DATA VISUALIZATION USING TABLEAU AND R

GROUP MEMBERS

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❖ Objective

To Integrate R with Tableau and visualize the insights of the dataset City-Quality-of-Life in Tableau.

❖ Introduction

Development happens as a result of interdependency of social and economical processes. The development of cities in its qualitative and quantitative forms is one of the most significant parts to shape both the processes.
Quality of life is holistic. It consists of two dimensions: subjective (well-being) and objective (quality of place) (Murgaš, Klobučnik, 2016a). It has two levels – individual and societal. Through our data visualization using Tableau and R , we tried doing the in depth analysis of factors that contribute to shaping quality of life.

❖ Dataset Description

The dataset used in this project has been taken from Kaggle.com . The data was originally collected by Teleport.org. It is related to quality of life for the most creative cities around the world, which enables users to find suitable cities for living and working according to their personal preferences.Furthermore, this data set provides Teleport.org generated scores for housing, cost of living, startups, venture capital, travel connectivity, commute, business freedom, safety, healthcare, education, environmental quality, economy, taxation and internet access.

❖ Integration of R with Tableau

R is a popular open-source environment for statistical analysis. There are many libraries, packages and even saved models available in R for Cleaning and Visualising the data . It is possible to utilise those in Tableau Desktop through calculated fields and take advantage of R functions, libraries, packages and even saved models. These calculations dynamically invoke the R engine and pass values to R via the Rserve package and are returned back to Tableau.

The Rserve package basically provides a server allowing external programs to use R.

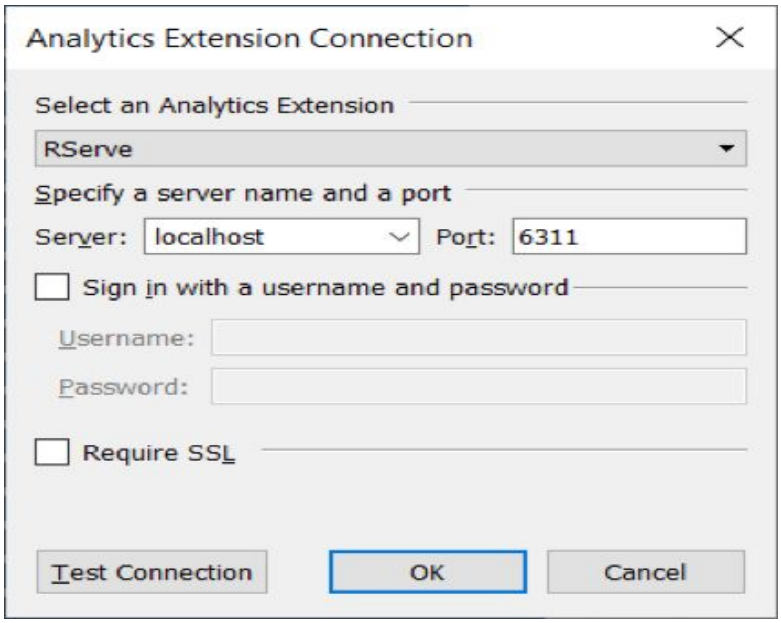
Steps:1.Install Rserve and Import it in R

- Initially, we need to install Rserve Package using the **“install.packages”** command and use the **“library”** command to import the Rserve Package.

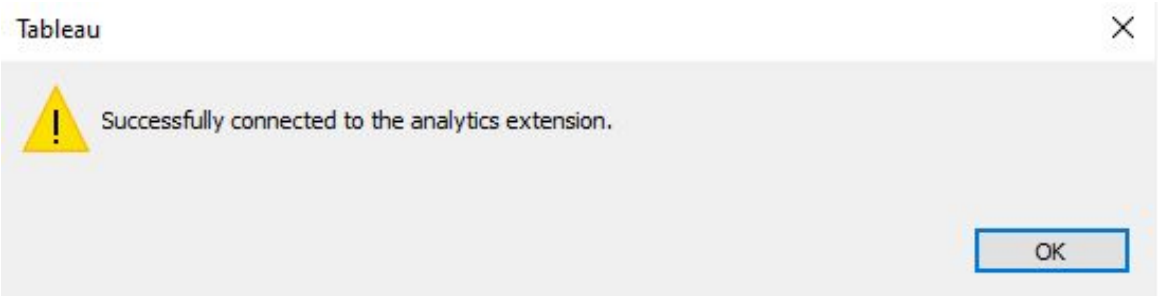
- Rserve debug mode is set to TRUE which specifies that debug version of R should be started (Rserve.dbg)

2. **Integration of R with Tableau**

- Open Tableau Desktop -> Help -> Settings and Performance -> Manage Analytics Extension Connection
- Under Analytics Extension Connection Window we need to select **Rserve** as the analytic extension and specify **localhost** server under the port **6311**



- Connection can then be tested and upon success we can then use R code to create visualisations in Tableau



❖ Visualization using Tableau

We are presenting our analysis in the form of a story in Tableau. Tableau is the fastest growing data visualization and data analytics tool that aims to help people see and understand data. In order to transform the way people use data to solve problems, tableau software ensures to meet strict requirements. In other words, it simply converts raw data into a very easily understandable format. is a user friendly visualization tool is to help users see and understand the data by enabling self-service visual analytics. The software is designed to facilitate analysis for non-technical information consumers.
In Tableau, stories are not just a collection of static sheets. We make the story points to remain connected to the underlying data to reflect data changes.

