Report of Exploratory Data Visualization of Global Migration Trends 1990 – 2020

How did I do

The sources for this report are listed at the end.

To create this report, I researched data and chose to use global migration data.

I downloaded emigration data and learned how to create visualizations in Python,

Also, I searched for geojson files to represent world data, that are also included in the sources.

First, I visualized emigration data, and created world maps and tables, but after reviewing the assignment, I realized I ought replace the table with charts for better clarity. then i added immigration data into the report.

For refugee data, I could not find relevant information. However, after more searching and testing, I found appropriate data from the same website and added it to my dataset.

I also reviewed previously published reports to improve the quality of my content. Among these, "pub2023-047-l-world-migration-report-2024_13.pdf" was especially helpful in shaping the structure and content of this report.

Acknowledgements

I would like to express my thankful gratitude to the instructors and teaching assistants of the CEN445 Introduction to Data Visualization course for their guidance and support throughout this assignment.

Special thanks to the creators and maintainers of the datasets used in this report, particularly those from Our World in Data, Kaggle, and GitHub.

It is also appreciated the developers of the Python libraries, such as Plotly and Pandas, which made it possible. Resources used in this report are listed at the end of the document.

Contents

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Global Migration Chance

1990 – 2020

Since 1990, the migrant populations in each destination region have grown at different rates, reflecting various factors such as political changes, economic and education opportunities, and social activities.

Over these decades migration patterns have been shaped by some type of conflicts, climate change, international policies. In this chapter, it examines both international emigration and immigration trends.

1   Global Emigrants – Immigrants – Refugees

Introduction

The global migration landscape between 1990 and 2020 has been shaped by a complex array of political, economic, and social factors.

Emigration and immigration patterns have fluctuated in response to conflicts, economic opportunities, political instability, and global events, such as the collapse of the Soviet Union, the Gulf Wars, and the rise of regional conflicts.

Chapter 1

Emigrant

Chapter 1 explores the trends and shifts in global emigration from 1990 to 2020, highlighting the countries with the highest numbers of emigrants and the key factors influencing migration patterns during this period.

Chapter 2

Immigrants

Chapter 2 chapter examines the evolving patterns of global immigration from 1990 to 2020, focusing on the countries that attracted the highest numbers of immigrants and the factors driving these shifts in migration trends.

Chapter 3

Refugees

Chapter 3 explores the significant changes in global refugee populations from 1990 to 2020, highlighting the countries most affected by conflicts and crises, and the resulting movement of displaced populations seeking asylum.

Chapter 1

Emigrant

Emigrants

Introduction

The significant variation and diversity in migration and displacement around the world make capturing global trends a challenge. We know from the increasing amount of information at our disposal that migration is often a highly politicized topic, making it increasingly prone to misinformation and disinformation by interest groups with political or commercial gains in mind.

1990s

In 1990s, The top three countries with the highest number of emigrants were Russia, Afghanistan, and India, each affected by distinct historical, political, and economic circumstances. (Figure 2)

Russia led the chart with over 12 million emigrants, largely due to the collapse of the Soviet Union and the end of the Cold War. The disintegration of the Soviet state created political and economic instability, forcing many citizens to leave in search of safer and more prosperous futures. (Figure 2)

Figure 1. Top International emigrant in 1990 In Map

Total Emigrants by Country (1990)
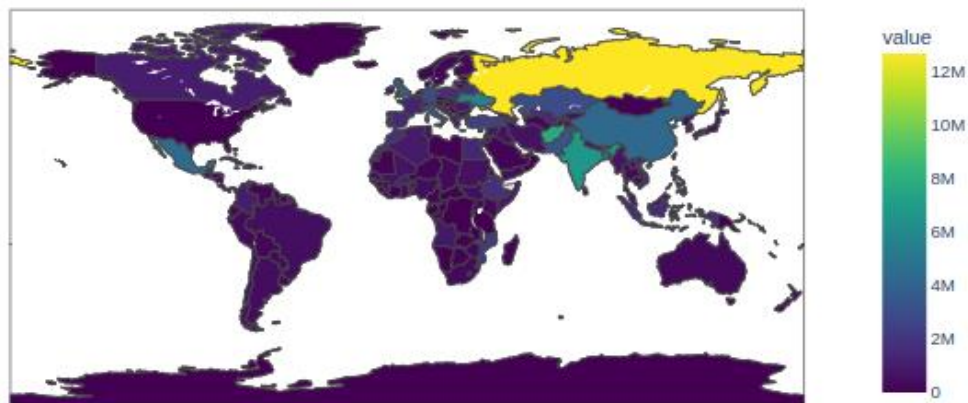
Afghanistan followed closely with 6 million emigrants, a direct consequence of the Soviet-Afghan War (1979-1989). The war devastated Afghanistan, and many fled to neighboring countries such as Pakistan and Iran. (Figure 1).

Figure 2. Top International emigrant in 1990

Top 10 Emigrant Countries in 1990
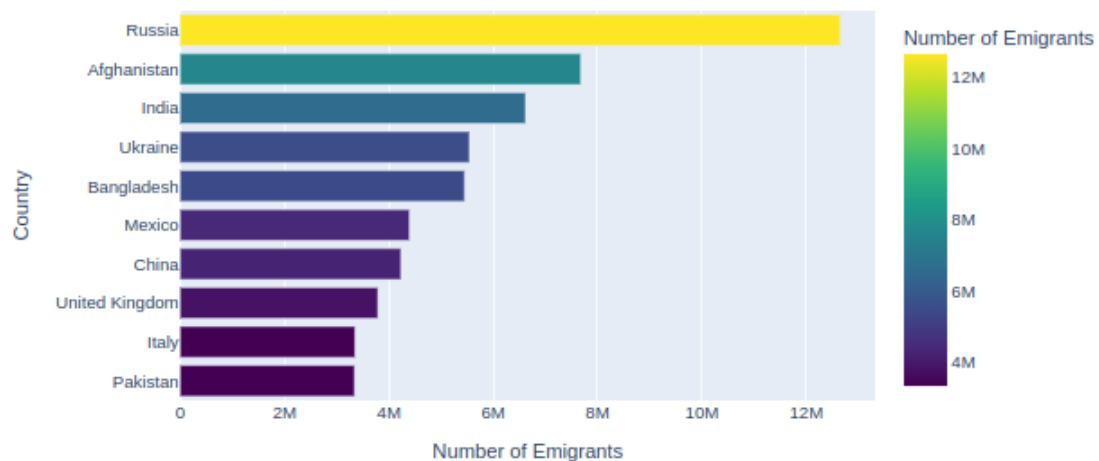
India also had 6 million emigrants, driven by economic factors. Many Indians sought better job opportunities abroad, especially in countries like the United States, the United Kingdom, and the Gulf countries. (Figure 1).

1995s

By 1995, Russia maintained its leadership as the largest emigrants, with over 10 million leaving the country. India and Mexico followed closely, each with more than 6 million emigrants. Afghanistan had fallen out of the top five as the Soviet-Afghan War had ended, and the country started to recover. (Figure 3)

Meanwhile, Bangladesh and India, geographically close to each other, experienced similar migration patterns due to economic factors and regional instability.

The political situation in Russia and Ukraine continued to influence migration flows, as many sought in more developed nations.

Figure 3. Top International emigrant in 1990

Top 10 Emigrant Countries in 1995
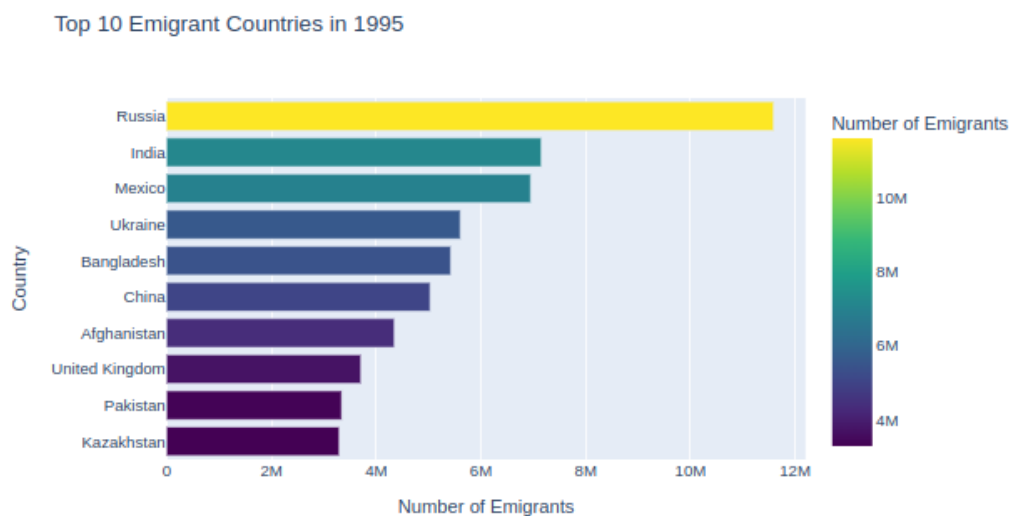
2000s

In 2000, Mexico had moved up to second place, surpassing India, with over 8 million emigrants. Russia continued to lead with more than 10 million emigrants, while India remained a significant contributor to global emigration with nearly 8 million people leaving. (Figure 5)

Figure 6. Top International emigrant in 2000s In Map

Total Emigrants by Country (2000)
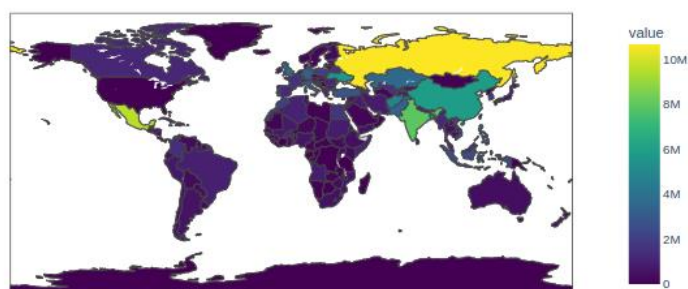
Ukraine, still grappling with the fallout from the Soviet Union's collapse, maintained its position in the top emigrant countries.

