



Project Report

Project Title: “Open Source Data Visualization”.

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Introduction

Data visualization is the graphical representation of any information or data. By using visual elements like charts, graphs, and maps are the few data visualization tools that provide the viewers with an easy and accessible way of understanding the represented information.

We need to visualize it to explore, understand, and explain our data fully, and that is the power of data visualization.

Open source Data visualization is visualizing and analyzing the data. In the world of Big Data, data visualization tools and technologies are essential to analyze massive amounts of information and make data-driven decisions.

Data visualization refers to the techniques involved in graphically representing data, using visual elements like charts and graphs to spot trends, patterns, and outliers, for quick insights, and to help in real-time decision-making. It's increasingly important in today's world to understand the overwhelming volume of data being generated by businesses every single day.





Why is data visualization important?

Good data visualization removes noise from data, highlights useful information, and tells a story. Edward R. Tufte, a pioneer in data visualization says, "Graphical excellence is that which gives to the viewer the greatest number of ideas in the shortest time, with the least ink in the smallest space."

Data visualization software for businesses

In this era of big data, businesses need a versatile data visualization software that would solve all their visualization needs. The effectiveness of any data visualization software lies in the richness of data visualization capabilities that it offers.

A data visualization software which offers this excellence will become a vital component of any business and its processes.

Broad goals of data visualization

In a business environment, the speed at which decisions are made is key. It shouldn't take too long to find answers for known questions and indicators. Yet, while dealing with unknown scenarios, there should be sufficient scope to explore the available data in less time-consuming ways.

Hence, for any data visualization tool, the two major goals are:

- ✓ Explanation: Visuals that provide users with relevant information for standard, day-to-day needs (ex: volume of sales in a day across regions)
- ✓ Exploration: Offering a multi-dimensional view of a data-set for users to explore, ask questions as they reflect, and uncover insights along the way (e.g., Performance of a business measured by different parameters over a given time period)



Components of data visualization

Human minds process visuals at an incredibly high speed, and the same also applies to data visualizations. The reason is that it takes less than half a second for the eye and the brain to grasp what is called the pre-attentive visual properties of an image—the color, form, spatial positioning and movement that makes up a data visualization.

A wide range of visualizations can be created with these building components. They include:

- Time-series visualizations, such as line charts and area charts which depict how a variable, or multiple variables, change over time.
- Ranking & comparison of different types of bar-charts, like horizontal/vertical, grouped, and stacked.
- Part-to-whole views of data on a percentage basis using pie charts.
- Correlation between two or three variables can be effectively understood using scatter plots and bubble charts.
- Geo mapping visualizations like choropleth—a shaded or pattern-filled map—are useful when it's necessary to compare or segment a data set by geographic region

Types of Data Visualizations

- Charts
- Tables
- Graphs
- Maps
- Infographics
- Dashboards

Charts

Be it discrete or continuous, charts can visualize any type of data for effective analysis and interpretation. There are a wide range of chart types like Area, Line, Bar, Stacked, Pie, Scatter,



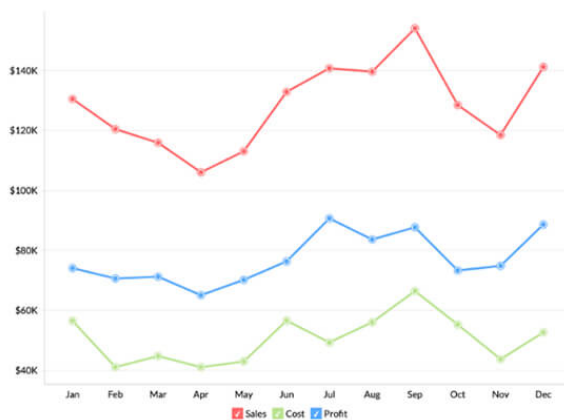
Combination, Funnel, Web etc. Each chart facilitates a wide range of user interaction options for further deeper and contextual analysis.

Some notable and widely used chart types include:

* Line Chart

This can be used to visualize trends across any time-period. There are two variants of line chart:

Smooth Line and Step chart.



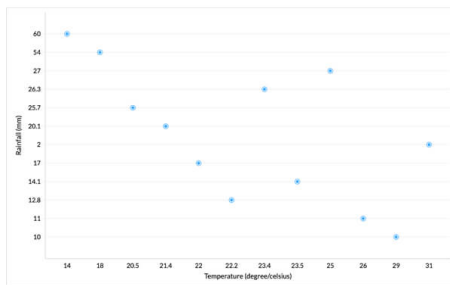
* Bar Chart

This displays data as individual bars whose height is proportional to the value plotted. Bar chart is useful to compare data classified into discrete groups.



