Information Visualisation

Channelling Hans!

Assignment Description

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Part 1 – Copying Hans

Link: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-1/

Features:

1. Bubble plot represents the countries of the world
   - Bubble size is mapped to the population of the country
2. x – axis represent **Income per person, $/year (GDP/capita)**
   y – axis represent **Life expectancy at birth (years), years**
3. Different colours represent different regions – Asia, Africa, Australia, America, Europe, Oceania
4. **Mouse hover** on the bubbles labels the Country
5. Changing the **slider** will help in viewing data of a year
6. **Play – Pause** button starts and stops the animation
7. Additional features: (inspired by the **GapMinder World Visualisation**)
   - **Filter data** per the region by clicking on the buttons. Button colour also represent region colour on the visualisation.
   - Clicking on the bubbles will stop the animation (if the animation is active) and all the **details** of that country will be visible for that year.
   - Clicking on the bubble will also **draw dashed lines** from the bubble to each axis which helps better visualisation.
   - The visualisation is dynamic with the screen size i.e. it works well on almost all kind of devices.
   - Grid view also helps in better data interpretation

Part 2 – Extending Hans (built in D3)

Link: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/

(N.B: the webpage takes some time to load data)

1 What Is the Purpose of Your Visualisation?

Ans:

The purpose of my visualisation is to answer some questions on no. of International airports for the year 2015.

Questions:

1. Which cities in the world have International airports?
   Link: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz1

2. Which country has the maximum number of International airports?
   Link: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz2

3. On which factor(s) the number of airports depend?
   First I created a visualisation in which I compared a countries GDP with its total no. of International airports
   Link: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz3

   Then I produced a visualisation describing the no. of airports by area and population of a country.
   Link: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz4

   I then mapped GDP against Density on a scatter plot where the bubble size shows the no. of Airports.
   Link: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz5

(NB: Visualisation details is in question 3 of the assignment)

2 What Similar Visualisations Exist?

Ans:

Openflights.org have a visualisation which shows some of the cities with International airports and it also shows their connections.
Link: http://openflights.org/

3 Why Is Your Visualisation a Good Solution?

Ans:

Visualisation by Openflights.org only plots few International airports. Although it shows cities connections but it does not answer my questions.

In Visualisation 1: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz1
I could show all the International airports in the world (which are open).
Question 1 answered!!!

In Visualisation 2: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz2
I was also able to show the no. of International airports for each country. This visualisation also

shows the country with maximum and minimum airports using Tree Map.
On mouse hover on a country, displays its no. of airports and its total share.
A heat map is also shown for better visualisation.
Question 2 answered!!!

In Visualisation 3: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz3
For each country I plotted the no. of airports with its GDP. This visualisation was not able to answer my question because there was no interesting trend. For example, Qatar has the highest GDP in the world but it only has only one airport. India's GDP is comparably less in comparison to Japan but both have the same number of International airports.

In Visualisation 4: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz4
Then I created a scatter plot which described Countries by Area and Population mapped to x and y axis. No. of Airport is mapped to the bubble size. This visualisation clearly shows that the no. of airports increases as the Population and the Area increase.

In Visualisation 5: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/#viz5
I tried to find out the trend combining Area, Population, and GDP. So, I plotted GDP against Density on x and y axis and mapped no. of airports to the bubble size.

From visualisations 4 & 5 it can be concluded that the no. airports not only depend on the GDP of a country, but it also depends on the Population and its Area.
Question 3 answered!!!

On mouse hover, all the above visualisations show relevant important details.

4 What Data Manipulation Was Required to Create Your Solution?

Ans:

Data Sources : http://ourairports.com/data/

Files used : i) **airports.csv** from http://ourairports.com/data/
ii) GapMinder data set provided for 1st part of the assignment

For Visualisation 1, I use airports.csv to show all the International airports.
First, I converted the file to .csv format. The file contains all kinds of airports details (small-airport, medium-airport, large-airport). So, to get all the International airports, I filtered out all the large airports and then filtered airports which were not open for public use. (I deleted the entries, which don't had IATA code).
Important Attributes: {type, name, Latitude, Longitude, iso_count, iata_code, municipality}

For Visualisation 2, after filtering for above visualisation, I counted the number of airports for each country. For this I made another .csv file (say Kamran.csv) and recorded the values. This new file contained country code and no. of airports.

Then I inner joined the GapMinder data with kamrna.csv to get gapminder_airport.csv file.
Keys used - {GapMinder dataset -> 'Code' and Kamran.csv -> 'iso_count'}

To calculate density, I divided Population by Area and added a new attribute in the file named 'Density'.

For visualisation 3, 4, 5, I used gapminder_airport.csv.
Important Attributes: {GDP, Population, Area, Density, No of Airports}

gapminder_airport.csv: http://kamranazmat.bitnamiapp.com/UCD_InfoVis/Assignment-1/Part-2/data/gapminder_airport.csv

To plot the world map, I used world-50m.json available at https://github.com/topojson/topojson/wiki .

5 What d3 Resources Did You Use to Create Your Visualisation?

Ans:

Resources:

- http://d3js.org/d3.v3.min.js
- http://d3plus.org/js/d3plus.js

Website:

- https://d3js.org/
- http://d3plus.org/
- https://github.com/topojson/topojson

Documentation:

- https://github.com/d3/d3/wiki
- https://github.com/alexandersimoes/d3plus/wiki
- https://github.com/topojson/topojson/wiki