

(World Population Dataset)

Title: World Population Analysis & Visualization Dashboard

Subtitle: Data Visualization Project (Winter 2025)

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Course: *Data Science*

Dataset: World Population Dataset (1970–2022)

Project Overview

Objective

The goal of this project is to explore global population patterns using real-world data and create meaningful visualizations to identify trends and comparisons.

Key Tasks

- Data cleaning and preprocessing
- Exploratory Data Analysis (EDA)
- 10 analytical questions with visualizations
- Streamlit dashboard creation
- GitHub repository deployment

Dataset Description

- **Dataset Used**

World Population Dataset

- **Rows and Columns**
- **234 countries/territories**
- **17 columns**

Important Columns

- Country/Territory
- Continent
- Population (1970, 1980, 1990, 2000, 2010, 2015, 2020, 2022)
- Area (km²)
- Density (per km²)
- Growth Rate
- World Population Percentage

Data Cleaning & Preparation

Steps Performed

- Loaded dataset using Pandas
- Checked missing values using `df.isnull().sum()`
- Verified datatypes using `df.info()`
- Confirmed dataset had **no missing values**
- Converted numerical columns into correct format for analysis

Result

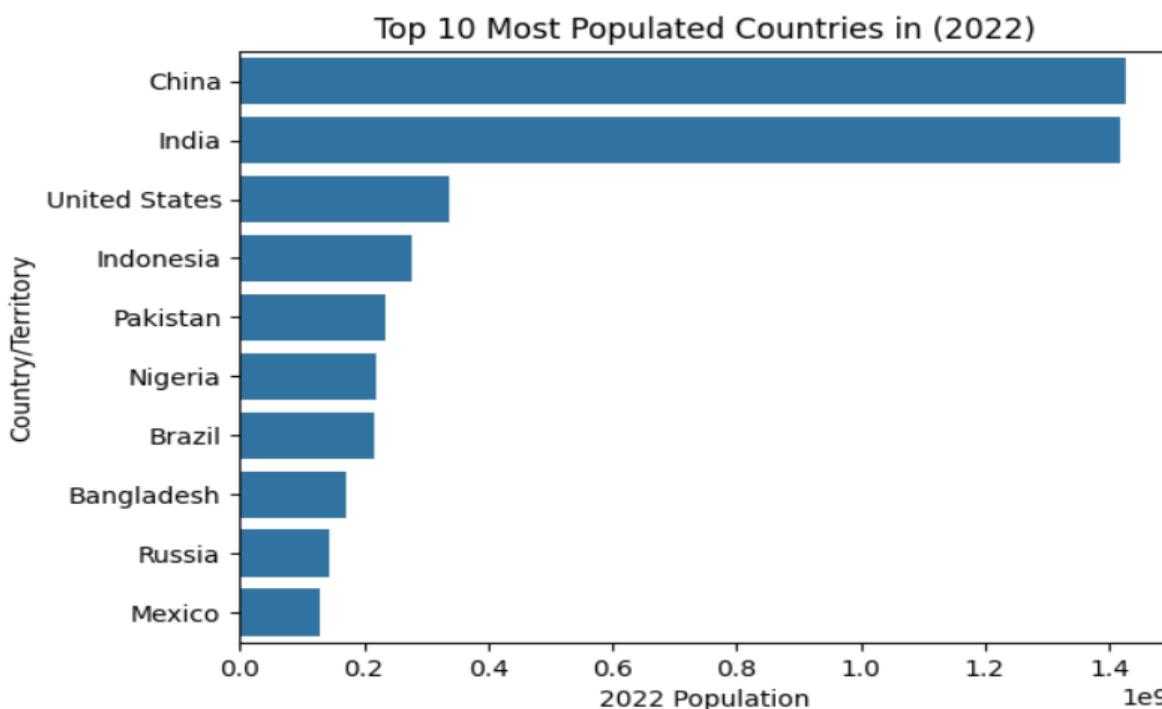
Dataset was clean and ready for visualization.

Top 10 Most Populated Countries (2022)

Chart: Bar Chart

Insight

- China and India dominate global population.
- The top 10 countries contribute a major share of world population.
- Population distribution is highly unequal among countries.