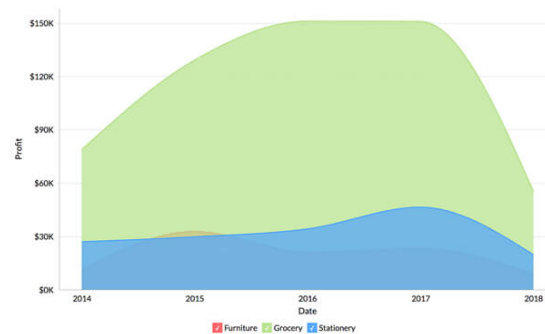
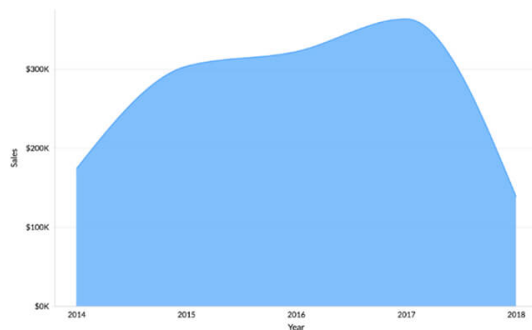
* Scatter Chart

Typical use of the scatter chart is to plot sporadic data with uneven intervals. It is used for the comparison between two numerical axes unlike the line chart, where one axis is never numerical.



* Area Chart

Area charts shade the area beneath the lines and therefore help you more readily compare data magnitudes.



Real-time business use cases

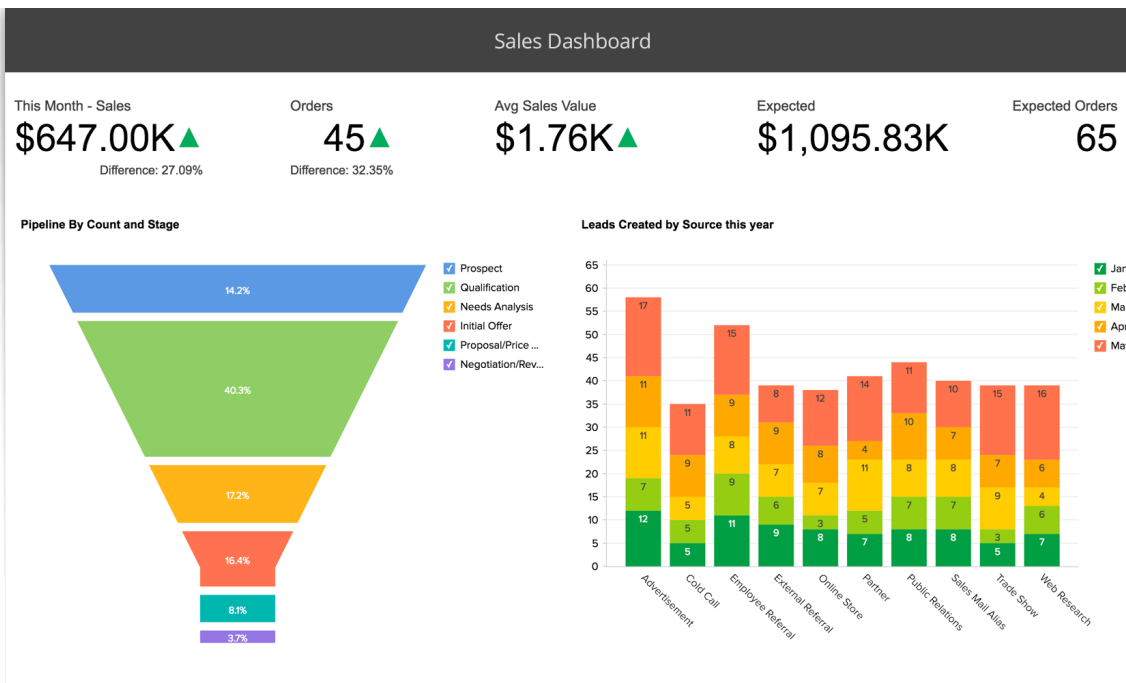
Faster decision-making in business can be better facilitated by precisely offering the context needed for stakeholders.

Choosing appropriate data visualizations for business can be made based on

1) the type of users, 2) the level of detail they're looking for, and 3) their frequency of usage.

Data visualizations have their specific utilities in different disciplines and industries. Here are just a few examples:

* **Sales:** Visualizations help in evaluating the effectiveness of different channels in achieving the larger sales objectives by communicating data aggregated from multiple tools and sources. Learn more about sales data visualization.



* Marketing

Track the impact of your marketing initiatives in terms of engagement and conversion-rates using insightful visualizations. They can also be easily shared across the stakeholders involved for their up-to-date awareness. Learn more about marketing data visualization.

Marketing ROI Dashboard





Why is data visualization important?

By now, you would have understood how data visualization simplifies the way information is presented. However, is that the only power of data visualization? Not really. As the world is changing, the need for information is changing as well.

Here are a few benefits of data visualization:

1. Easily graspable information – Data is increasing day-by-day, and it is not wise for anyone to scam through such a quantity of data to understand it. Data visualization comes handy then.
2. Establish relationships – Charts and graphs do not only show the data but also establish co-relations between different data types and information.
3. Share – Data visualization is also easy to share with others. You could share any important fact about a market trend using a chart and your team would be more receptive about it.

PROBLEM STATEMENT:

"We have a client who owns a restaurant which provides food of 5 different origins, he wants to know the overall ratings of his restaurant from his customers"