

1 Introduction

Syria has been a country in constant conflict of civil war for the past seven years. Many cities are being destroyed violating human rights. Basic needs like food and shelter are sparse. The country is turning uninhabitable with lack of basic amenities. People are looking for ways out of the country.

The visualization is submitted as a part of this assignment aims to better understand the Syrian refugee crisis with the help of data. This visualization attempts to show the effects of the Syrian civil war on humanity and how different countries are helping Syrian people to rebuild their lives.

2 Description

The data from UNHCR [1] and other sources was obtained as multiple CSV and json files, pre-processing of data, merging and data preparation was done in Microsoft Excel. All these visualizations were designed in JavaScript with the help of the d3.js library.

The visualization is divided into three sections, each one describing a unique data set.

2.1 Visualizing all the Syrian migration.

This first visualization depicts the number of refugees per country and per continent in the world. The dataset was obtained from The UN Refugee Agency [1]. Another data set for the population of every country was obtained from the world bank [4].

Data Types: *The Year* – Discrete value identifying the year, *Country* – discrete value identifying the country, *Population* – population of the country, *Refugee* – total number of Syrian refugee count in the country, *Continent* – continent the country belongs to.

Idiom: The data is represented using a circle chart starched along the x-axis. We use the circles with force chart to depict the scale of Syrian migrations in all the countries in the different continent.

Encoding Channels:

- **Space:** Each chart represents the data for every year between 2008 and 2014. Each circle represents the country.
- **Colour:** The size of the circle depicts the population of it, we have divided the circle based on the size in three different categories 1 to 10 million, 10 to 50 million and above 50 million.
- **Size:** The color of the circle represents the continent, namely Africa m Asia m North America, South America, Europe, and Oceania
- **Position:** x-axis represents the number of Migrations on a log scale.

There are three selectors in the top right of the chart with options to sort based on the number of refugees above 1000 and based on the continent.

Tasks: This graph helps us visualize the number of refugees immigrating to different countries in the world.

- **Compare** the different continents accepting immigrants, as we can see from the visualization most of the immigrants move to Europe followed by Asia.
- **Distribute:** tries to display countries with the highest rate of migration over the year.
- **Categorize:** Categories the countries according to the continent.

2.2 Visualizing the main causes of conflict.

The second one depicts the major causes of disputes in Syria. The dataset was obtained from Harvard Dataverse [2]. Event data contains of interactions between war causing actors like cooperative or hostile actions between individuals, groups, sectors and government.

Data Types: The dataset consists of many detailed event data, but the important ones are, *Event Date* – The date the event happened, *Source_Name* – the source of the attack, *Source Country* – The source country, *Target Country* - The target of the attack, *City* – the city of the attack

Idiom: The visualization is depicted using a stacked bar chart.

Encoding Channels:

- **Colour:** With different colours of stack representing different actors/reasons in the war.
- **Position:** The x-axis denotes the year of the events occurred and the y-axis denotes the number of the incidents. Y-axis can be changed to show relative values by selecting the chart type from the dropdown.

Tasks: The visualization helps in seeing the as seen there has been a considerable decrease in the violence events through 2012 to 2015.

- **Compare:** The main tasks this visualization archives are comparing different actors/events in the Syrian crisis.
- **Categorize:** This visualization also categorizes different actors/events into 8 different categories.
- **Find Trends:** This shows us the major decrease in violence in 2015 after the UN intervention.

2.3 Visualizing major Countries supporting refugees.

And the third one depicts the major migrations in the refugee camps of the top 5 countries. The dataset is obtained from UNHCR [3] the operational research refugee situation.

Data Types: *Date* - the date of data recorded *refugee* – the count of refugees', *level_1* – The country of the camp, *level_2* – the sub-location of the refugee camp, *level_3* - the sub-location of the refugee, *lati*- the latitude of the camp, *longti* – the longitude of the camp.

Idiom: The visualization contains two idioms, the area chart depicting the increased volume of refugees in the refugee camps in the top 5 countries Jordan, Iraq, Turkey, Lebanon, and Egypt. And another one is the map of these countries showing the spatial location of the camps.

Encoding Channels:

- **Colour:** The color identifies each of the top 5 countries in the graph.
- **Area:** The area covered signifies the increase in the refugee and camps in each of the countries.
- **Space:** The circles on the map depicts the refugee camps site location.
- **Size:** the size of the circles on the map denotes the camp size with respect to refugees.

Tasks: This type of visualization achieves various visualization tasks.

- **Locate:** The circles on the map denotes the refugee camp site.
- **Compare:** The area char compares the top 5 countries accepting refugees in refugee camps, with recent highest being Turkey.

The design choices of all the three charts were made after looking at the data and what would fit best to describe the data accurately.

Strengths: This visualization shows the roles neighboring countries to Syria in helping the general people of Syria live among all the chaos. More visualizations like this could help spread awareness among the public and make us extend a helping hand towards the victims.

The visualization serves a clear purpose of making the user aware of current Syrian refugee crisis.

Also, each of the visualization present many numbers in a small space, effectively utilizing the visual space.

Weaknesses: Although this may seem sufficient visualization, there is many more things that could have been visualized. E.g. the victim data could give us an insight into how many humans lives have been affected by the crisis.

The first visualization of the circle chart could be better visualized with one more dimensional data along y-axis like the demographic categories (male/female ration)

In the stacked bar chart, I feel more data could have been fitted alongside the actors (like the news source etc.)

The visualization can be viewed at: <http://romaan7.blinkenshell.org/data-viz/>

(if any problem in viewing the link please contact shaikhr@tcd.ie)

Source code can be found at <https://github.com/romaan7/DS7DS4---Data-Visulization>

3 Citing third party resources

This visualization uses many components from below libraries

- **d3.js** – for visualizing data with HTML, SVG, and CSS.
- **MS-Excel** – For data cleaning and data prepration.
- **jquery.min.js** - JavaScript Library
- **queue.min.js** – for loading multiple files before rendering.
- **colorbrewer.js** - colour advice for cartography
- **plot-transform.js** - D3.js-based Multiple Transforms in Plotly.js.

Thanks to below agencies for providing the data:

- [1]. <https://data2.unhcr.org/en/situations/syria>
- [2] <https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/28075>
- [3] http://popstats.unhcr.org/en/persons_of_concern
- [4] <https://data.worldbank.org/indicator/SP.POP.TOTL?page=1>

Help from below forms:

- <http://stackoverflow.com/questions/32057842/d3-js-highlighting-stacked-bar-and-getting-selected-values/32079517#32079517>
- <http://bl.ocks.org/biovisualize/1016860>
- <https://bl.ocks.org/mbostock/3885304>