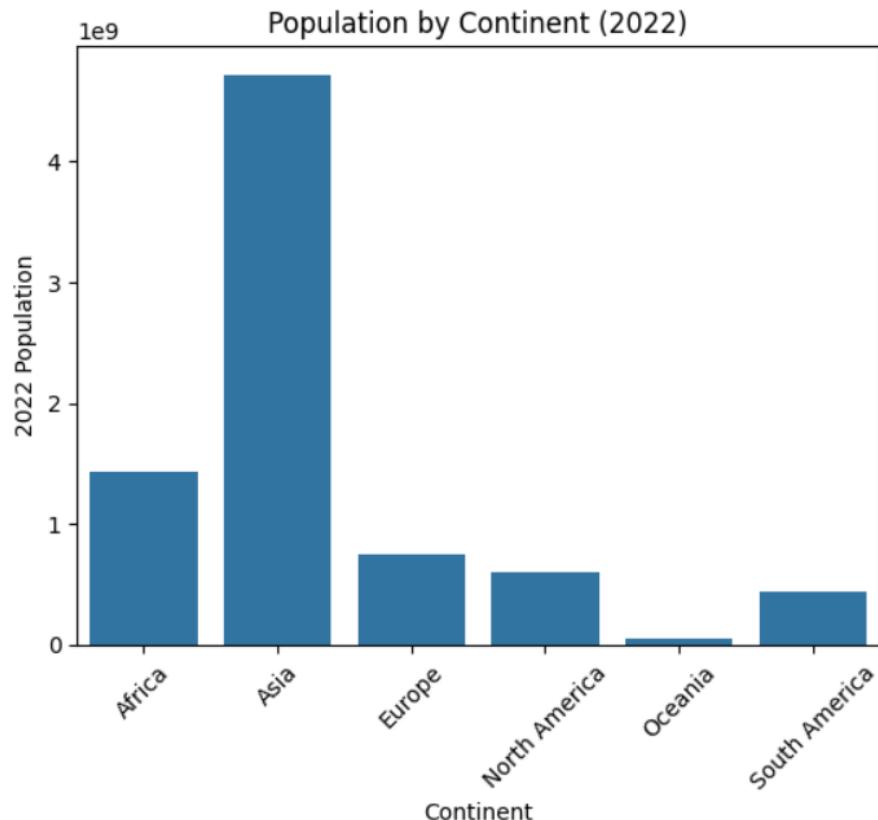


Population Share by Continent

Chart: Bar Chart

Insight

- Asia contributes the largest share of global population.
- Africa is the second-highest contributor.
- Oceania contributes the smallest percentage.

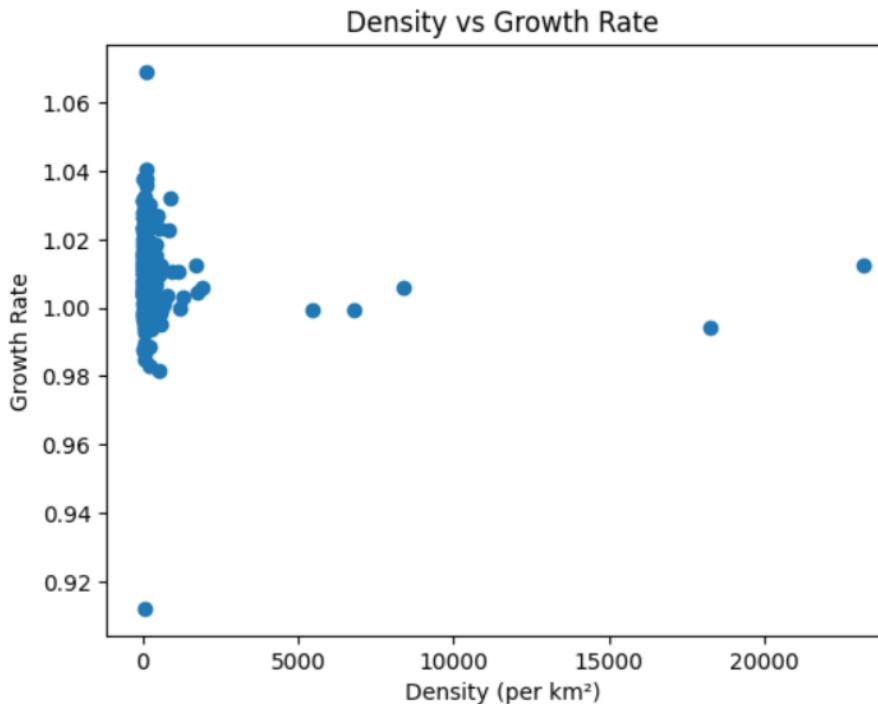


Relationship Between Population Density and Growth Rate

Visualization: Scatter Plot (X = Density, Y = Growth Rate)

