

Visual Analytics For India Trade Dataset

Gaurav Joshi /MT2018035/ Pritesh Ghogale/ MT2018086 /CD732 /IIT Bangalore

Visual analytics is the science of analyzing raw data in order to make conclusions about that information using visualizations. Here the dataset we've considered is India Trade Information from Kaggle which is hierarchical in nature hence we apply various information visualisation techniques to analyze the data.

Dataset Breakdown

This dataset includes the trade data for India for commodities in the HS2 basket. The dataset consists of trade values for export and import of commodities in million US over the period 2010-2018. Some context to what HS2 basket is, economic basket or commodity bundle is a fixed list of items, in given proportions. Its most common use is to track the progress of inflation in an economy or specific market. Our dataset is hierarchical in nature showing details of a commodity valued for a country for a given hierarchy. Thus, details of year followed by commodity name for a given country can be easily depicted using specific visualizations.

Question Addressed

Some of the pressing questions we plan on answering via data visualization techniques are mentioned below,

- 1.What did India export the most in any given year?
- 2.Which commodity forms a major chunk of trade?
- 3.How has the trade between India and any given country grown over time?
- 4.Difference between the import and export values?
- 5.How has the trade between India and any given country grown over time?

Dynamic Bar Chart Analysis

Through bar chart we wish to address the question that answers which were the countries which imported/exported the most to/from India. We've tried to keep the nature of bar dynamic by adding the provision to first select whether user wants to see import or export details, next the number of countries is also up to the user. Thus, top 4 export countries, bottom-20 countries India imports from are examples of what bar can achieve. Thus, this graph is a good indication of how strong the trade relations are between other countries and India. Refer Fig-1 and Fig-2 for to see how the bar charts look.

Trade Deficit Graph

The amount by which the cost of a country's imports exceeds the value of its exports. The value of trade deficit is calculated by difference of the aggregated sum of import and export values grouped by year. The following results are shown

using a bar chart, refer Fig-3 for more details. The bar chart in picture is dynamic in nature, hovering over any bar gives the value of deficit that year in the tooltip. Refer Fig-3 to get more details on deficit and see how the graph looks.

Sunburst Analysis

Through the sunburst chart we wish to depict what commodities held good during a particular year. The sunburst first divides the whole pie in year format, once clicked on any one of the year, it gives details of top 4 commodities which were traded that particular year. Again, authority is given to the user to select data being import or export through a drop down.

One interesting analysis via sunburst is we see the most imported and exported commodities India has is Mineral Oils. So what India does is, being rich in manpower and infrastructure, it imports mineral oils from countries, distills and processes it, produces products like usable wax, kerosene, etc and then exports these finished produces. Refer Fig-4 and Fig-5 to see hierarchies via sunburst.

Treemap Analysis

With treemap we further dive deep in hierarchy of commodities doing well for a given year. So as we see in sunburst we now know which were the 4-most exported commodities in the year 2018. We further go ahead to ask, which countries were these commodities being exported to. Thus, a detailed country level analysis is possible using treemap.

Why is country detail necessary? Information of such sorts are important to foster better trade relations between countries. Also, if we are the largest exporter of a product to a country, there are chances we could negotiate our terms with the products we are importing from that country. Thus, all these relations are displayed nicely in play using the treemap. Refer Fig-6, Fig-7 and Fig-8 to see the hierarchies being represented via the treemap.

Choropleth Graphs

Choropleth graph are visual representation of values over a world map. Through this plot we wish to show the relation between commodity and the country, example, what is the value of arms and ammunition's that US has imported over the years. Again, the user is given the authority the commodity he/she wishes to see and to select between import/export information. Once the plot appears, hovering over any country details the information in a tooltip nearby. Thus, detailed relationship between commodity and country is what we can analyze using this plot. Refer to Fig-9 and Fig-11 to see the export and import choropleth maps respectively.

Line Graphs

Line graph is used to see how commodity has done over the years. Choropleth represents the value of commodity for a given country. To see how that commodity has done over the years, we use the line graph, thus for the selected commodity, the line graph depicts the amount imported/exported over various years. It is used in conjunction with choropleth to compare the commodity values all together. Refer Fig-10 and Fig-12 to see the export and import line graphs for selected commodities respectively.

Conclusion

Information Visualization is a powerful way of analyzing numerical, categorical, geographical and other different formats of data. The various techniques we've demonstrated combined with user interaction serves as a good way to make the visualizations more understandable to the users. India's trading information is really useful in maintaining economic and trade sanctions with other countries. We believe that these visualization techniques can further the cause of analyzing the data more meaningfully and help unearth various questions that at first might not seem fairly obvious.