China had entered the top five, further reflecting the global migration trends shaped by both political and economic factors. (Figure 5)

Figure 5. Top International emigrant in 2000s

Top 10 Emigrant Countries in 2000
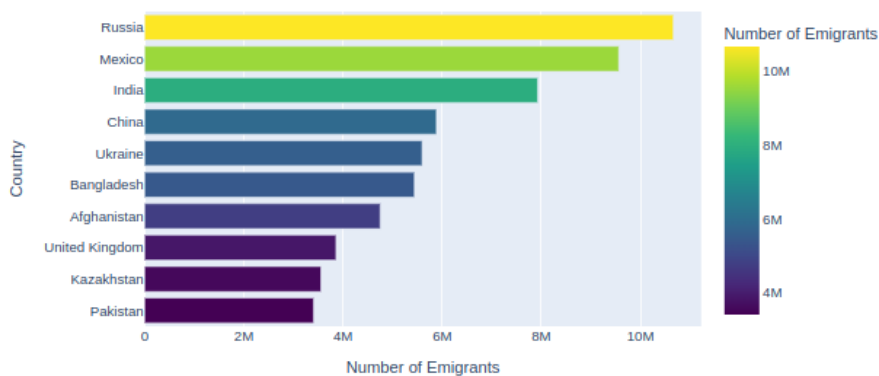
2005s

By 2005, Mexico had taken the lead, with over 10 million emigrants. Russia continued to see high numbers, with over 10 million emigrants, while India followed closely behind with more than 8 million. (Figure 7)

Figure 7. Top International emigrant in 2005s

Top 10 Emigrant Countries in 2005
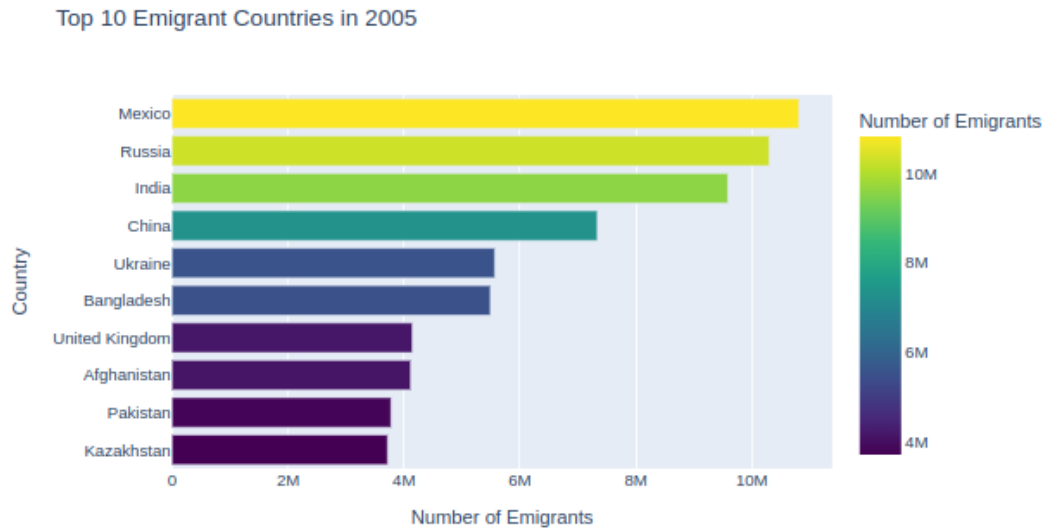
China remained a key player in global migration, with over 6 million emigrants. Ukraine and Bangladesh, also affected by regional conflicts and economic conditions, still ranked among the leading countries of emigration. (Figure 7)

Figure 8. Top International emigrant in 2005s In Map

Total Emigrants by Country (2005)
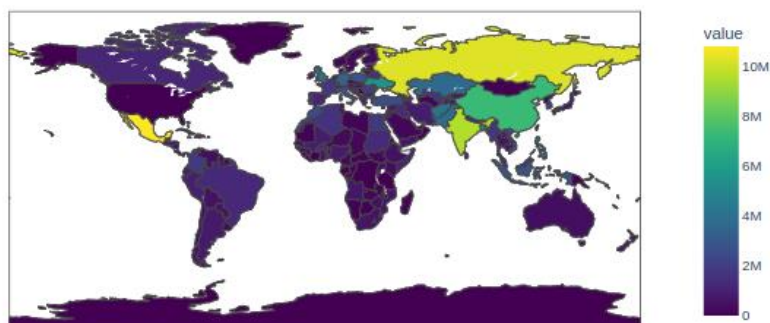
Afghanistan had begun to heal from the effects of the war, but it was no longer among the top countries with the highest number of emigrants. (Figure 7)

2010s

In 2010, India had overtaken Mexico to become the leader in global emigration, with more than 12 million emigrants. Mexico remained a strong contender with over 10 million emigrants, while Russia's emigration numbers hovered near the 10 million mark. (Figure 9)
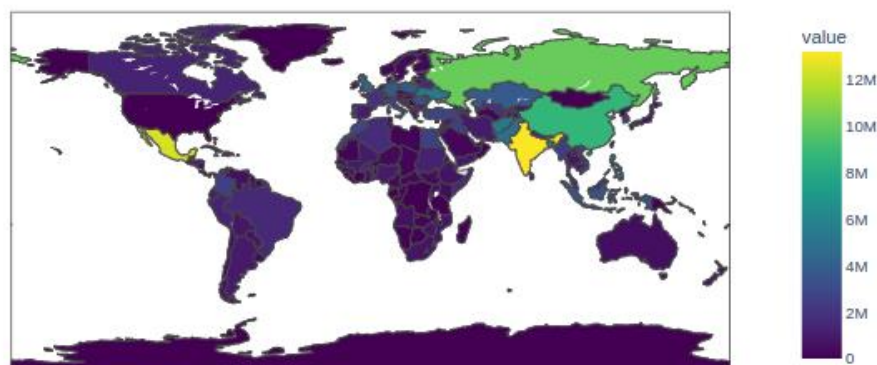
Figure 9. Top International emigrant in 2010s
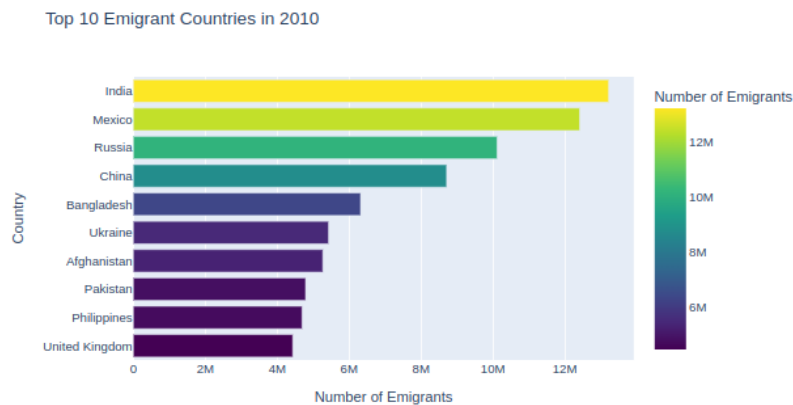
China continued to rank fourth with over 5 million emigrants. Russia's emigration was still primarily driven by the political and economic instability it faced, while China's emigrants sought better economic opportunities abroad.

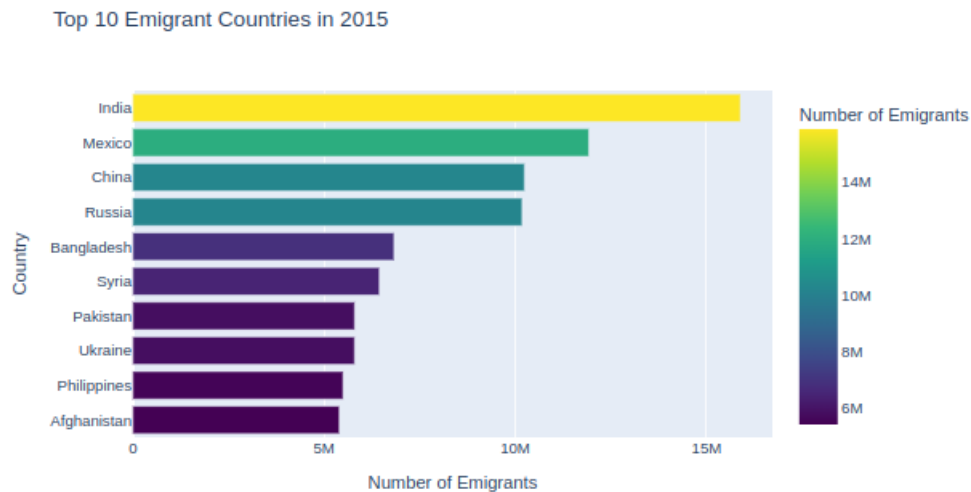Figure 10. Top International emigrant in 2010s In Map

2015s

By 2015, India had solidified its position as the leader in global emigration, with over 15 million emigrants. Mexico maintained its second place, with over 10 million emigrants, while China and Russia continued to rank in the top five.

Figure 11. Top International emigrant in 2015

A notable addition to the list was Syria, with over 5 million emigrants, driven primarily by the devastating Syrian Civil War, which forced millions to flee their homeland. The war in Syria had a profound impact on global migration, leading to a significant increase in the number of refugees and displaced people seeking safety in neighboring countries and beyond.