Key Insight

- Most countries fall in the **low density + moderate growth** range.
- Highly dense countries are not always high-growth.
- This shows **density does not strongly predict growth rate**.

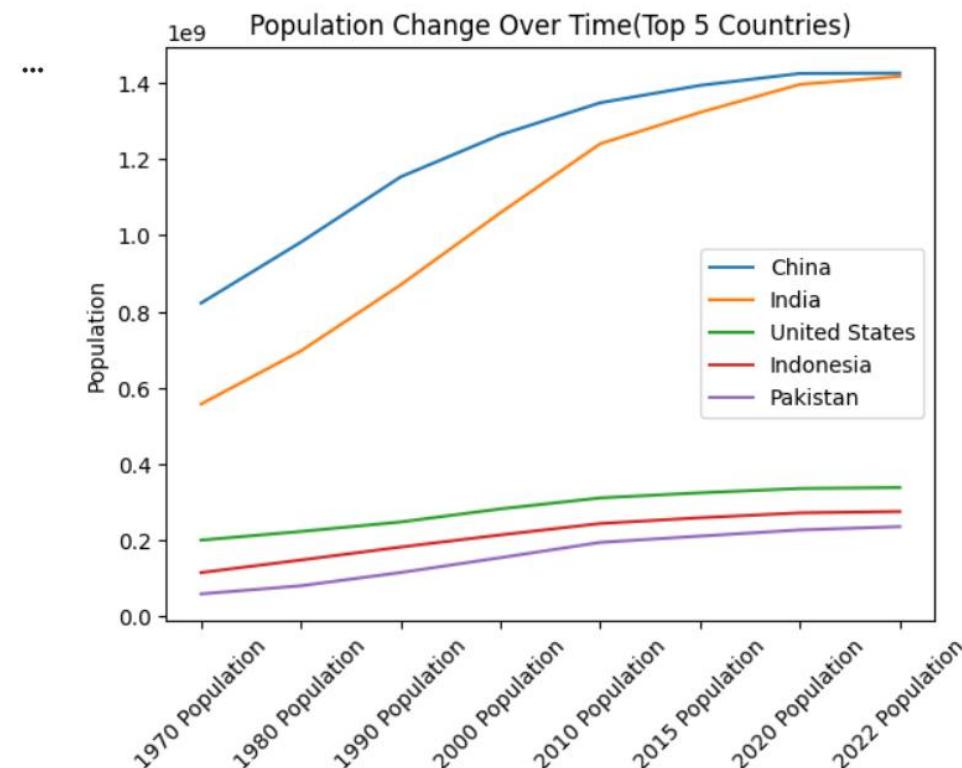


Population Growth Over Time (Major Countries)

Chart: Line Chart

Insight

- Population growth is continuous for most major countries.
- India shows a rapid increase after 1990.
- Some developed regions show slower growth compared to developing nations.