Enter the value of n to get top or bottom-N imported/exported countries by India:

Top N-Imports ▾

Submit

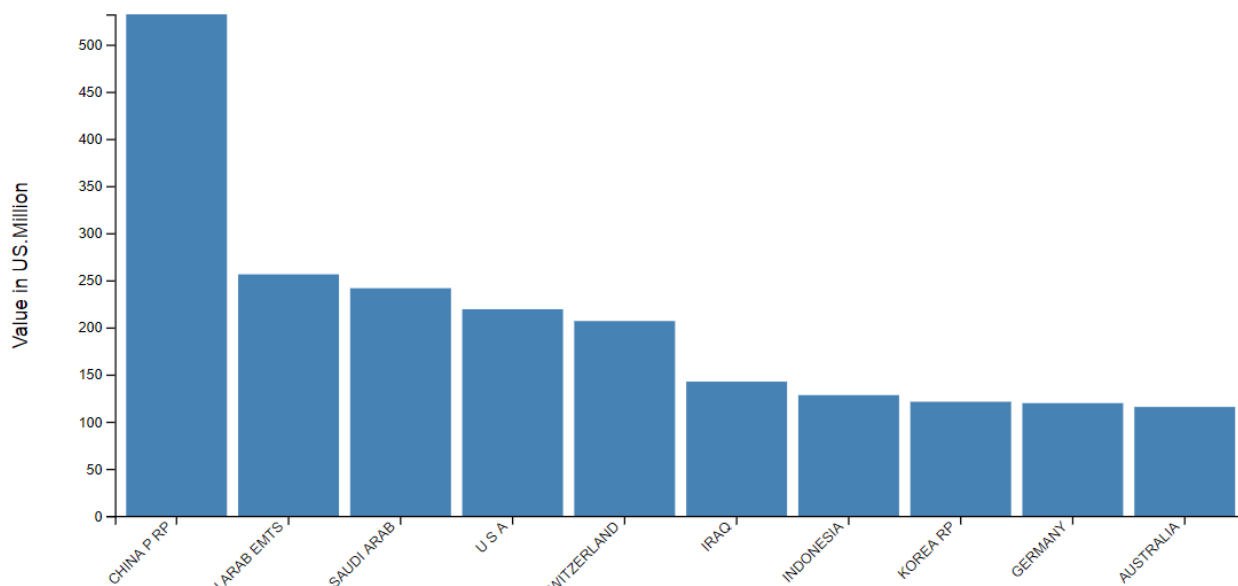


Fig. 1. Bar Chart Representing Top 10 Countries India Imported From

Enter the value of n to get top or bottom-N imported/exported countries by India:

Bottom N-Exports ▾

Submit

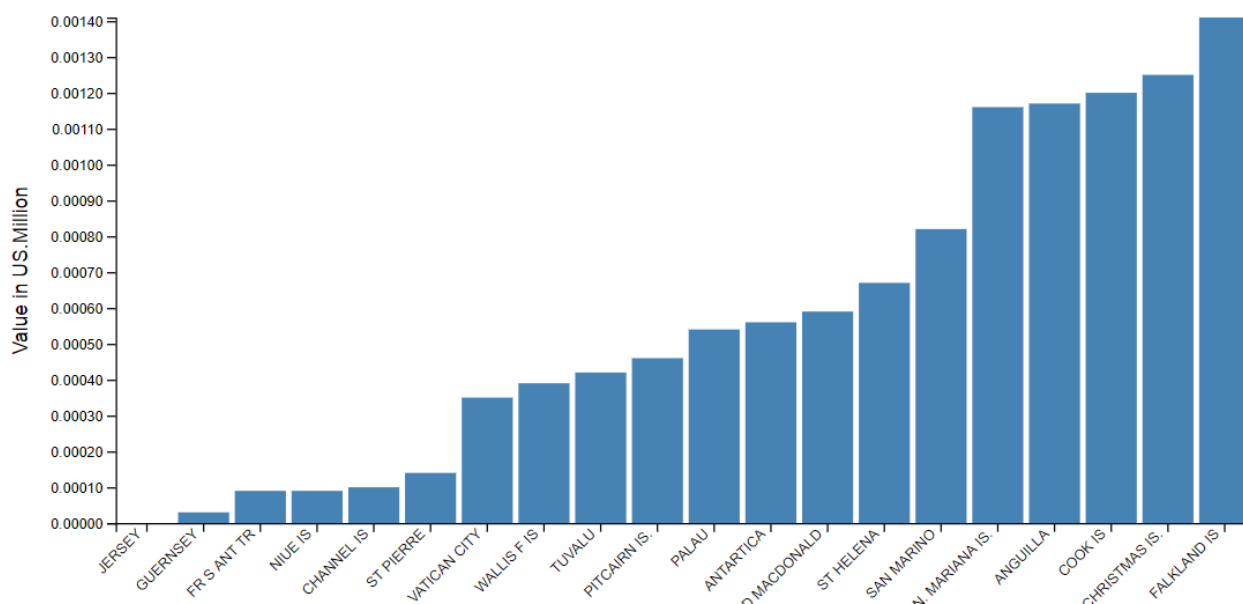


Fig. 2. Bar Chart Representing Bottom 20 Countries India Exported To

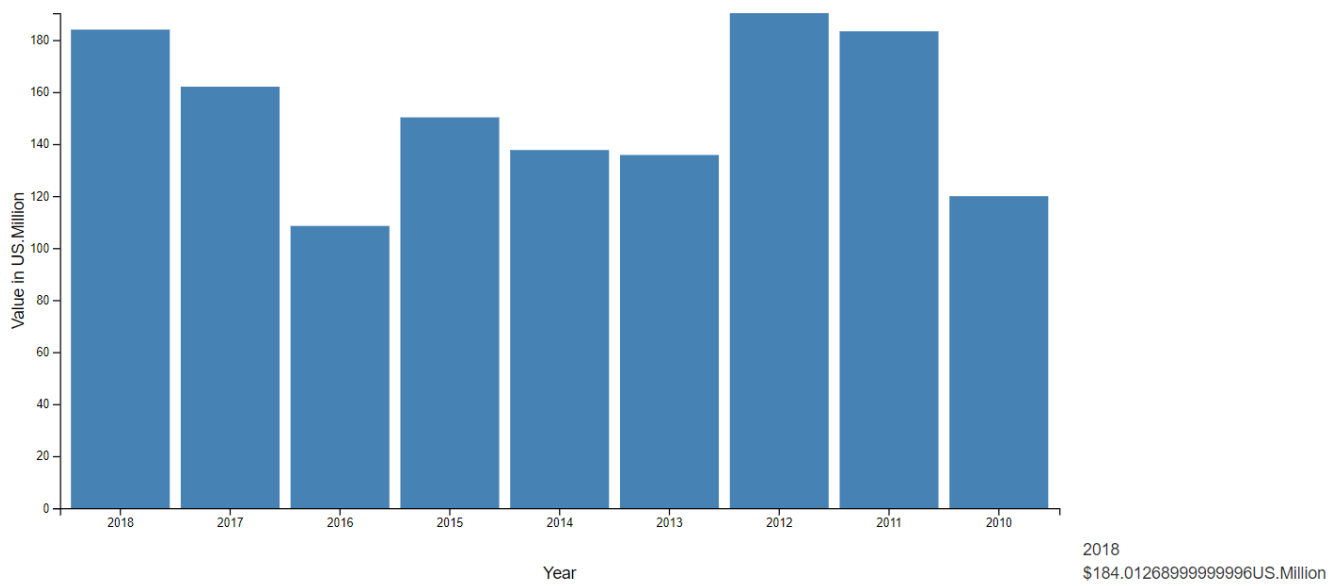


