Data Visualisa tion

Assignment 2

A dive into Forced Migration

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Nguyen Duy Anh - 104212294

Lai Gia Khanh- 104222015

[link]

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# Introduction

## Background and Motivation

Human migration has been around for a long time, but in recent years it has become a truly global problem. To understand the rise and the reasons for human migration, people are required to understand and be able to analyze a huge number of data which is a struggle for most people. For that reason, we created this report with visualization to provide an overview of human migration issues in the world to everyone regardless of whether you are policymakers, academics, researchers, businesses, journalists, students, or people who have an interest in global human migration. With clear and comprehensive visualizations, this report allows users to gain more knowledge and understanding of the surge and underlying causes of human migration.

## Visualisation Purpose

With our provided visualizations, users will be able to answer various questions about human migration issues in the world such as:

* How does the number of migrants tend to change today compared to the past?
* What could be the main reasons for human migration?
* Are there any specific migration patterns or trends corresponding to each reason?

The completed visualizations could have some possible benefits such as:

* Providing users with an easier and more digestible approach instead of having to analyze a large amount of data.
* Helping all users, regardless of whether they have expertise or not, have a general view and better understanding of human migration.
* Analyzing the reasons leading to human migration along with specific country examples and human migration trends in those countries affected by that reason.
* Creating a premise and opportunity for further research on human migration issues.

## Project Schedule

Week 1-2: Start the project:

* Form the group.
* Create the GitHub repository.
* Create a communication channel (Discord server).

Week 3-5: Prepare for the project:

* Looking for information about migration, doing a literature review.
* Doing research and analyzing datasets about migration.
* Decide the visualizations that are suitable for the found dataset.

Week 6-7: Start coding the website and visualizations:

* Using HTML to build the structure of the website.
* Using JS to draw the graphs based on the found datasets.

Week 8: Finish the website:

* Using CSS to improve the interface of the website.
* Add some transitions or effects to the visualizations.

Week 9-10: Writing the Project Process Book:

* Complete the content of the Process Book based on the prepared information.
* Fix the grammar and spelling mistakes if they exist.

Week 11: Make improvements:

* Receive feedback from the instructor to fix all problems with the Process Book and the website. Week 12: Presentation:
* Submit the project.
* Present and interview with the instructor.

# Data

## Data Source

All the data for this project come from the UN, particularly, the UNHCR and UN Department of Economic and Social Affairs. There are two datasets used for this project which can be found here <https://www.un.org/development/desa/pd/content/international-migrant-stock>

And here <https://www.unhcr.org/refugee-statistics/insights/explainers/forcibly-displaced-flow-data.html>

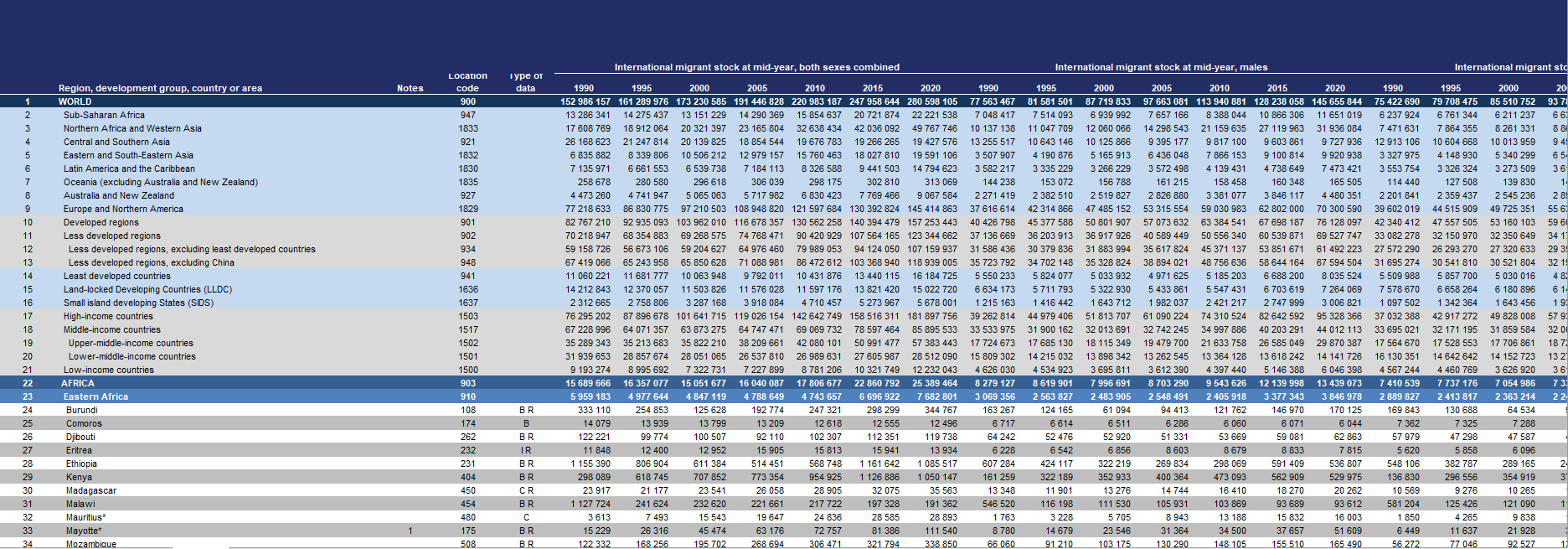
The dataset is structured as a table, containing categorical attributes such as Region, development group, country or area, Notes, Location code, and Type of data. These attributes offer descriptive insights into the regions, countries, and the nature of the data provided. Additionally, the dataset incorporates numerical values representing years from 1990 to 2020, serving as interval/quantitative data. These temporal values facilitate the examination of trends and variations over time in the international migrant stock across different regions and categories. The dataset presents estimates of international migrants disaggregated by age, sex, and country or area of origin, drawing from national statistics including population censuses, registers, and surveys. Covering 232 countries and areas globally, it provides a comprehensive overview based on official statistics concerning the foreign-born or foreign population. The dataset contains multiple tables but my team will only be using the International migrant stock at mid-years, both sexes combine to get the fullest data for the line chart.