Figure 12. Top International emigrant in 2015s In Map
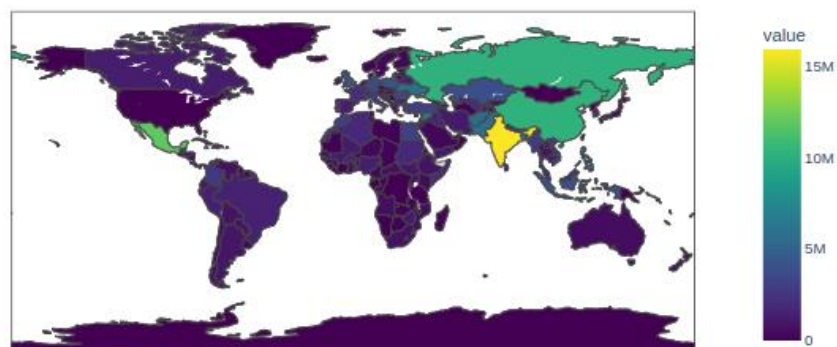
2020s

By 2020, Syria had entered the top five countries with the highest number of emigrants, with over 5 million people forced to flee due to the ongoing civil war. (Figure 13)

India, Mexico, and Russia continued to be prominent sources of emigrants, with India's emigration numbers increasing every five years. India's emigration figures had risen to over 15 million, a reflection of the country's growing economic opportunities and the desire for a better life abroad. (Figure 13)
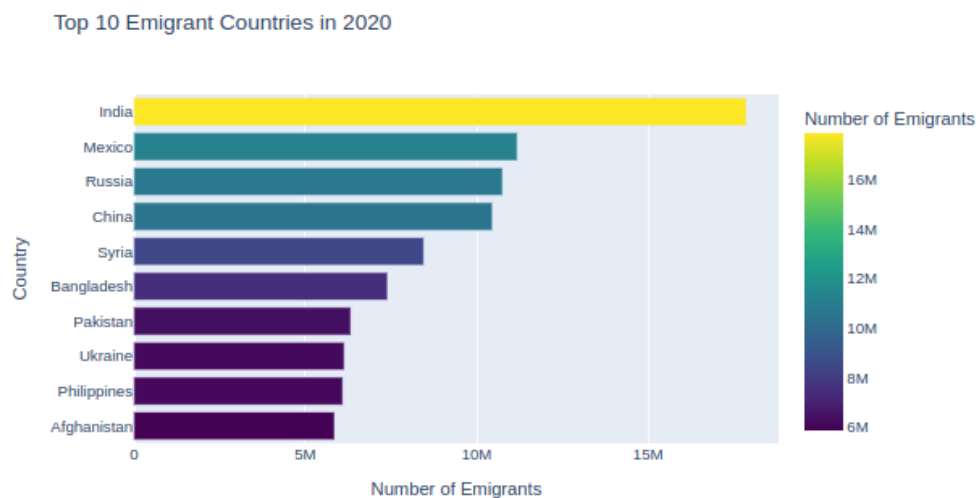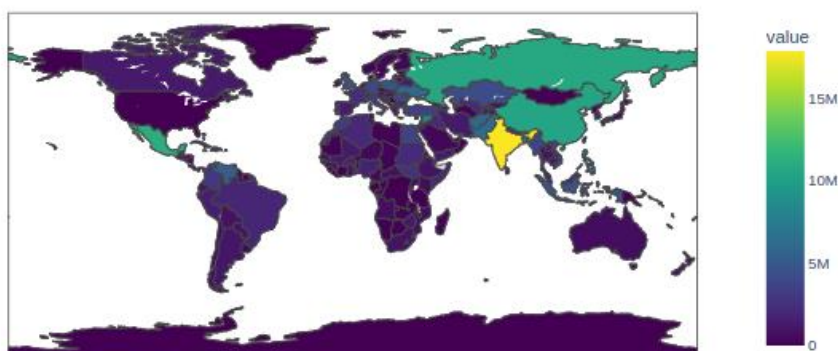
Figure 13. Top International emigrant in 2020s

Figure 14. Top International emigrant in 2020s In Map

The pattern of global emigration continued to evolve, with political, economic, and humanitarian crises shaping migration flows, and countries like Syria adding new dimensions to the global emigration trends.

# Chapter 2

Immigrants

Immigrants

Introduction

In this chapter, the data for immigrants is presented, showing the trends and changes in migration patterns over the years. The number of immigrants in various countries has fluctuated due to geopolitical, economic, and social factors.

1990s

In 1990, Russia, India, Ukraine, and Pakistan were the top countries with the highest number of immigrants.

Russia led the list with approximately 10 million immigrants, followed by India, Ukraine, and Pakistan, each with around 10 million. (Figure 1)

Figure 1. Top International immigrant in 1990
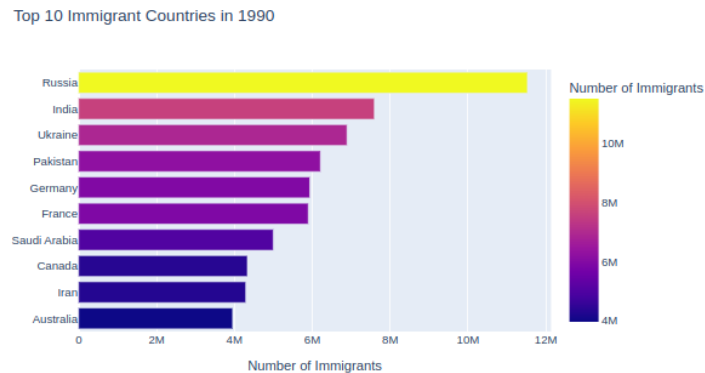
Other notable countries included Germany and France, each hosting nearly 6 million immigrants.

Russia was unique in that it was both a leading source of emigrants and a destination for immigrants, primarily due to the political and social upheaval following the collapse of the Soviet Union.

Figure 2. Top International immigrant in 1990 Map
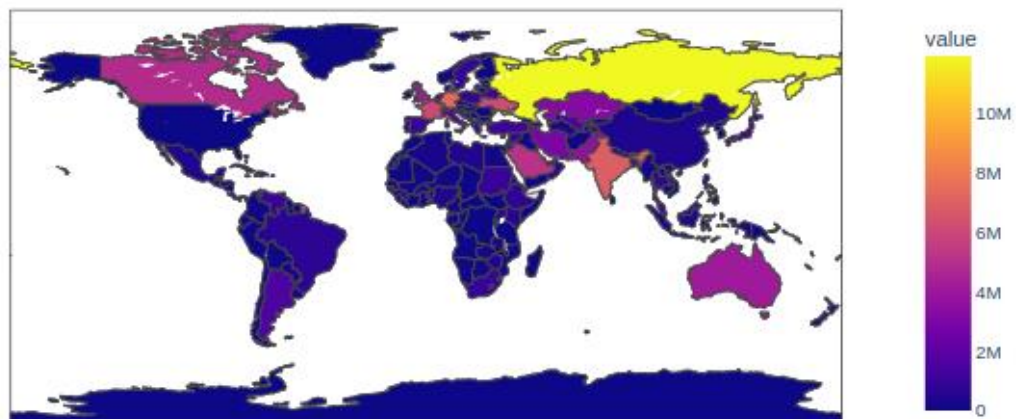
Total Immigrants by Country (1990)
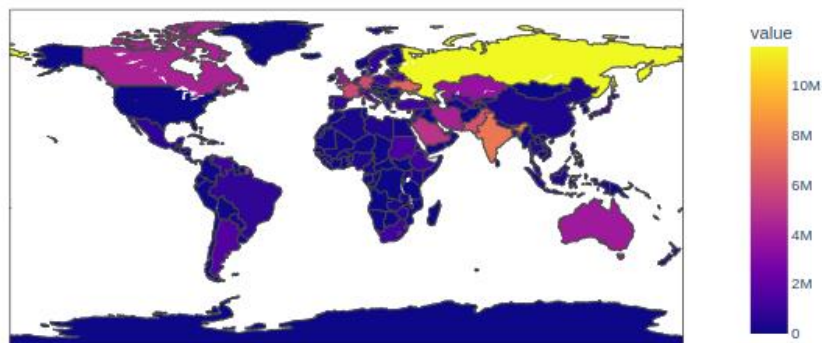
1995s

By 1995, Russia's immigrant numbers increased to nearly 12 million, reflecting the continued political and economic instability in the former Soviet republics, which drove many people to seek refuge in Russia. (Figure 3)

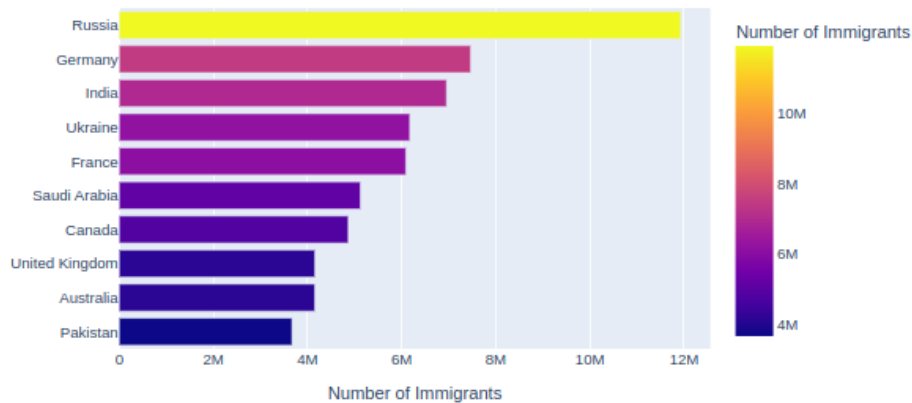Figure 3. Top International immigrant in 1995 Map

Total Immigrants by Country (1995)

Germany rose to second place, surpassing India, with approximately 8 million immigrants. India experienced a slight decrease, with its immigrant population falling to just over 6 million. (Figure 3)

Figure 3. Top International immigrant in 1995

Top 10 Immigrant Countries in 1995

Ukraine and France continued to host around 6 million immigrants. The percentage change for Russia was an increase of 20% (from 10 million to 12 million), while Germany saw a 33% increase in its immigrant population (from 6 million to 8 million). India's immigrant numbers decreased by 10% (from 10 million to 6 million)(Figure 3)

2000s

In 2000, Germany surpassed India, becoming the second-largest host country for immigrants with around 9.