Fig. 3. Trade Deficit Graph

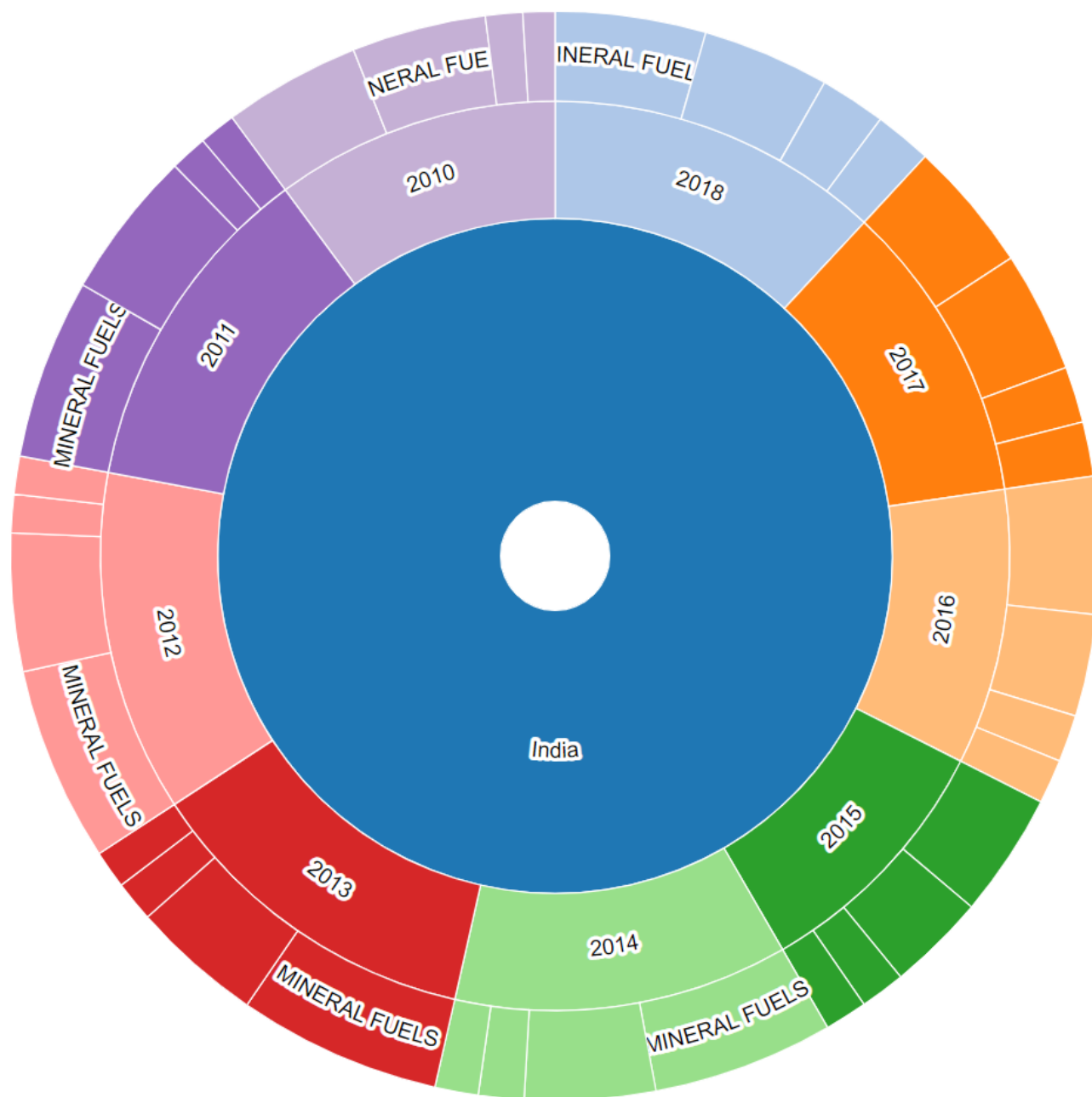


Fig. 4. Sunburst Full View Showing Yearly Distribution

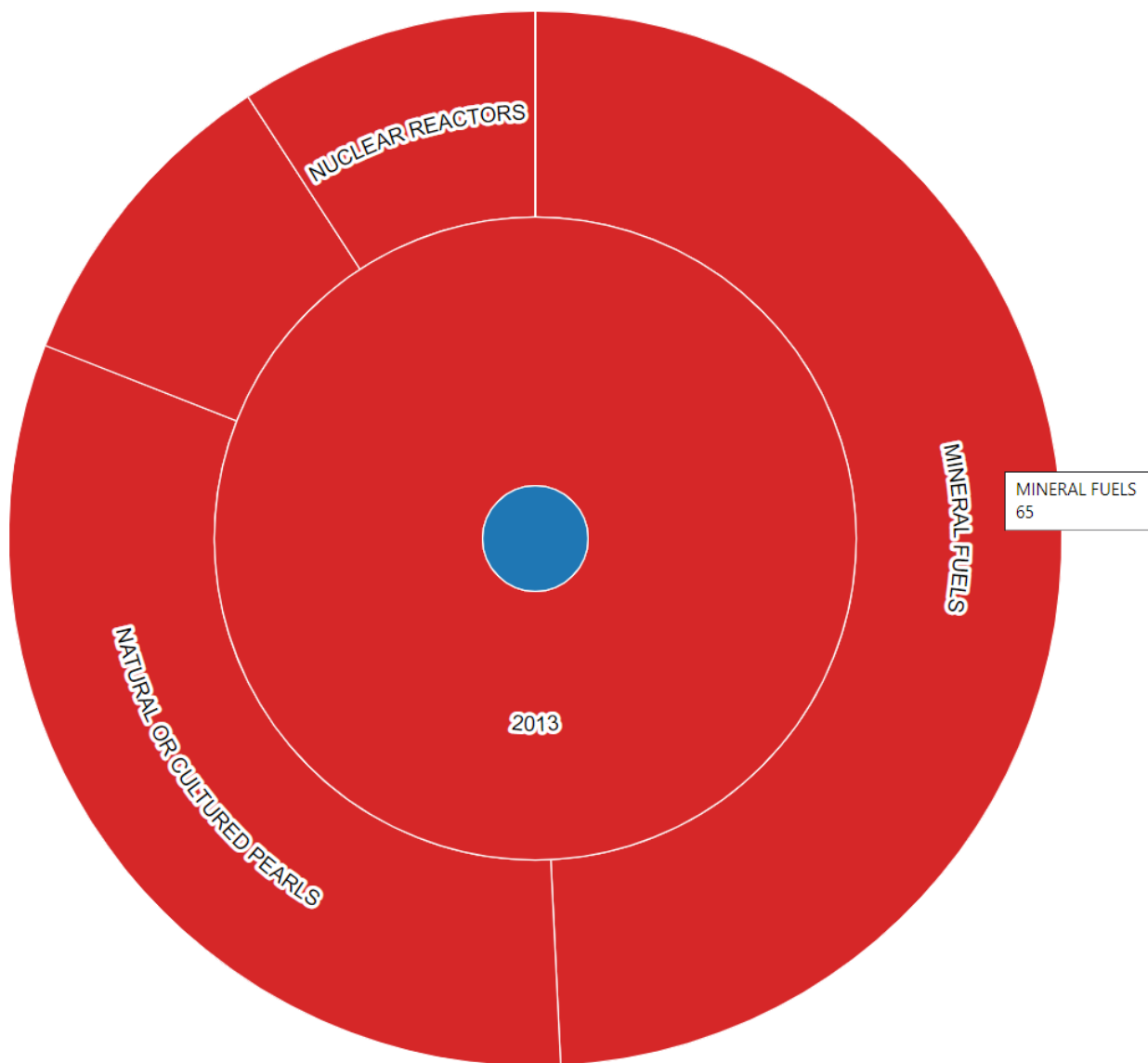


Fig. 5. Expanding Sunburst For 