Perceiving Data Visualization

What makes a visualization good?

The data being presented should be established in two ways by a decent visualization:

- Display data linkages that are too intricate to be explained in words.
- Make it simpler for the audience to comprehend the information supplied and take into account the results from that data fast.

The amount of observation categories, which are often a variable, and its data, as well as the type of data, are what cause the complexity (numeric or categorical). If the modes and outliers of the statistical distribution of numerical data are of interest, a histogram or box plot is typically used as the visualization. Frequency distribution and skew should be displayed in a representation of categorical data. All of this is typical for data visualization where observations are for a single variable, such as the screen size of a laptop, where observations would contain numbers listed for a variety of models.

Complexity increases when there are two or more variables. The comparison should be numerical to numerical (scatterplot, for example), numerical to categorical (many histograms, for example), or categorical to categorical for the best visuals (e.g. side-by-side bar plot).

A visualization should simplify the complexity posed by the variable and data selections in order to aid management in gaining a clear understanding of the data. The graph should show a hierarchy of the relationships between the data and your company's concerns, highlighting underlying themes that appeal to the target audience. Therefore, you would select a statistic that is immediately recognized to them if you were presenting data to a marketing manager who is interested in online interaction. Always be aware of the intended audience and the information that the visualization is meant to convey.

The addition of interactivity adds still another level of intricacy. To show the rate at which a measure or result is occurring or to make side-by-side comparisons, you can have interaction over time. Selecting the approach that tells the tale the best presents a challenge. Selecting interactions for comparison must be simple because research data is frequently hidden in tables, especially if the visualization was created using a computer framework.

A Few Rules of Thumb for Creating Powerful Visualizations

"Visualization gives you answers to questions you didn't know you had." (Shneiderman, 1999, 1)

Overall, a few general guidelines will make your visualizations effective tools for illuminating the idea behind your data, regardless of the variables and observations at hand.

- Think about how the background and the figures contrast. The general guideline is to have a gradient in similar shades for online observation, but if you know the audience will probably print the graph, you may wish to have a version with distinct patterns.
- Determine acceptable cutoff points for each variable. By doing this, you may compare current performance to prior results and get advice on how to prevent showing misleading discrepancies between categories. In order to help the team decide whether the campaign is worthwhile

repeating or if the results can be built on, you may wish to highlight how past campaigns fared in a line chart that shows how a digital ad performed over time.

- Label bar graphs with numbers, but not so many that the information becomes confusing. Long numbers are typically difficult to read. When accuracy to the nth degree isn't crucial, use a shorthand that everyone on the team is familiar with. On a bar graph, the number "10,523" can be displayed as "10K."
- To emphasise scale, group data by value whenever possible, but be careful not to obscure the distinction between categories.

Data Outliers and How to Handle Them

"The greatest value of a picture is when it forces us to notice what we never expected to see." (Tukey, 1997, 2) Certain data sources generate distinctive complexity. To make sure your chosen visualisation will make sense to your intended audience, you must examine how that data is used.

For instance, survey findings typically require scoring, which entails categorising responses into groups that regression analysis or machine learning techniques can identify. To decide how to communicate categories and differences using graphs and charts, you must first comprehend the survey and the data.

Another area where knowledge of the underlying data influences visualization decisions is the selection of visual patterns. Regions are depicted on clorapeth maps using various colors or patterns. These make small regions difficult to view for handouts or small screens, but they are ideal for regions or clusters. Heat maps can display gradient variations, but they may not be the best option when it comes to identifying the precise numerical differences between data points.

In the end, a visualization should bring the audience together around the issue the data is illustrating. Your managers may go be the heroes and heroines who overcome those challenges once the issue has been clearly defined.

Ways to visualize your data

"There is no such thing as information overload. There is only bad design." (Tufte, 2019, 2) The result of all the data processing is data visualization, which is designed to take lengthy numerical lists and complex KPIs and present them in a clear, understandable manner. If you select the appropriate visualization for your data, that is.

1. **Indicator**

On the off chance that you just have to show a couple of mathematical qualities, like a number, check, or ticker, utilize the Indicators perception. You can add more names and a variety coded sign realistic, like a green up bolt or a red down bolt, to additionally convey the worth.