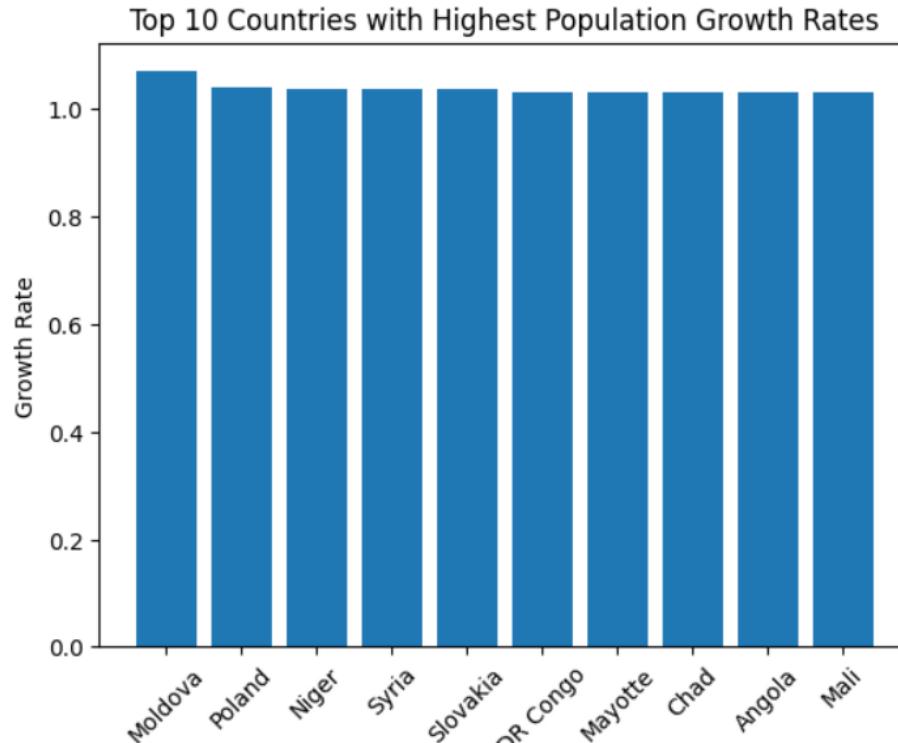


Countries with Highest Growth Rate

Chart: Bar Chart

Insight

- Certain African countries show very high growth rates.
- Growth rate differs significantly across countries.
- High growth rate indicates increasing future population pressure.

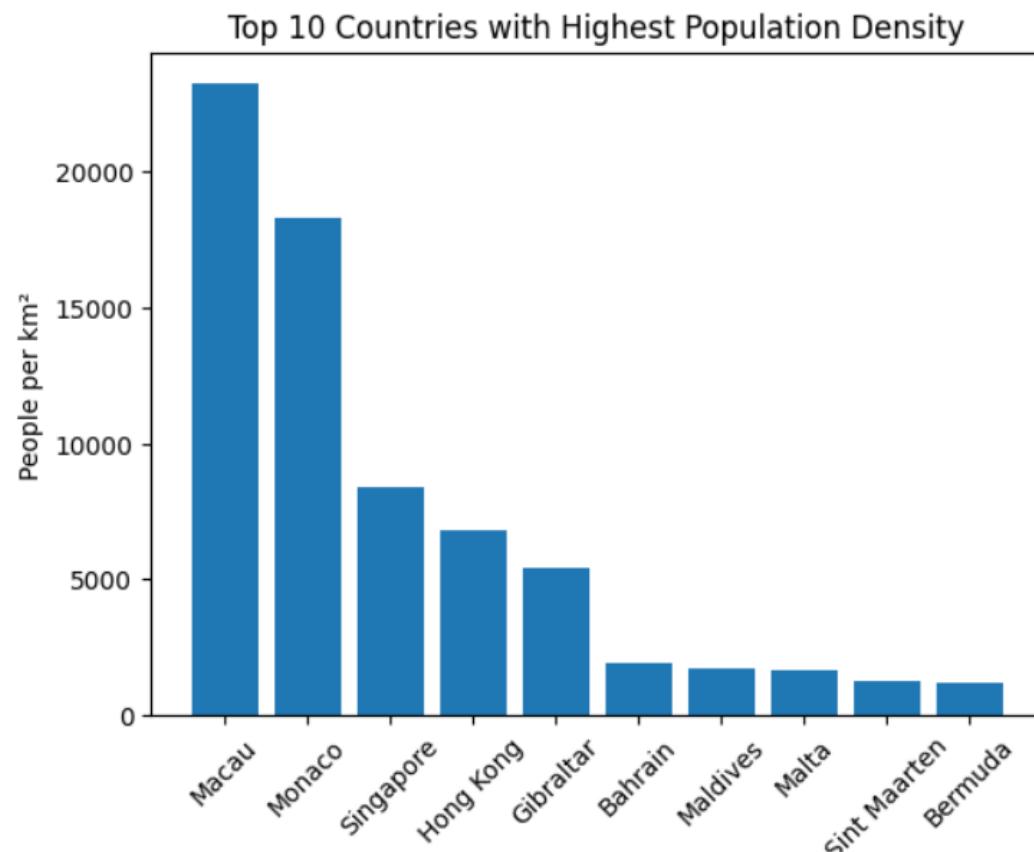


Most Densely Populated Countries

Chart: Bar Chart (Top 10)

Insight

- Small countries/territories often have extremely high density.
- High density does not always mean high population (example: small area countries).
- Urbanization plays a major role in density.