2013 Depicting Top 4 Exported Commodities

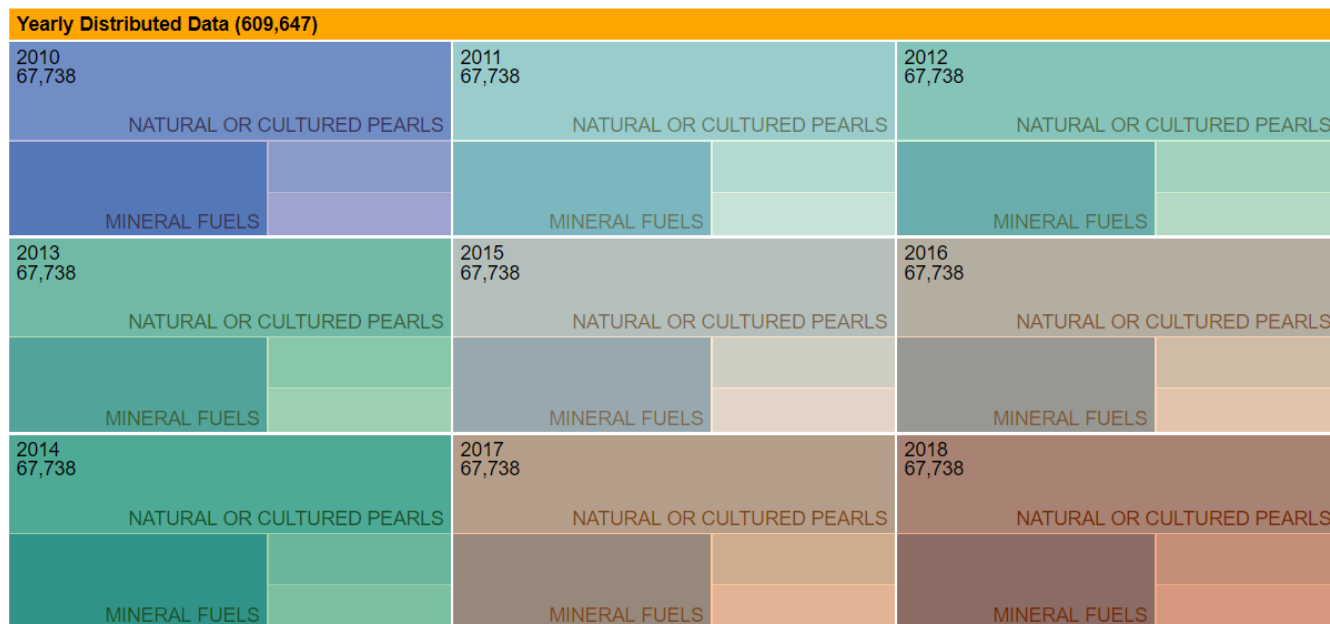


Fig. 6. Treemap Outer Yearly Distribution

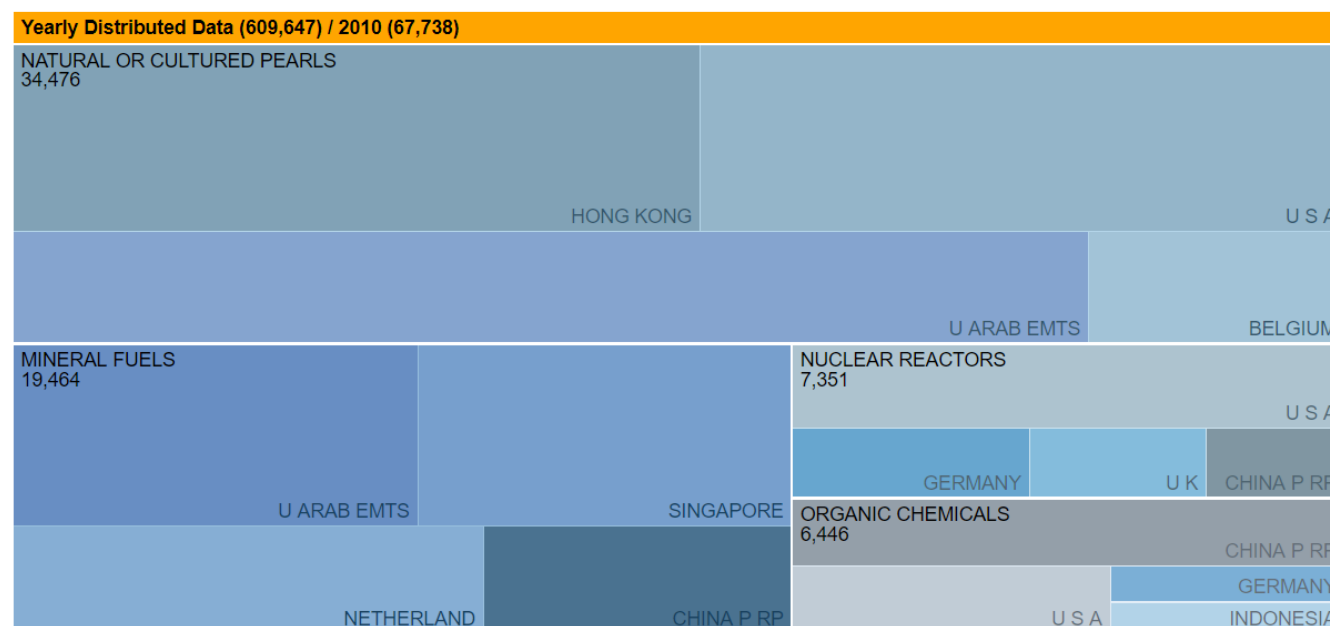