2. Line chart

The line outline is a typical graph since it is powerful in an extensive variety of business situations, including

- To recognize patterns, think about information after some time (Example: dissect deals income for as long as a year)
- Look at changes all through a similar time span for various gatherings or classifications (Example: dissect consumptions of various specialty units for as long as a year).

3. Column Chart

The best applications for the segment diagram are thing correlations and information examinations over the long run. The segment diagram can show a breakdown by class on the Y hub and various qualities on the X and Y axes.

4. Bar Chart

To compare numerous elements, use the bar chart. Typically, the Y axis of the bar chart shows categories or items, and the X axis shows values for those categories or objects. The values can also be divided into different categories or groups.

5. Pie chart

The pie chart performs effectively when attempting to depict proportional data and/or percentages. Since the pie chart depicts the size relationships between the constituent parts and the entire entity, the pieces must add up to a meaningful whole. Pie charts should only display six categories or fewer.

6. Area chart

Albeit a region outline and a line diagram might have all the earmarks of being comparative, a region graph has filled-in (hued) segments underneath each line, making it conceivable to show them stacked for more straightforward examination. If you have any desire to show outright or relative (stacked) numbers throughout a time span, utilize a region diagram.

7. Pivot table

One of the most straightforward and practical methods for visualizing data are pivot tables. Large volumes of data may be swiftly summarised and analyzed, and the visual aspects can be improved by using extra features like coloring and bars.

8. Scatter chart

The often used scatter chart functions well when seeking to depict the distribution and association of two variables. The color of the circles on the graph and the quantity of information represent the comparison categories, respectively (indicated by the circle magnitude). That is a great example if you want to compare total revenue generated and units sold grouped by gender.

9. Scatter Plot

Using data points on a map, a scatter map allows users to visualize geographic information throughout a region. Circle size and color can be used to visually indicate the value of up to two pieces of numerical data.

10. Tree Map

It's a multi-faceted gadget that uses layered rectangles to show hierarchical data. When comparing numerous categories and subcategories, for instance, you may use this style of the chart instead of a column chart.

What Are The Benefits of Data Visualization?

With interactive visual representations of the data, data visualization positively influences an firm's dynamic interaction. Since organizations can now grasp information in graphical or pictorial structures, they can now recognize drifts all the more rapidly. Here are a few extra subtleties on how information perception can help an organization:

● Relationship Correlations: Finding the connections between's autonomous factors may be troublesome without information representation. We can further develop our business choices in the event that we can figure out those autonomous factors.

- Patterns Over Time: Although apparently like a conspicuous application for information perception, this is really quite possibly of its most advantageous use. Without the expected information from an earlier time and the present, making forecasts is unimaginable. Patterns after some time show us where we have been and where we could go.

- Recurrence: Frequency is intently attached to patterns after some time. We can get a more clear feeling of how potential new buyers would act and answer different promoting and client obtaining endeavors by taking a gander at the rate, or how much of the time, they make buys and when they do as such.

- Looking at the Market: Data perception utilizes data from different business sectors to give experiences into which crowds to target and which ones to stay away from. By introducing this data in different diagrams and charts, we can see the potential inside those markets all the more plainly.

- Risk and Reward: Analyzing value and risk measures needs skill since, in the absence of data visualization, we must decipher challenging spreadsheets and figures. When data is visualized, we may then identify regions that could or might not need action.

- Reacting to the Market: Being able to quickly and easily access information with data shown in a clear manner on a useful dashboard enables firms to act fast in response to findings and helps them avoid making mistakes.

Citations

Tufte, E. (2019). *SEEING WITH FRESH EYES: MEANING, SPACE, DATA, TRUTH.* https://www.edwardtufte.com/tufte/seeing-with-fresh-eyes

Shneiderman, B. (1999). *Readings in Information Visualization: Using Vision to Think.* Morgan Kaufmann Publishers. http://www.cs.umd.edu/hcil/pubs/books/readings-info-vis.shtml

Tukey, J. W. (1997). *Exploratory Data Analysis.* Addison-Wesley Publishing Company. http://www.ru.ac.bd/wp-content/uploads/sites/25/2019/03/102_05_01_Tukey-Exploratory-Data-Analysis-1977.pdf