Figure 5. Top International immigrant in 2000 Map
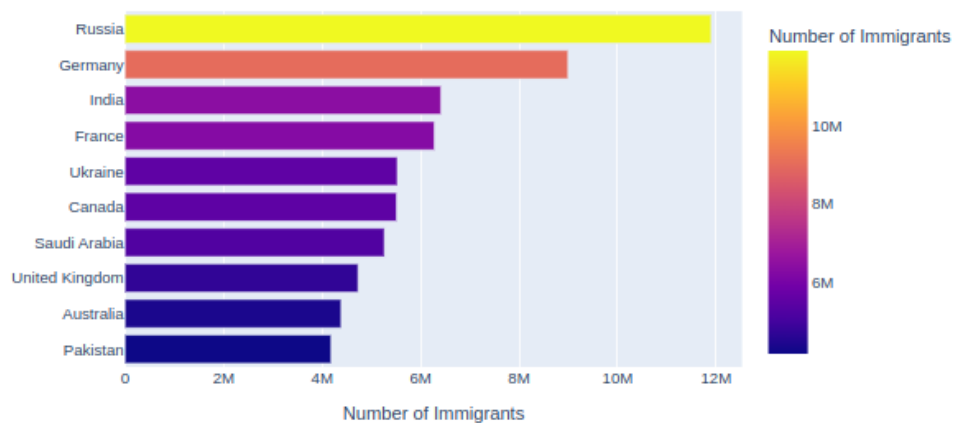
Total Immigrants by Country (2000)
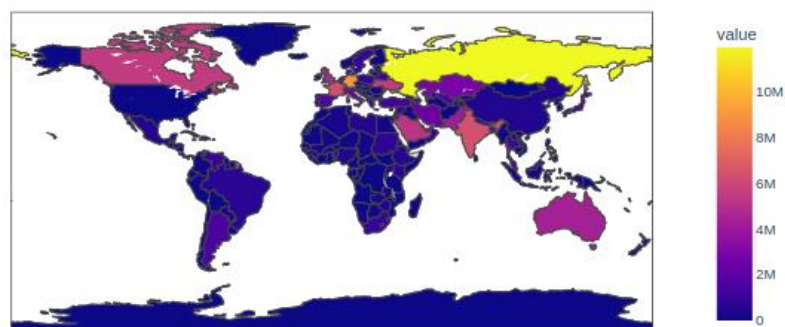
Russia maintained its position as the leader with 12 million immigrants. France continued to attract immigrants, with numbers remaining steady at over 6 million, while Ukraine and Canada had around 5 million immigrants each.

Saudi Arabia also emerged as a significant destination, hosting about 5 million immigrants. Germany's increase from 8 million to 9 million marked a 12.5% rise in immigration, while France's remained stable, and Ukraine's immigrant numbers declined slightly by 16% (from 6 million to 5 million).

Figure 5. Top International immigrant in 2000

Saudi Arabia's immigrant population saw a significant rise of 25% (from 4 million to 5 million).

2005s

By 2005, Russia's immigrant numbers were still close to 12 million, while Germany had nearly 10 million.

France and Saudi Arabia were both in the top five, each with over 6 million immigrants, while Canada, India, and the United Kingdom also hosted around 6 million immigrants.

France moved up to third place, overtaking Ukraine, and Saudi Arabia climbed to fourth place, reflecting the increased influx of workers in the oil-rich Gulf region.

Figure 5. Top International immigrant in 2000

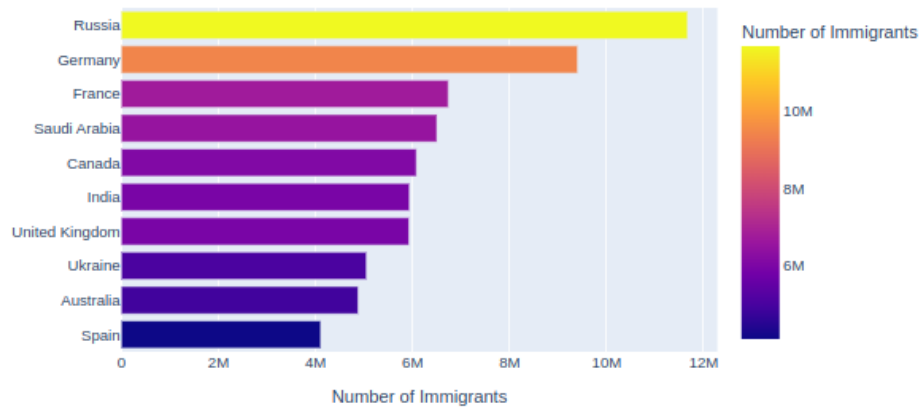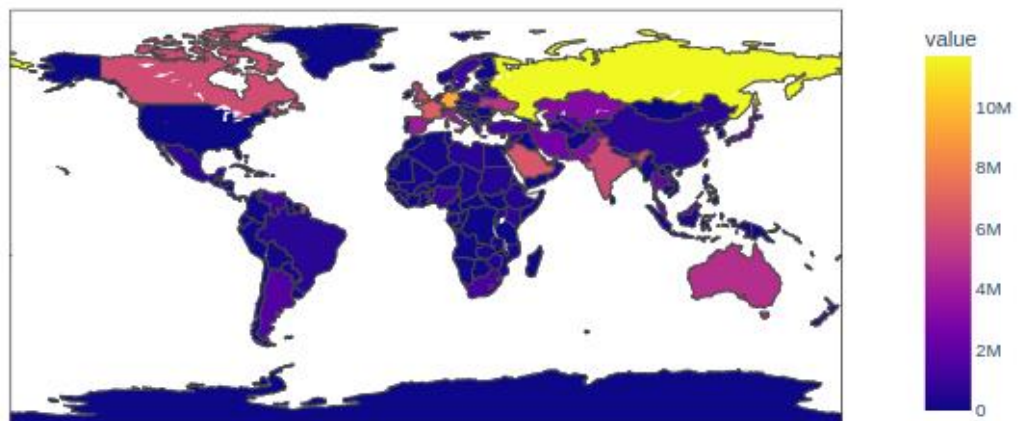Top 10 Immigrant Countries in 2005

Figure 4. Top International immigrant in 2005 Map

Total Immigrants by Country (2005)

Germany's increase from 9 million to 10 million marked an 11.1% rise, while Saudi Arabia saw a more significant increase of 20% (from 5 million to 6 million).

2010s

By 2010, Russia's immigrant population had remained steady at nearly 11 million, and Germany was close behind with 10 million. Saudi Arabia experienced a significant increase in its immigrant population, surpassing Germany, with approximately 7 million immigrants. (Figure 7)

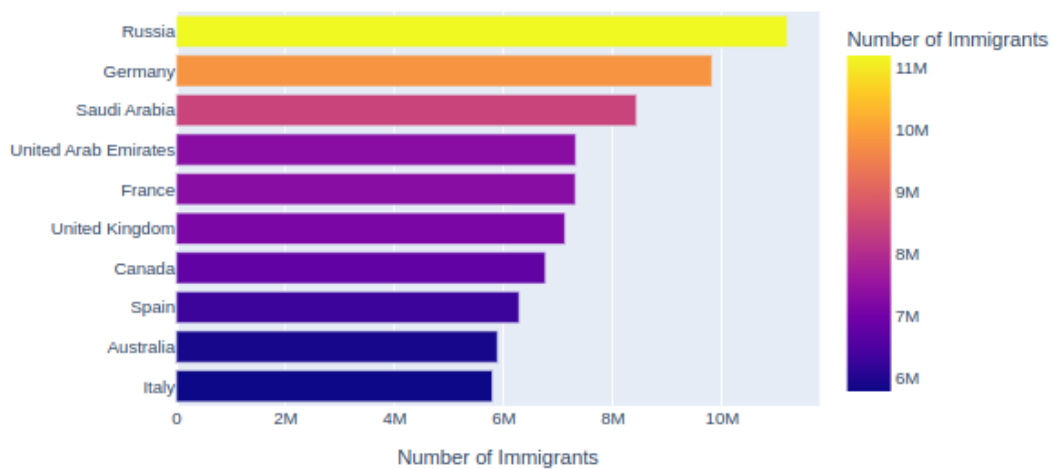Figure 6. Top International immigrant in 2010 Map

Total Immigrants by Country (2010)
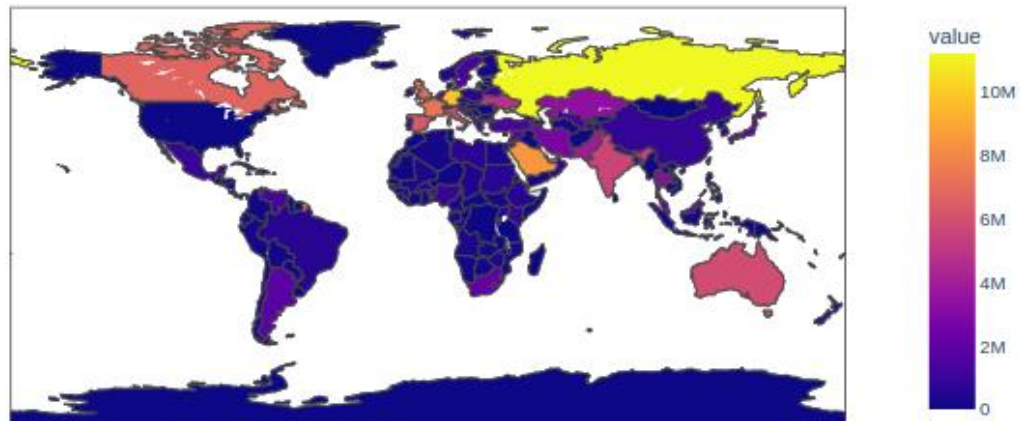
The United Arab Emirates (UAE), France, the United Kingdom, and Canada all had close to 7 million immigrants each, reflecting the increasing trend of migration to the Middle East and Western countries.