Fig. 7. Treemap View Expanding In 2010 Depicting Top Commodities

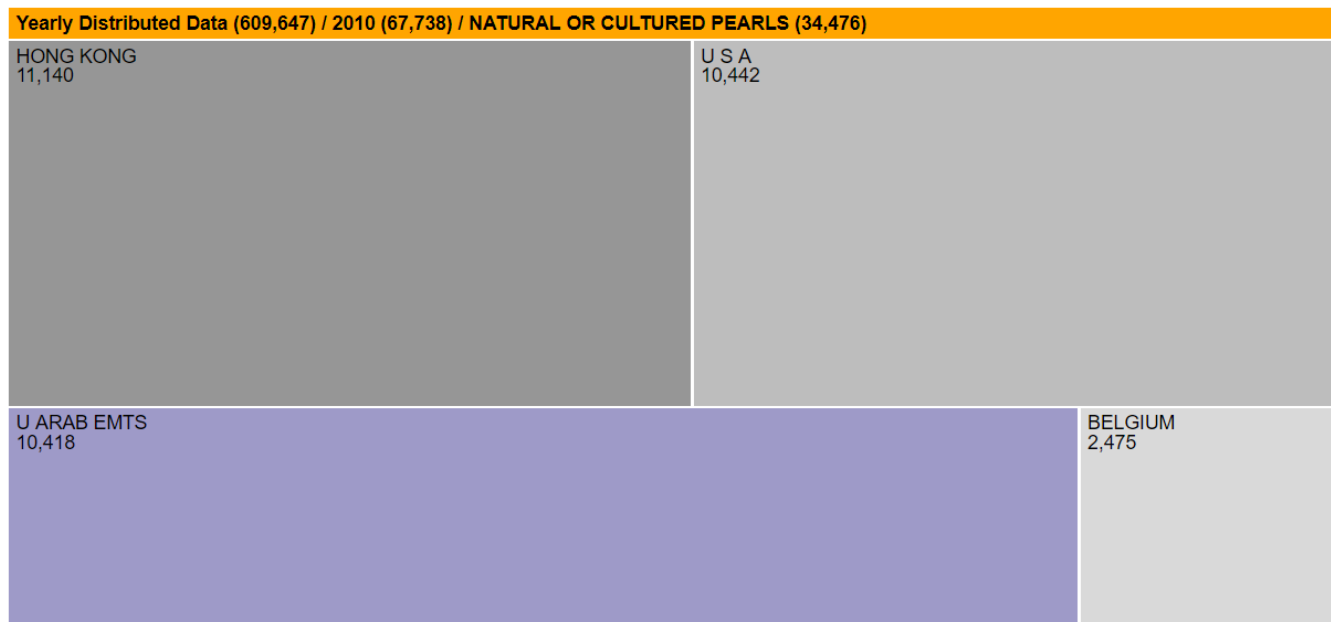


Fig. 8. Treemap Top Natural Oil Export Countries In 2010

India's Export Insights Across World [2010-2018]