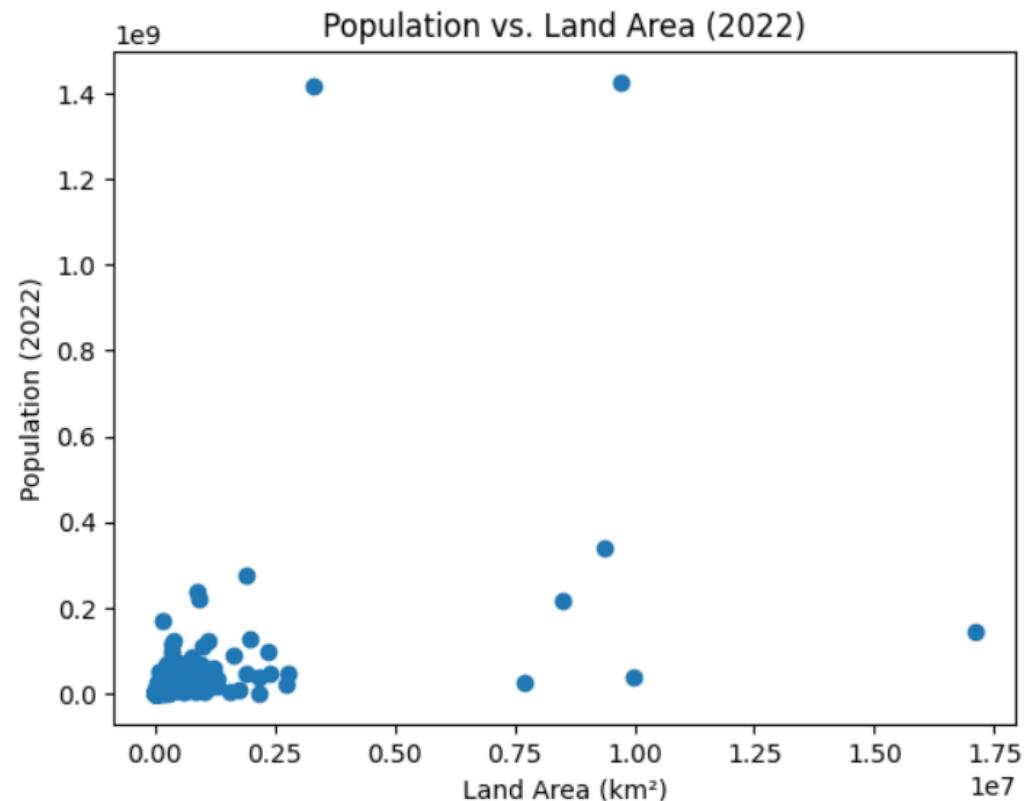


Relationship Between Area and Population

Chart: Scatter Plot

Insight

- Large area countries do not always have large populations.
- Some countries have high population despite smaller area.
- Scatter plot shows weak direct correlation overall.