Figure 7. Top International immigrant in 2010

Top 10 Immigrant Countries in 2010

The percentage increase in Saudi Arabia's immigrant numbers was 16.7% (from 6 million to 7 million), while Russia's numbers decreased by 9% (from 12 million to 11

million). The UAE also experienced a sharp increase of 16.7% in its immigrant population, moving from 6 million to 7 million. (Figure 7)

2015s

By 2015, Russia's immigrant population remained close to 11 million, while Saudi Arabia surpassed Germany and became the leading destination for immigrants with around 11 million.

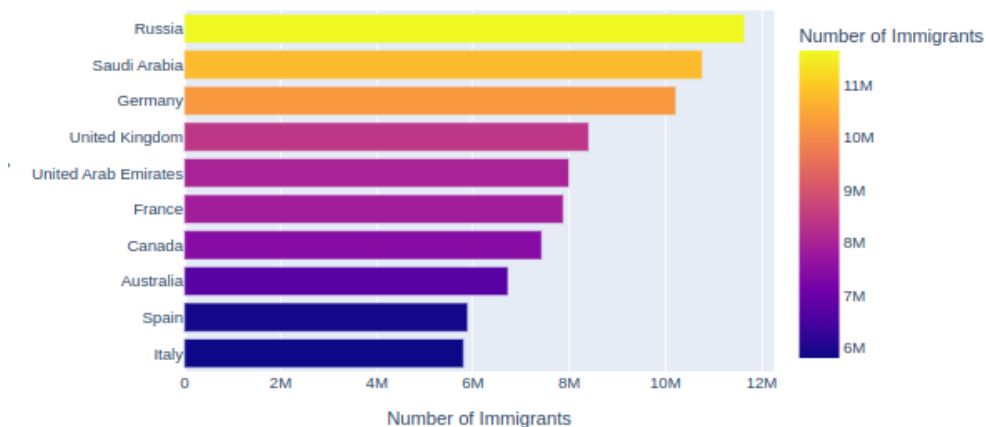### Figure 10. Top International immigrant in 2015 Map

Total Immigrants by Country (2015)
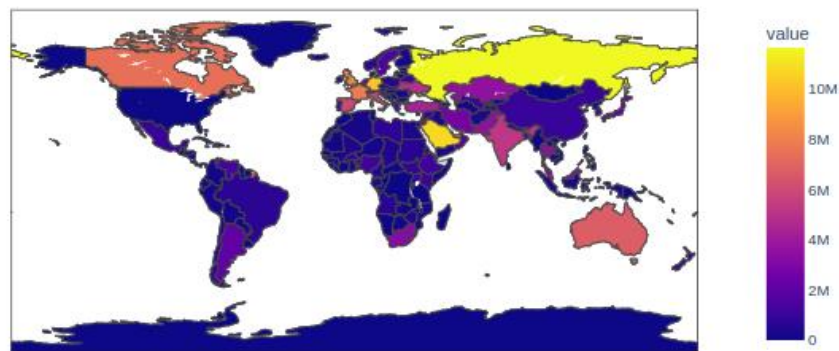
Germany's immigrant population had decreased slightly to nearly 10 million, while the United Kingdom and the United Arab Emirates both had 8 million immigrants. (Figure 11)

Figure 11. Top International immigrant in 2015

Top 10 Immigrant Countries in 2015

France's immigrant numbers dropped to 6 million, and Canada saw a further decline to 5 million. The percentage change in Saudi Arabia's immigrant population was a

remarkable 57% increase (from 7 million to 11 million), while Germany saw a 9.1% decrease (from 11 million to 10 million).

The United Kingdom also experienced a significant increase of 14% (from 7 million to 8 million).(Figure 11)

2020s

By 2020, Germany had become the leader in global immigration, surpassing all other countries with approximately 16 million immigrants. Saudi Arabia followed closely with 14 million, while Russia had 13 million immigrants. The United Kingdom, United Arab Emirates, and others like the United States all had around 9 million to 8 million immigrants. (Figure 13)

Figure 12. Top International immigrant in 2020 Map


Total Immigrants by Country (2020)
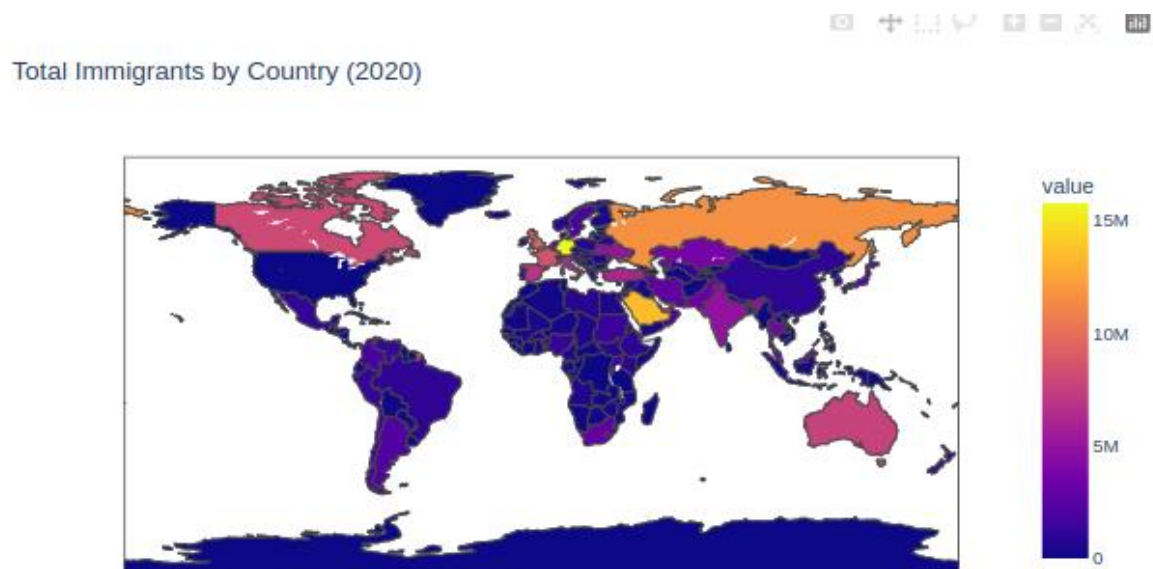
Germany's impressive rise, from 10 million to 16 million immigrants, marked a 60% increase over the five years, while Saudi Arabia's population of immigrants grew by 27% (from 11 million to 14 million).

 Russia's numbers remained relatively stable, with only a slight increase of 9% (from 12 million to 13 million).

The United Kingdom saw an increase of 12.5% (from 8 million to 9 million), while the UAE's numbers remained unchanged at 8 million.(Figure 13)

Figure 13. Top International immigrant in 2020

Top 10 Immigrant Countries in 2020
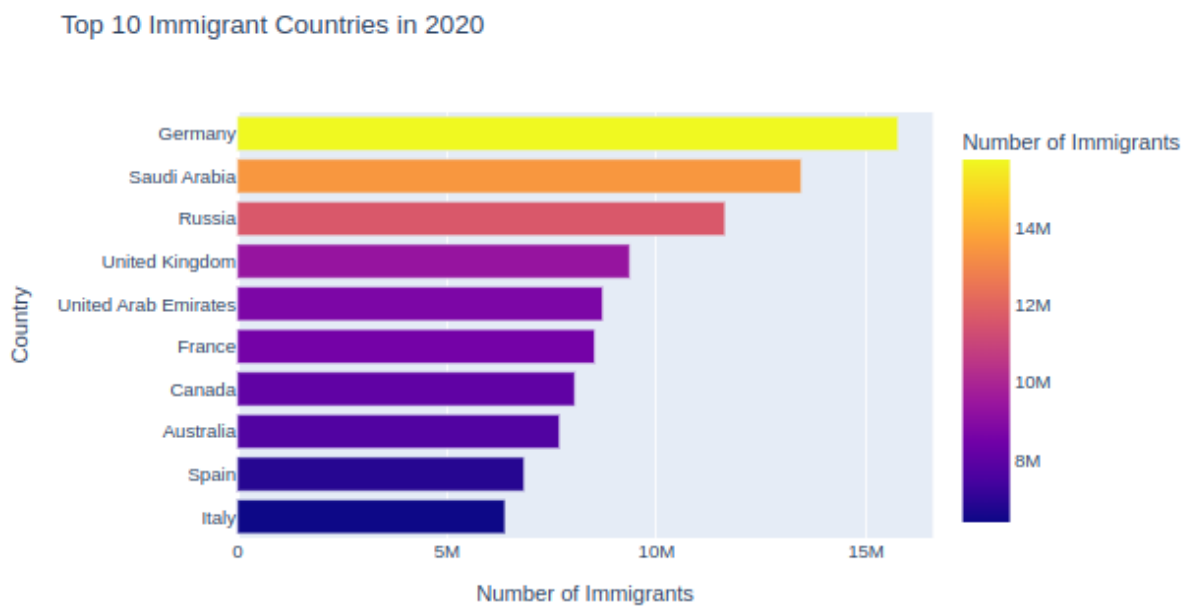
Summary

The data reveals several key trends in global immigration. Countries like Russia, Germany, and Saudi Arabia saw significant increases in their immigrant populations over the years, while others like India and France experienced fluctuations.