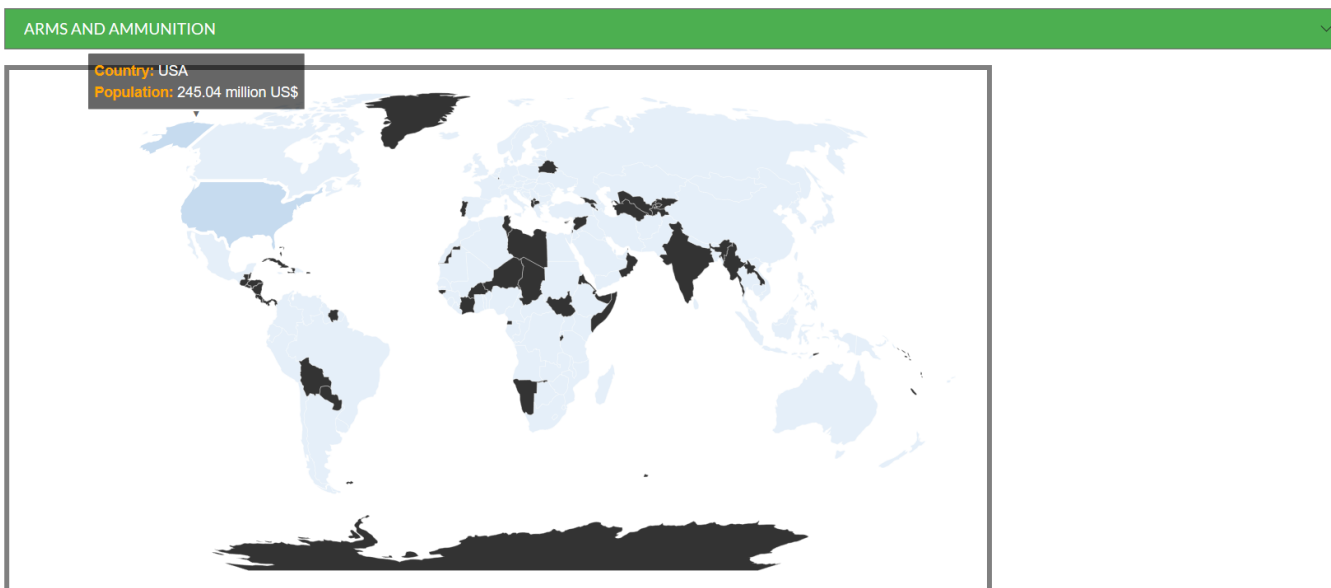


Fig. 9. Choropleth Relating Commodity With Countries India Has Exported To

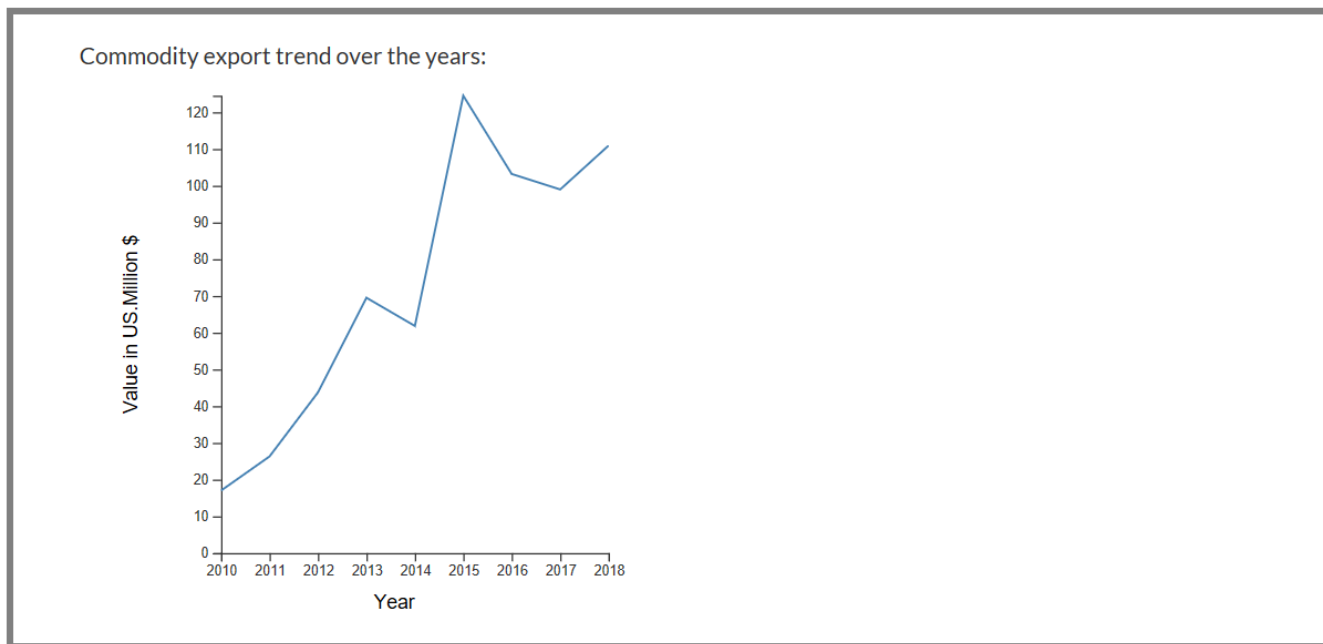


Fig. 10. Line Graph Depicting How Arms Export Commodity Has Done Over The Years

India's Import Insights Across World [2010-2018]

