

Data visualization and its relevance

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Date of Submission: 10-10-2023

Date of Acceptance: 20-10-2023

INTRODUCTION

The main purpose of this research is to understand and further our knowledge on data visualization and its applications in our daily life. In order to grasp the significance of data visualization, it is vital to understand the background from where it emerged and its role in decision making. This paper is an effort to understand the concept of visualization in different phases of human history and how it had evolved.

It is astonishing that many ancient civilizations had used visualizations in order to get insights and better understanding on the particular topic. The paper is an effort to understand the relationship between brain and data visualization while taking crucial steps in the decision-making process. We will explore these exciting setups and jot down how data visualization is crucial in this modern era.

Research objectives

- 1) To understand evolution of data visualization
- 2) To understand complications in data visualization
- 3) Different types of data visualization
- 4) To understand relevance of data visualization

Research question

- 1) What are the complications in data visualization?
- 2) Why is it relevant to use data visualization?

Research problem

- 1) Complexities in data visualization

What is visualization?

The art of visualization involves presenting information in a visually appealing way to help people understand it more clearly. People often imagine the events and results of their futures in daily life. For instance, a person who is about to take an exam can see himself passing it, which might boost his confidence. People may be able to predict future occurrences with the aid of visualization, which will enable them to take actions that are in their best interests.

Data visualization

The process of presenting data in a visual format using diagrams, maps, and graphs in order to get deeper insights from the data is known as data visualization. With the use of graphs, charts, and maps, data visualization enables individuals to forecast future trends, patterns, and relationships. People may visualize large amounts of data and gain insights from it with the aid of data visualization. The ability to display all the data on the screen without requiring readers to read numerous pages, which would take a lot of time and effort to do, is another time-saving benefit of visual data representation. Due to the pressure of global competition, people, in my opinion, always want to save time and make decisions quickly, but they also want to make wise decisions that will affect their position in the future.

Different type of graphs and charts in data visualization

Different forms of graphs and charts are used in visualization to portray information according to the needs. People have long sought out simple graphs and charts that everybody can understand with no trouble. Humans have created many charts and graphs because they are constantly trying to perceive things better than anybody else. The list below includes a few of the graphs and charts.

Bar chart: bar chart is one of the most used chart in the data world because it is so simple to understand and interpret. Bar charts are used to compare various categorical information and also used in time series data. For example, a company's sales over the years.

Pie chart: pie chart is also well-known to the most of the people. Pie chart is a circular shaped chart which shows slices of information dividing them in particular segment. For example, percentages of people who can read and who cannot read.

Heat map: heat map is representation of data through colors to show the depth of the data. For example, to know where the users have clicked most number of times on a certain website.

Line graph: as the word itself indicates, line graph consists of lines to show data. For example, a company's profit graph can be presented in the form of line graph.

Scatter plot: scatter plot displays the correlation between two different variables. For example, scatter plot can be shown between profit and profit ratio of a company.

Area chart: In this chart, the area occupied by particular segment is shown by different colors. For example, percentage of area occupied by different companies.

Histogram: histogram is used to represent continuous data that are measured on a scale. For example, height of the people in a classroom.

Tree map: tree map is used to show enormous amount of data. Tree maps divide different categories into rectangles based on their proportion.

History of visualization

From the Romans to the British, visualizations were always used to gain a better understanding of how the things should be done and planning of it. Throughout history, even before the invention of language, people used visualizations on cave walls to show the various animals, signs, and movement of celestial bodies and their trajectories, etc. Kings like Napoleon used visualizations in wars as well¹. Even in wars, many rulers and kings used visualizations. Roman world map from Vienna, through Italy, to Carthage could be considered as one of the oldest visualizations which is from 366-335 BC¹. In fact, one of the best statistical visualizations was created during Napoleon's invasion of Russia². It showed advance and retreat groups as well as the temperature of that particular area by using lines, and it is now known as a line chart. According to theories, between 950 and 1092 AD, people used a grid method to depict planetary bodies' positions and times; time periods were presented on the grid's horizontal axis, while trajectories were displayed on its right side. William Playfair made a bar chart of Scotland's annual export and import in 1786 and pie chart of statistical representation of America in 1805. Data visualizations have emerged as a major innovation in the last century thanks to technology that no one could have imagined becoming a reality before this one. Visualizations have become a part in every individual's life for understanding things. Today's

visualization is in a way that even a person who doesn't know anything is able to understand and get some insights out of the visualization. As humans have always tried to make their lives simpler and easier in every possible way, data visualization is helping much more to it in time saving and understanding the complex things in a much easier way. Every person uses visualizations in their daily lives to help them understand things.

Today's visualizations are made in such a way that even someone with no prior knowledge can understand them and gain some insights. Data visualization is helping people understand complicated concepts more easily and save time, as humans have always strived to make their lives as easy and straightforward as possible.

Brain and data visualization

Human brain is that organ in the body which is so complex that despite humans being the most civilized species and the most advanced of all of the animal kingdom have not been able to completely explore it. All actions of human beings, or any other organisms that have central nervous system are because of electric impulses generated by the brain. From an eye blink to a complicated pull back in resistance to touching a hit object; from tasting food to digesting it, everything is controlled by the brain. Human brain is the sole cause for all our reflexes, actions and responses! Hence our decision making is basically how motivated our brain is to do a specific function. I feel our brains perform a variety of functions that are currently undiscovered and undeveloped, and they are much more versatile than we realize. I believe that humans have always liked to visualize things in order to understand them better. According to several hypotheses, the brain processes visual representations of information significantly more quickly than spoken ones. Even though we don't know much about the subconscious mind of a person, I believe that it is far more powerful than we realize and processes everything we see that our conscious mind isn't paying attention to. When it comes to visualization, I believe our subconscious mind is capable of seeing every detail that we see and provides you with an innate sensation when making decisions. Because we don't understand it very well, I believe that the subconscious mind is significantly underrepresented in visualization data.

When making decisions, your subconscious mind sometimes signals your conscious mind to act in a particular way. This is also referred to as having gut instincts or gut feelings because your subconscious mind observes

everything while your conscious mind focuses on one particular thing while looking³.

REFERENCE

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