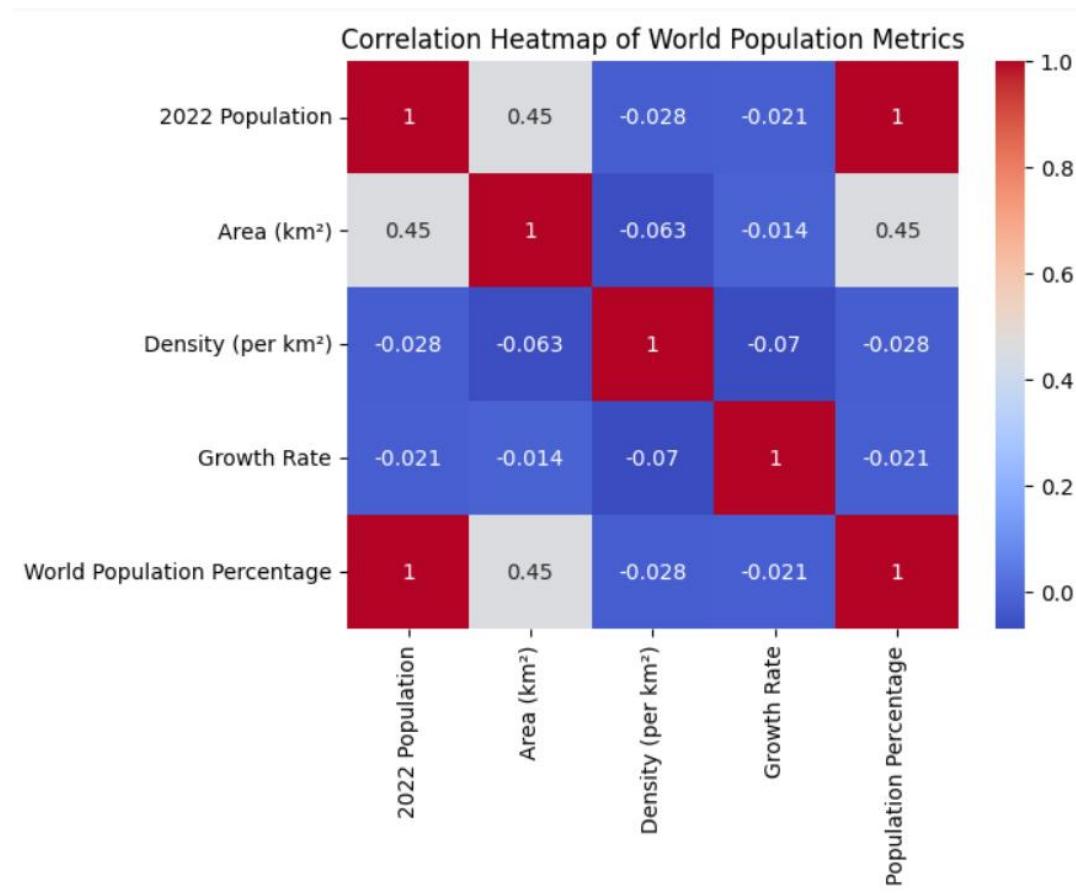


Correlation Heatmap of Numeric Variables

Chart: Heatmap

Insights:

- Strong correlation exists between population columns across years.
- Density and area show weaker correlation.
- Growth rate is not strongly correlated with current population size.

