributes, it's clear that a lot more diversity can be seen in terms of different ages over the years. The average age also varies significantly by sport (with gymnastics favoring youth and equestrian favoring experience).

Future Work: In the future we can integrate GDP and population datasets to calculate "medals per capita," so that smaller nations get fairly judged.

References

1. **Dataset Source:** Griffin, R. (2018). *120 Years of Olympic History: Athletes and Results*. Retrieved from [Kaggle/GitHub](#).
2. **Pandas Documentation:** The pandas development team. (2024). *pandas-dev/pandas: Pandas*. Zenodo.
3. **Plotly Documentation:** Plotly Technologies Inc. (2015). *Collaborative data science*. Montreal, QC: Plotly Technologies Inc.

Additional Data Details

- The dataset contains entries for individual athletes. Team sports have an entry for *every* player, which creates a multiplier effect on the medal counts (e.g., the US Basketball team winning Gold counts as 12 gold medals in this raw data).
- For the "Country Medal Race," we aggregated medals by Team and Year to mitigate individual weighting issues.