The largest percentage growth was observed in Saudi Arabia and Germany, reflecting the changing global migration dynamics driven by economic opportunities, political stability, and regional conflicts.

 In contrast, some countries saw slower growth or even declines in their immigrant populations, often due to political changes or the availability of fewer opportunities for immigrants.

The steady rise in immigration to countries like Germany and Saudi Arabia highlights the global demand for labor and refuge, particularly in regions with strong economies and political stability.

Chapter 3

Refugees

Global Refugees

Introduction

In this chapter, the refugee data is presented, reflecting the trends and significant changes in refugee populations over the years. These changes were driven by factors such as political instability, conflict, and economic hardship in various regions. Below is an analysis of the refugee data from 1990 to 2020.

1990s

In 1990, Afghanistan had the largest number of refugees, with around 6 million. This was primarily due to the ongoing Soviet-Afghan War and the subsequent political instability in the region.

Figure 1. Top International refugees in 1990

Top 10 Countries by Refugees in 1990
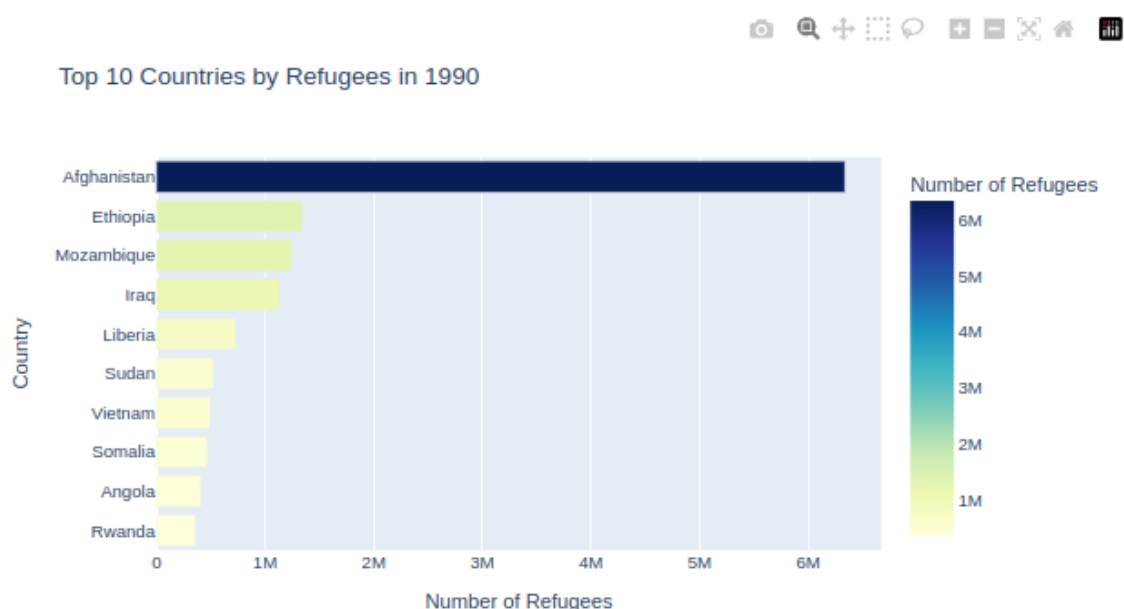
Other countries with significant refugee populations included Ethiopia, Mozambique, Iraq, Liberia, and Sudan, each hosting around 1 million refugees.

The overall refugee crisis was heavily influenced by prolonged conflicts, particularly in Afghanistan and Africa, where wars displaced millions.

Figure 1. Top International refugees in 1990 Map

Total Refugees by Country (1990)

1995s

By 1995, Afghanistan's refugee numbers had decreased significantly to 2.5 million, but it remained the leading country of origin for refugees. Figure 3

Rwanda emerged as a new source of refugees, with 1.5 million fleeing the Rwandan Genocide. Bosnia, Liberia, Iraq, Somalia, and Vietnam all had refugee populations near 1 million.(Figure 3)

Figure 3. Top International refugees in 1995

Top 10 Countries by Refugees in 1995
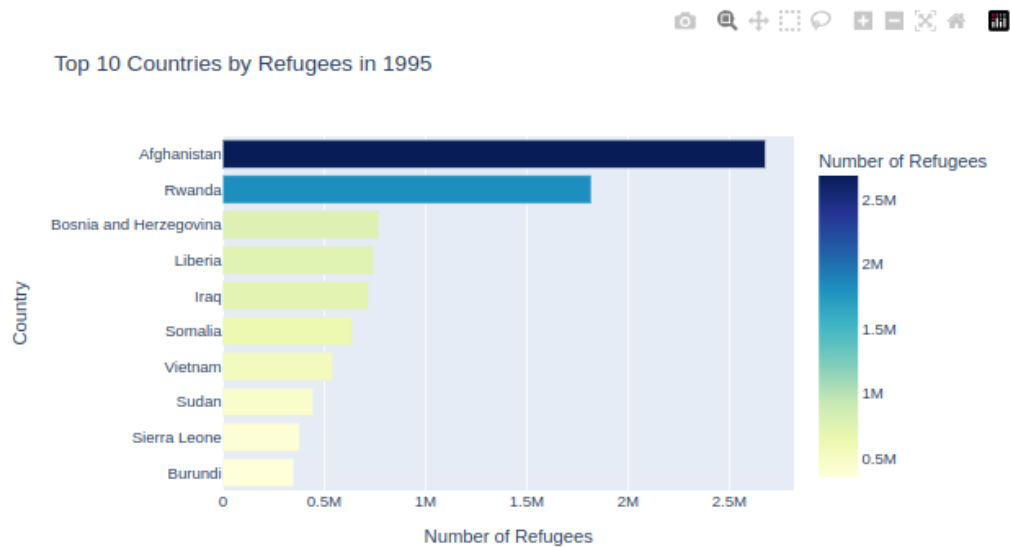
Rwanda's increase in refugee numbers marked a significant shift in global migration trends, while Afghanistan's refugee population continued to decline as the situation in the country improved slightly. Bosnia's refugee crisis was a result of the Bosnian War, which began in 1992. Figure 3

Figure 4. Top International refugees in 1995 Map

Total Refugees by Country (1995)
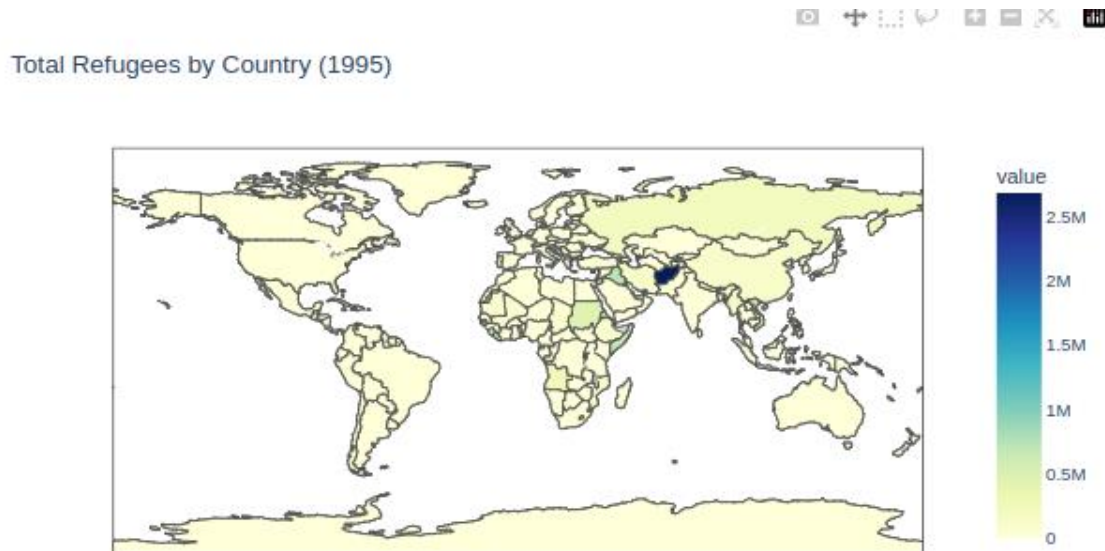
The percentage change for Afghanistan was a 58% decrease (from 6 million to 2.5 million), while Rwanda saw an increase of 50% in its refugee population (from 0 to 1.5 million).

2000s

By 2000, Afghanistan's refugee population had risen again, reaching nearly 4 million, primarily due to the ongoing conflict with the Taliban.

Other countries with substantial refugee populations included Burundi, Iraq, Bosnia, Sudan, and Somalia, each hosting around 0.5 million refugees.

Afghanistan's refugee numbers had increased by 60%, showing that the situation in the region remained dire.