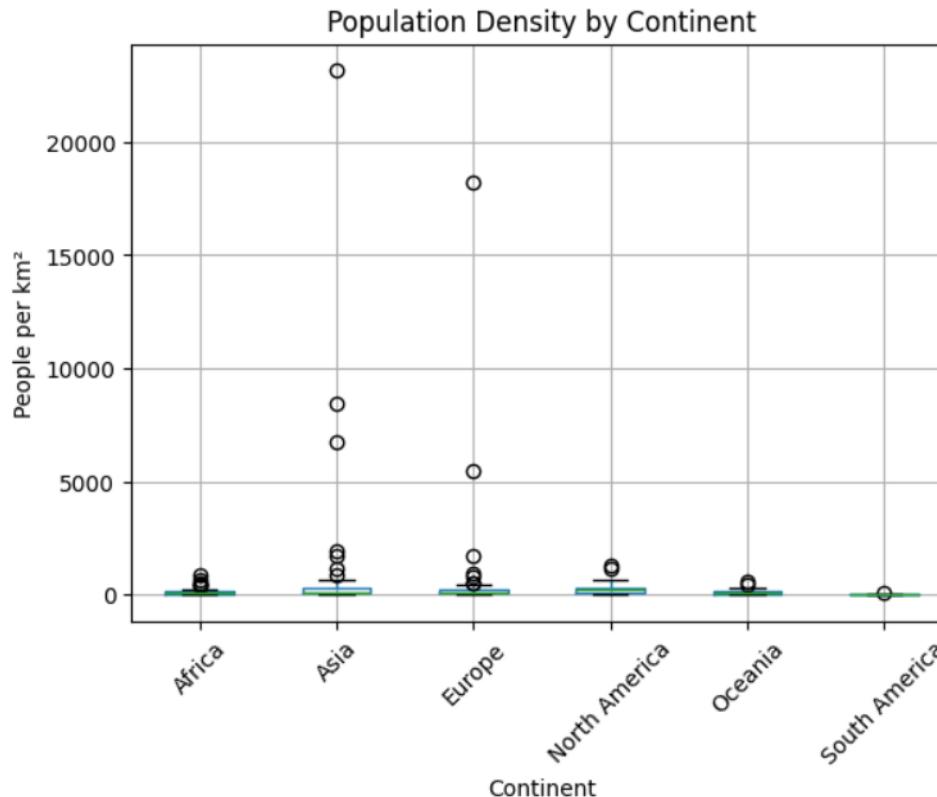


Population Density Distribution Across Continents

Visualization: Box Plot (Density grouped by Continent)

Key Insight

- Some continents show **wide variation**, meaning both sparse and dense countries exist.
- Outliers represent extremely dense countries (example: small nations or urbanized regions).
- Continents with higher median density indicate more concentrated populations.

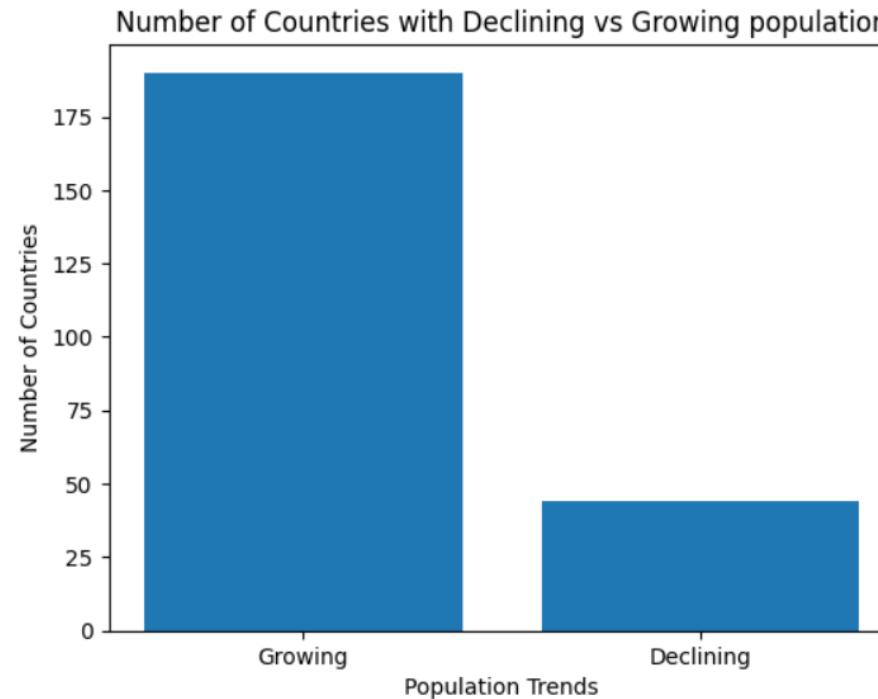


Comparison of Declining vs Growing Countries

Visualization: Bar Chart (Count of countries by Growth Status)

Key Insight

- Majority of countries show **positive growth**.
- A smaller number of countries show **negative growth**, indicating population decline.
- Declining population may indicate aging population or migration.



Streamlit Dashboard

Dashboard Features

- Interactive continent filter
- Dataset preview table
- Top 10 populated countries visualization
- Multiple charts for population trends
- Easy user exploration of dataset

Streamlit Link: <https://world-population-dashboard-zoesfp8dokwjpq8hqm7rbu.streamlit.app/>

Filters

Select Continent

All



World Population Dashboard

📌 Dataset Preview

	Rank	CCA3	Country/Territory	Capital	⋮	Continent	2022 Population	2020 Population	2019 Population
0	36	AFG	Afghanistan	Kabul		Asia	41128771	38972230	38972230
1	138	ALB	Albania	Tirana		Europe	2842321	2866849	2866849
2	34	DZA	Algeria	Algiers		Africa	44903225	43451666	43451666
3	213	ASM	American Samoa	Pago Pago		Oceania	44273	46189	46189
4	203	AND	Andorra	Andorra la Vella	⋮	Europe	79824	77700	77700