❖ Our Analysis using Tableau

We created sheets in tableau which helped us in crafting a story. Our story, “City Quality” explains in detail about our findings in the dataset . We tried making it user-friendly so that the viewer is able to understand the analysis immediately.

➔ **Main objective of “City Quality’ story:**

- Overview of analysis
- Identification of cities based on different criterias
- Shortlisting cities based on personal preferences
- Presentation of factual information
- Guidance in deciding best cities for a good quality life based on different parameters like real estate, education, and living.
- Scope of career in all cities.

The story lets users browse through data according to their needs based on the above objectives.
Here’s a detailed look of the dashboard through which we crafted our story

➔ **Overview of City quality**

In the dashboards, “City-Quality Score” is the main filter that was used in order to arrange data. The city quality score is defined out of 10 using different categories that a city has parameters like education, internet facility, travel connectivity, business freedom, cost of living, crime rate, etc. The score of a city is the sum of all the attributes which is scored out of 170. The dashboard contains various charts and filters in order to present this data in a very analytical way.

➔ **Points visualized through tableau sheets-**

- **Country Wise total quality:** This is the derivation of the total city quality score of a country by adding all cities in that country. It is represented by a map to easily show through colors which country is on top and which country is on the bottom.

- **Country wise average city quality through heat map:** This sheet helps us define a filter to easily navigate through different cities.

➔ **Actual and expected city quality:**

- **A representation of total and average city quality :**

After the overview of city quality, it is time for a brief representation of cities based on quality score. The main focus of this dashboard is to give the viewer an idea of a city based on its top factors with respect to location.

- **Points visualized through Tableau sheets**

❏ **Categorization of countries based on city quality:** Here countries are categorized on the basis of the top characteristics of its cities. The viewer can easily glance through this map in order to have a quick look at the cities.

❏ **City quality bar chart through heat map:**In this sheet , the heat map represents where each city stands on the basis of city quality.

❏ **Country Wise total city quality through heat map:** Similar to above chart this heat map gives a categorization on the basis of country.

❏ **Depiction of continent wise city:** For viewers to quickly understand how progressive a continent is on a qualitative basis, a pie chart is created.

➔ **Top 5 best and worst cities of the world.**

This dashboard represents an insight into which cities are best and worst in the world. This can help figuring out what really makes a city different. The resultant city that came out of this analysis such as Hongkong, Singapore etc., as top cities show the reliability of this dashboard.

➔ **Consolidated view of important parameters**

Here different continents were compared based on important parameters that are considered to contribute to the quality of a city such as economy, safety, education, cost of living. The findings on different continents were expressed through a tree map, which represents the hierarchy through visualization..

➔ **Insight of important parameters**

This sheet helps us understand where cities of the world stand. As there are so many cities in the world, the top 20 categories best and worst suits best to give a very quick overview to viewers.

Again, here we found out the top 20 cities in both best and worst levels for the above parameters using scatter plots.

➔ **Business establishment scope**

The objective of our analysis discussed above is to give career scope in the cities around the world. Likewise, here we can look forward to finding the business scope summarized in the sheet named “financial aspects to consider country wise” using factors deemed essential for a business to flourish such as business freedom, taxation, economy, venture capital. The color scheme of map charts also giveaway the stand of different countries.

A city is said to be prosperous where young ideas can grow, Hence a bar chart is created that helps understanding the opportunities for start-ups in order to give the idea about business stability.

➔ **Factor wise comparison of different countries through a map chart**

Here, the four important parameters that are prerequisite to have a quality life in a city for namely finance, real estate, education and safety are used to draw comparisons of different countries using blue and red color gradients.

❖ Conclusion

The fact that quality of life is greatly influenced by the place we live in cannot be argued and thus through our visualization we are helping our viewer understand how different cities are in qualitative terms.

The flow of the story from start to end helps the viewer to understand not only factors affecting city life but also scan the complex data with the ease of legends, charts and analysis that we have formulated. The three main categorical applications of our visualization which determines city quality are Business scope, Real estate and Education. It gives us a very detailed prediction from a simple factual dataset which any person can use. One main advantage the visualization provides is how trustful the results are by comparing them from obvious facts, for example like top cities for education in the world or top real estate cities. Hence we can conclude that the visualization and analysis performed on the dataset are captivating, trustworthy, detailed and predictive in nature thus compiling with our mission in aiding our viewers in understanding the city factors.