Figure 5. Top International refugees in 2000

Top 10 Countries by Refugees in 2000
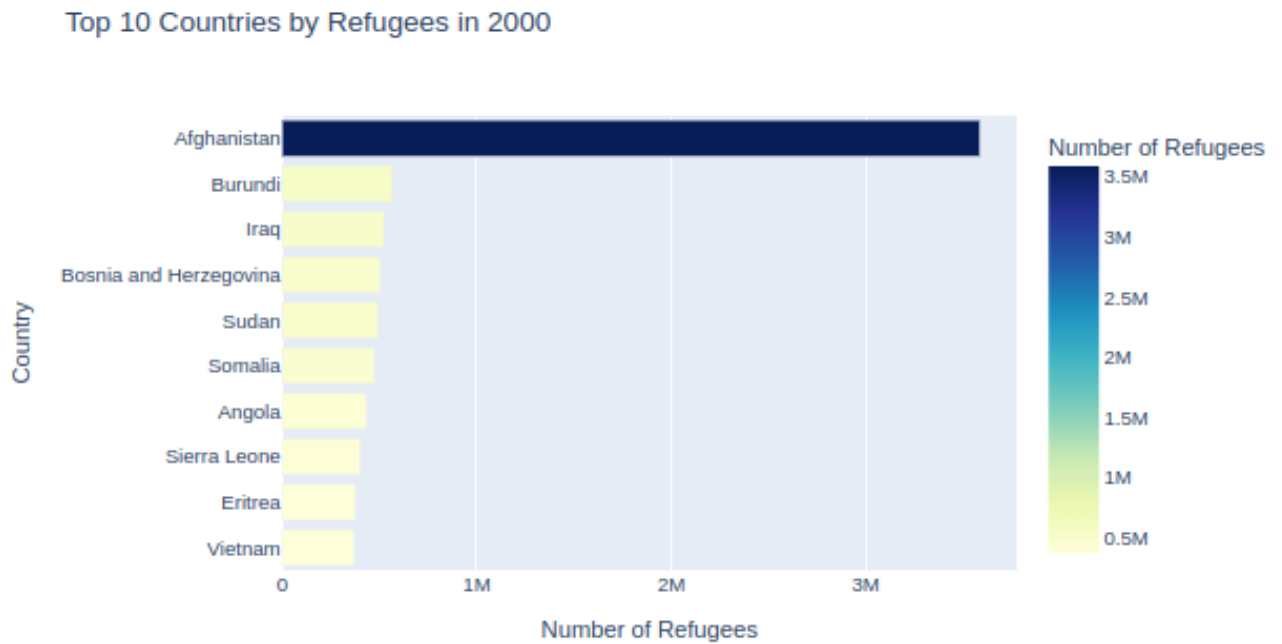
The increase in Afghanistan's refugee numbers reflected the resurgence of conflict and political instability.

Figure 6. Top International refugees in 2000 Map

Total Refugees by Country (2000)

Other countries, like Burundi and Iraq, also saw their refugee numbers grow as a result of conflicts and repression.

2005s

In 2005, Afghanistan's refugee population remained near 3 million. Sudan's refugee numbers had increased to around 1 million, with conflicts such as the Darfur crisis causing widespread displacement.

Figure 7. Top International refugees in 2005 Map

Top 10 Countries by Refugees in 2005
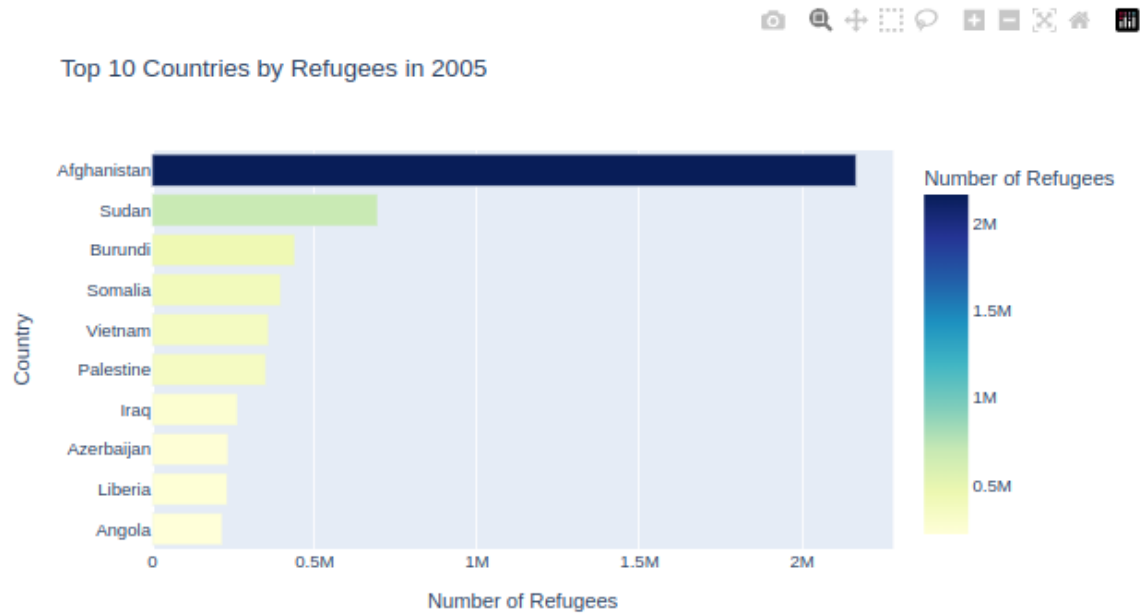
. Burundi, Somalia, Vietnam, and Palestine had around 0.5 million refugees each. Afghanistan's numbers had slightly decreased by 25%, but the continued crisis in Sudan and other African nations contributed to the global refugee crisis.

Figure 8. Top International refugees in 2005 Map

Total Refugees by Country (2005)
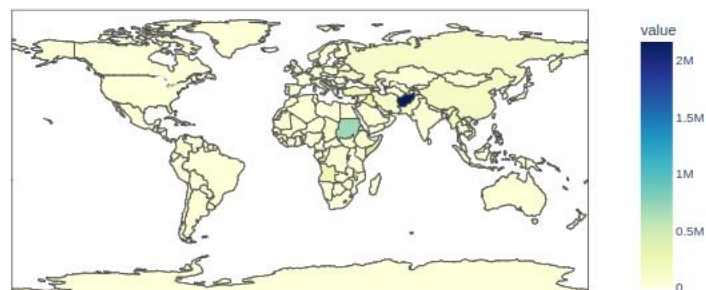
Sudan's 1 million refugees marked a significant increase of 100% from the previous year.
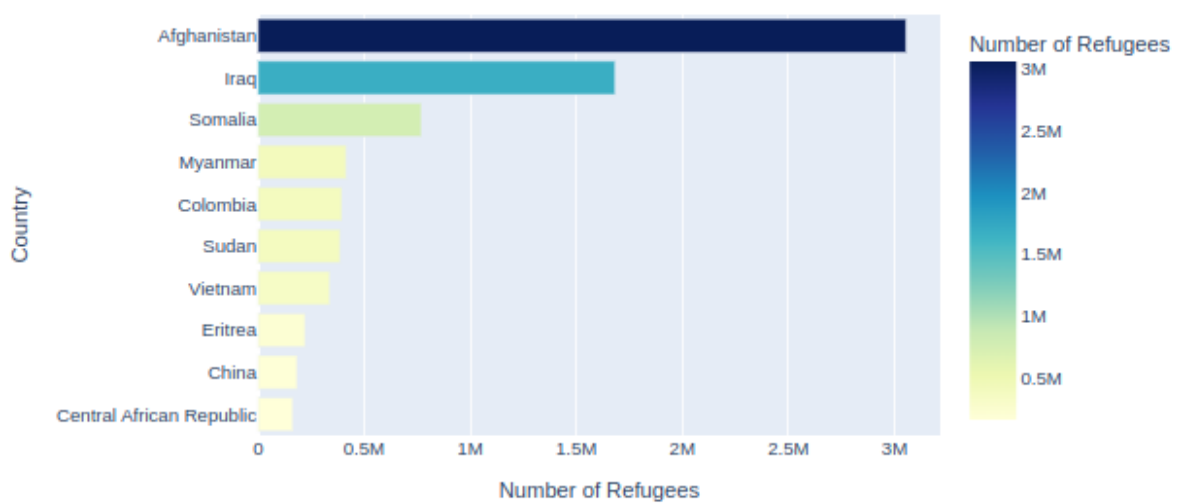
Total Refugees by Country (2010)

2010s

By 2010, Afghanistan still had around 3 million refugees, while Iraq's refugee population had grown to over 1.5 million due to the Iraq War. Somalia's refugee numbers stood at 1 million, and Myanmar also began to emerge as a major source of refugees, with approximately 0.5 million people displaced.

Figure 9. Top International refugees in 2010 Map

Other countries such as Colombia, Sudan, and Vietnam had around 0.5 million refugees each.

Figure 10. Top International refugees in 2010 Map

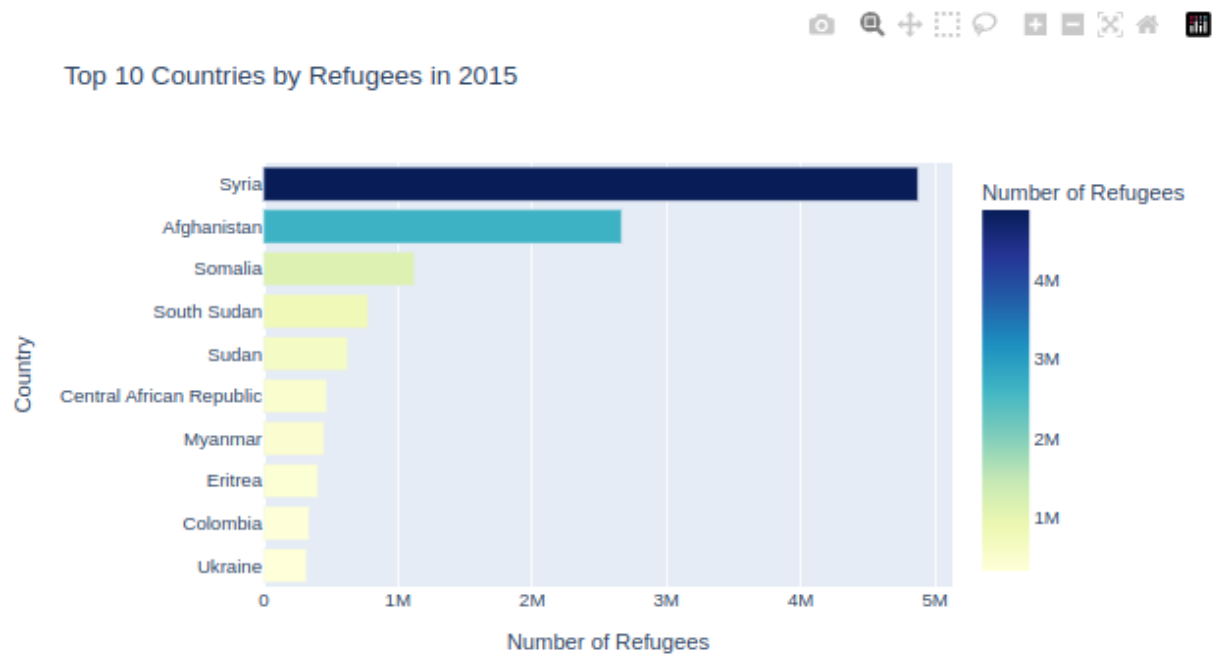

Total Refugees by Country (2010)

The refugee populations from Iraq and Somalia showed notable increases, reflecting the ongoing conflicts in these regions. Iraq's 1.5 million refugees marked a 50% increase compared to the previous decade.