📍 Filtered Data

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4	203	AND	Andorra	Andorra la Vella	Europe	79824	77700	77700
5	42	AGO	Angola	Luanda	Africa	35588987	334284	334284

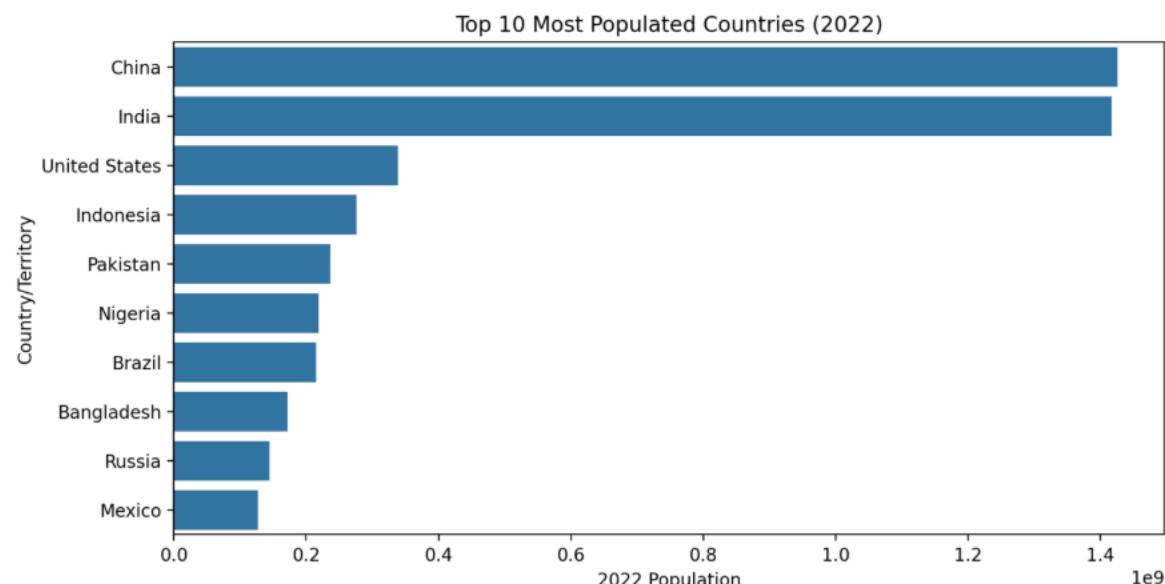
Manage app

Filters

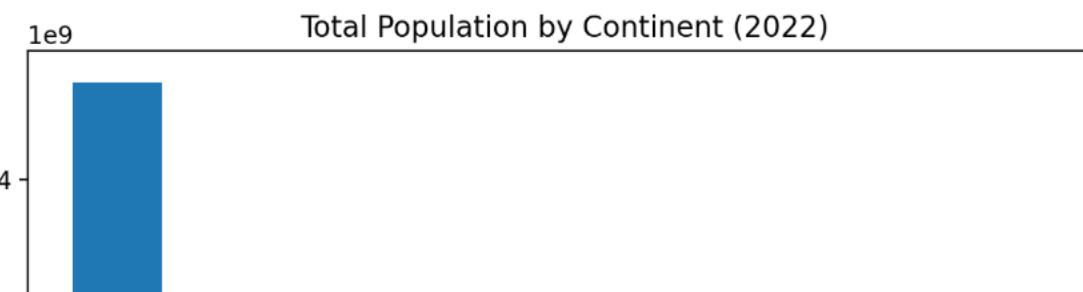
Select Continent

All

🏆 Top 10 Most Populated Countries (2022)



Total Population by Continent (2022)



GitHub Repository

- **GitHub Repository Includes**
- Jupyter Notebook (.ipynb)
- Dataset (.csv)
- Streamlit app code (streamlit_app.py)
- requirements.txt
- README.md

GitHub Link: <https://github.com/mansimranjitkaur03-hash/world-population-dashboard>

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README

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Conclusion

- Asia is the most populated continent.
- Population distribution is highly unequal across countries.
- High density is mostly found in smaller countries.
- Growth rates are highest in developing regions.
- Scatter analysis shows that land area does not directly determine population size.

Final Outcome

- The project successfully answered analytical questions and created a functional Streamlit dashboard.