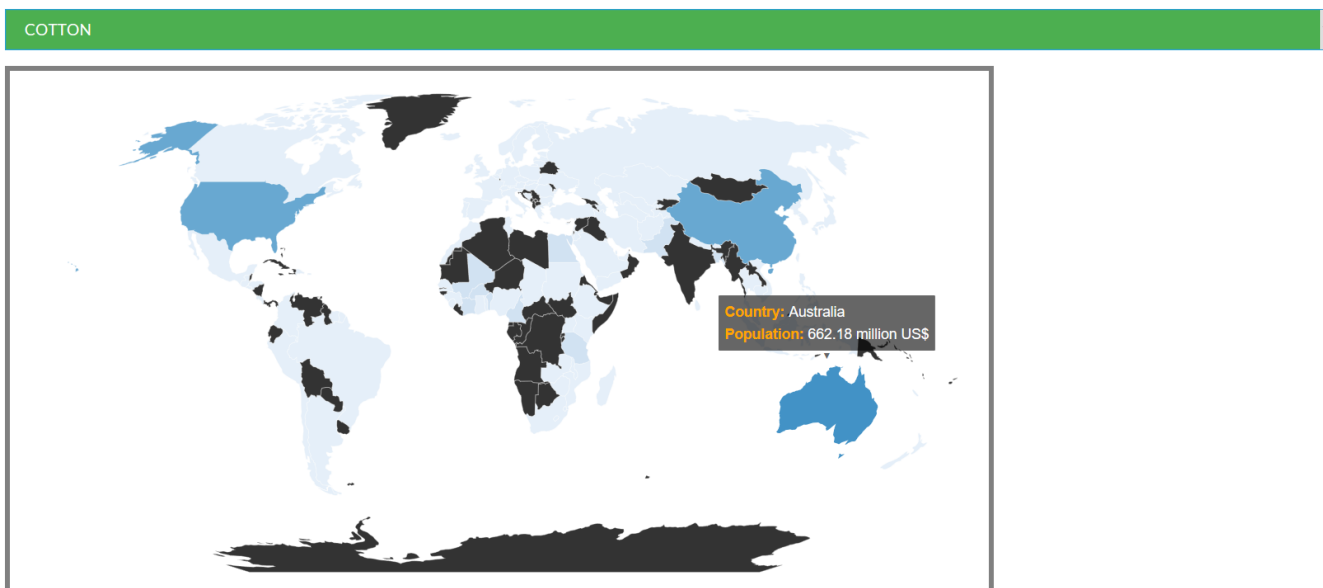


Fig. 11. Choropleth Relating Commodity With Countries India Has Imported To

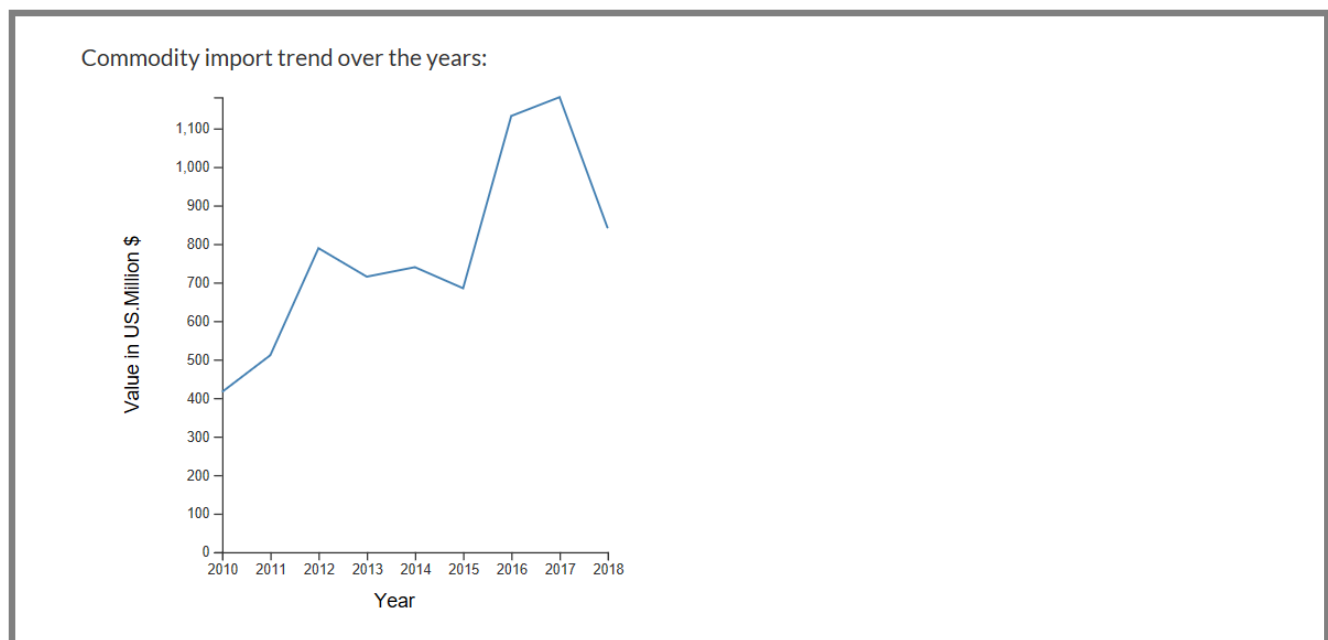


Fig. 12. Line Graph Depicting How Cotton Import Commodity Has Done Over The Years