2015s

By 2015, Syria emerged as the largest source of refugees for the first time, with approximately 5 million Syrians displaced due to the ongoing Syrian Civil War. Afghanistan's refugee population remained close to 3 million, while Somalia had over 1 million refugees.

Figure 11. Top International refugees in 2015 Map

Top 10 Countries by Refugees in 2015

The percentage change for Syria was an increase of 400% (from 0 to 5 million), while Afghanistan's refugee numbers remained relatively stable.

Figure 12. Top International refugees in 2015 Map

Total Refugees by Country (2015)

Sudan's refugee numbers had also increased to around 1 million. The rise of Syria as a major refugee source marked a dramatic shift in global refugee trends, driven by the devastating effects of the Syrian Civil War.

2020s

By 2020, Syria remained the leading source of refugees, with around 7 million people displaced due to the ongoing conflict. Afghanistan's refugee numbers had decreased to nearly 2 million, and Sudan's population of refugees had risen to around 2 million. Myanmar's refugee population had also increased to 1 million, reflecting the political instability and violence in the country.

Figure 13. Top International refugees in 2015
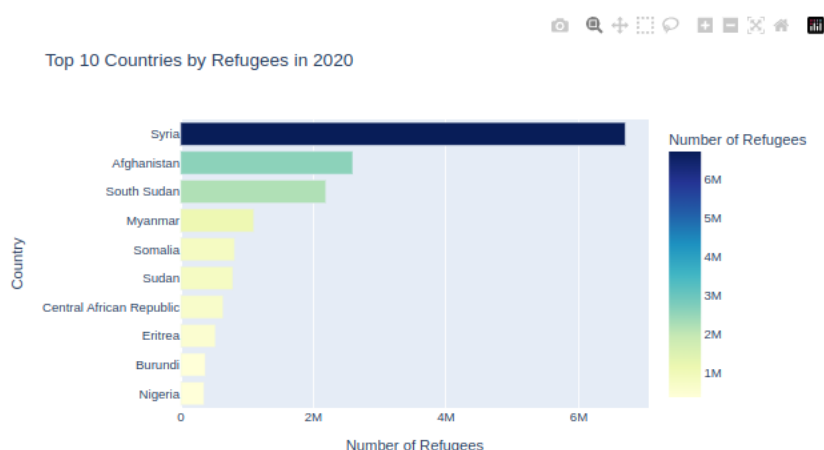
Syria's increase of 40% from 5 million to 7 million showed the continuing severity of the conflict. Afghanistan's 2 million refugees marked a decrease of 33%, while Sudan's refugee numbers increased by 100% (from 1 million to 2 million). Myanmar's 1 million refugees represented a 100% increase from the previous decade.

Figure 14. Top International refugees in 2020

Total Refugees by Country (2020)

Summary

The global refugee data shows significant shifts in migration patterns due to conflicts, political instability, and humanitarian crises.

Afghanistan, historically the largest source of refugees, saw its numbers fluctuate due to the ongoing conflict in the region.

However, the rise of Syria as a major source of refugees in the mid-2010s marked a significant turning point in global refugee trends. Other countries, such as Sudan, Somalia, and Myanmar, saw steady increases in their refugee populations.

The data highlights the direct impact of regional conflicts on global migration, with countries in the Middle East and Africa being particularly affected.
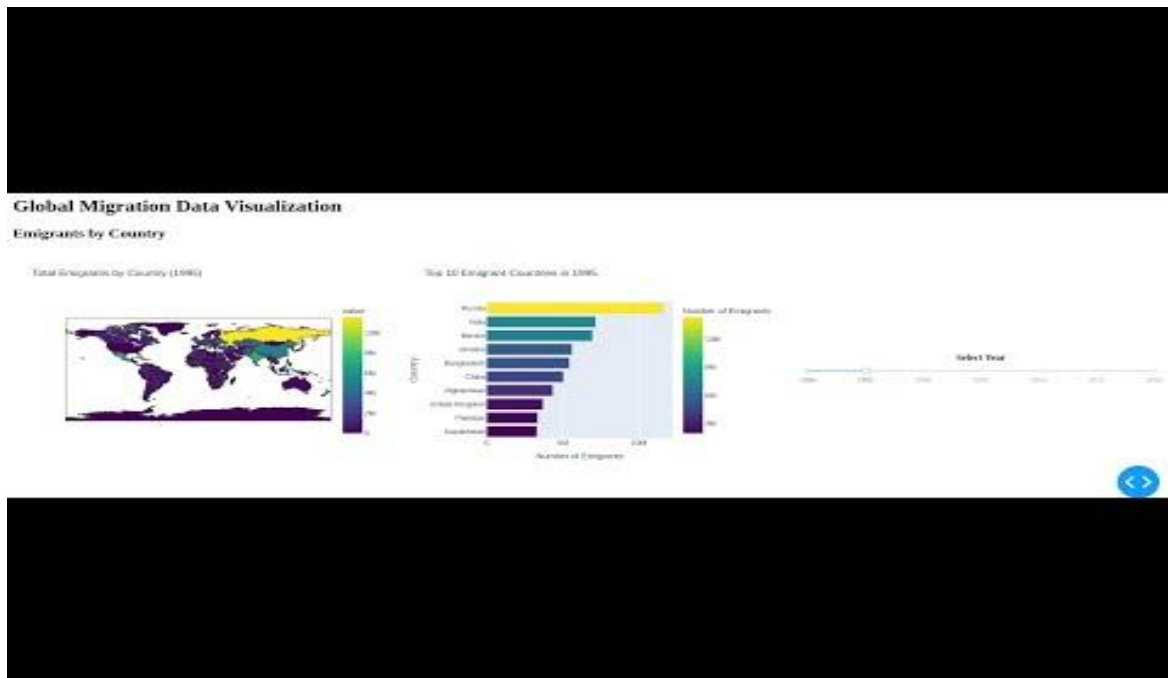
Main Sources

- https://ourworldindata.org/migration
- https://github.com/datasets/geo-countries/tree/main
- https://www.kaggle.com/datasets/arslaan5/global-data-gdp-life-expectancy-and-more
- https://www.kaggle.com/code/ashfakyeafi/suicide-rates-overview-1985-to-2016-around-globe
- https://ourworldindata.org/explorers/migration?Metric=International+immigrants&Period=Total+number&Sub-Metric=Total&Age=All+ages&country=CAN~FRA~DEU~GBR~USA~IND~CHN~SYR~YEM
- https://ourworldindata.org/explorers/migration?time=2018&Metric=Refugees+by+origin&Period=Total+number&Sub-Metric=Total&Age=All+ages&country=CAN~FRA~DEU~GBR~USA~IND~CHN~SYR~YEM

Report Sources

- https://publications.iom.int/books/world-migration-report-2024
- https://www.pewresearch.org/wp-content/uploads/sites/20/2024/08/PR_2024.08.19_religious-composition-migrants_report.pdf

My Work

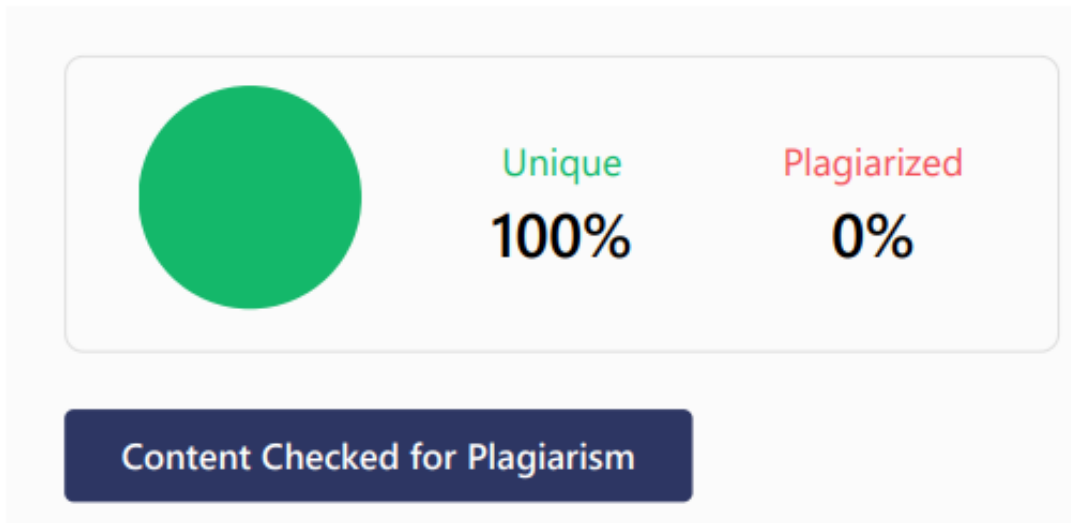- https://colab.research.google.com/drive/1zb6EsG88yME5BlvdBFTLFL6fnp4JPxwz?usp=sharing
- https://youtu.be/sdWw5COpMuc
- https://github.com/Tolga-dev/DataVisulation

Tests

Plagiarism Test

https://plagiarismchecker.ai/