For the second dataset, it contains 3 tables: Summary of migrant by years, Summary of Asylum and the last one contain the total data of migrant across the world from the origin country to destination country and amount of migrant from 1962 to 2023. For the second visualization, we will use the last table as our dataset. This dataset comprises information on asylum seekers originating from different countries seeking refuge in various destination countries. It includes categorical attributes such as the country of origin, its ISO code, and name, along with corresponding details for the destination country. Additionally, asylum region, type of protection sought, year of asylum application, and the count of asylum seekers are provided. These data, spanning from 1962 onwards, offer insights into the flow of asylum seekers across different regions globally, aiding in the analysis of migration patterns and refugee movements over time.

## Data Processing

Substantial data clean up are require for our datasets.

Regarding the first table, the pre-cleanup dataset has a lot of unnecessary data and stretching 294 lines, this is a problem as it will make the code run slow and messy to dealt with



*Fig1. Pre-cleanup dataset 1*

The cleanup process starts with extracting the necessary data to a new excel file.

We realize that the simplicity of the dataset will help us a lot during the coding process. In the first visualization, we only need the Years and Count adjacent to the year so we extract those two to a new table. After cleanup, this is the new dataset. This will be turn into csv file to use for the first visualization. If you notice, the dataset from UN only provided the year from 1990 to 2020, pre 1990 data are not online anymore so we have to do some more research for the full dataset. Additional data can be found here: <https://www.statista.com/statistics/679702/international-migrant-stock-1960-to-2015/>



*Fig2. Dataset 1 after cleanup*

The second dataset are much more complicated. As mentioned before, it contains comprises information on asylum seekers originating from different countries seeking refuge in various destination countries on the span of 61 years.



*Fig3. Pre-cleanup dataset 2*

We decided to only focus on 3 countries: Ukraine, Venezuela and Syria as prime example of forces migration. In the new dataset, we exclude the redundant column such as country code of origin and destination country. Luckily, there are filter built into the data table of the UN so everything is much easier. For each targeted country, we choose a time span that is eventful and saw and influx of migrant. For example, we take data from 2010 to 2023 for Ukraine. This requires filter country to only Ukraine and limit the time from 2010 forward. Moreover, we examine the data to determined the most popular destination for Ukraine refugee and put a focus on those country. After the clean up process, we have the final dataset that will be turned to csv file for coding



*Fig4. Post-cleanup Ukraine dataset*

The process will be repeat again for other countries.

# Requirements

## Must-Have Features

For our project, the requirement is to have a one-page website with HTML, CSS and d3.js for the visualization. The webpage will include an introduction, 2 type of visualization:

* Line chart: Use to show the trend of migration through history. This visualization will have a hover features. The aim of this visualization is to help user have a better idea of the ongoing increase in amount of people migrating.
* Stacked Area Chart of selected countries: This visualization main purpose is to talk about forced migration, aka people forced to runaway from their home country by either war, economic crisis or both.

In addition to charts, explanation will also be provided on why we chose this data, what happened in the period of time in the dataset and what we found out after analyzing

## Optional Features

* Connection Map: The Connection Map is a powerful tool designed to enhance the presentation and understanding of immigration patterns across the globe. This feature provides users with a visual representation of the interconnectedness of different regions through immigration flows. By leveraging a world map interface, users can explore and analyze the movement of people across borders, gaining valuable insights into migration trends and patterns.

# Visualisation Design

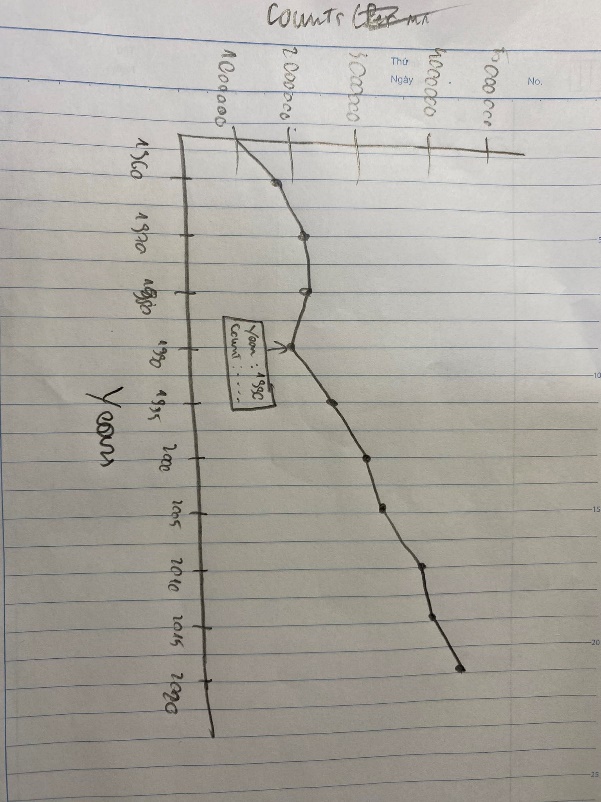
## Line Graph

### Design

The idea of the line graph is to show the evolution of migration number of the world throughout history

* X axis will represent years from 1960 to 2020
* Y axis will represent Count(people)
* Dots will be use to indicate the migration number for each year when hover mouse over, allow user to know the data better.

Sketch:



Final Design:

# Validation

# Conclusion

# References