



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 8, Issue 8, August 2020

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.488

9940 572 462

6381 907 438

ijircce@gmail.com

www.ijircce.com

Importance of Data Visualization for Big Data Analysis: A Review

Prajakta P. Sawant, Mr. Vipin K. Wani

Department of Computer Science and Engineering, SOCSE, Sandip University, Nashik, India

Faculty in Department of Computer Science and Engineering, SOCSE, Sandip University, Nashik, India

ABSTRACT: The growth of data in this world is increasing day by day due to increase in tons of data from different sectors. So, this abundant of data coming from various sources becomes an important factor in analyzing. Big data will be very useful in transforming every sector present till now[1]. Data visualization enables visual analytics to be more effective and to give clear visual insights required for decision making. Visualization tools provide graphical representation which is important to understand trends, patterns and outliers from the data. Also it gives new direction in research field by unfolding new patterns or trends during analysis. It allows business to grow as decision making process becomes easy and accurate with the help of analysis done from the data. So, every organization should follow some rules to have appropriate strategy for doing analysis of huge volume of data. In this, we describe about the requirement of visualization, different techniques and need of visualization for the data which is generated every day in today's world coming from variety of data sources.

KEYWORDS: Data visualization; Big Data; Data Storytelling; Decision Making

I. INTRODUCTION

A perfect analysis is useless without a good presentation of the result. It may seem like an exaggerated statement, but the visualization created from the analysis has the potential to highlight every important aspect to be observed, but it also has the potential to ruin a job that may have cost months of effort.

Before starting to plan an analysis and data visualization, we need to define what the expected result is. That is, the first step is to understand the problem. It is recommended that a good amount of time be invested in this stage so that everyone involved can understand well what will be the consequence and repercussion of this work. Do the data answer the questions? Will further analysis be necessary? Should the data be displayed in real time? How long is the analysis valid for? These are some examples of questions that can guide the creation of the most appropriate visualization for the situation.

When it comes to data visualization, it is common to remember graphs and dashboards, which are more visual presentation styles. It is essential to understand that visualizing data must be an accessible and practical way of viewing data and understanding various aspects such as exceptions, trends and patterns. The user must be able to analyze the information and make decisions based on what he sees. The correct choice of visualization can fully influence the interpretation. That's because our eyes are attracted to colors and patterns. Instead of reading values individually, as in tables or text, through visual representations we can perceive and understand countless values at once. There are several resources that we can use such as graphs, tables, maps, infographics, and panels and so on[2].

II. PRE-ATTENTIVE PROCESSING

There is an extremely important concept that should be known and used whenever possible, with due care. It is called "Pre-attentive processing". Our brain can identify several details even before our conscious attention. This means that when we visualize something, before we perceive the image as a whole, our brain has already paid special attention to some elements or objects. It is fast and parallel processing, over which we have little control. This is a device that determines which objects are important and can make it easier for the user to gain insights. See some examples taken from the book Information Visualization: Perception for Design. Another fundamental aspect to be observed when creating visualizations is the positioning of the data and images in a way that enhances and facilitates the interpretation of the data. See an example of two graphs that show exactly the same information, as a comparison of the balance of some people. However, the graph on the left clearly shows that there are people with negative balance, while the graph on the right does not favour this type of analysis. Situations like this are so common that books like "How to lie with statistics" were published. This book shows how the misuse of data and statistics can manipulate analysis results and direct readers to draw conclusions that do not really represent reality[6].

III. DESIGN THINKING

It has already been said that the tip is to define the expected result before starting the analysis, ensuring that everyone involved can understand well what the final product of a project will be. Adopting this practice you will use the so-called Design Thinking, which is a mindset and means focusing on identifying and understanding the problem you are solving. In this way, all other stages of the analysis will be directed to the end user, towards something that solves their problems and creates value.

In other words, it is the process that allows organizing information and ideas to address problems, make decisions, and acquire knowledge. In this way, the focus becomes the experience of the target audience in the search for answers to the problems encountered. In the case of data visualization, it must be well known who the end user is, the one who must draw conclusions, make decisions and gain insights from the data. The proposal is for the analyst responsible for creating the visualization to put himself in the user's position, who is not obliged to know technical details of the analysis, but at the same time must understand the reason for each decision made during the process [3].

IV. DATA STORYTELLING USING DATA VISUALIZATION TOOLS

Much is said about presenting the data so that people understand the line of reasoning used in each step of the analysis. This is called Data Storytelling. It is the art of storytelling. The premise of this technique is that the journey of building the analysis is as important as the result. In other words, it is not necessary to explain just where it arrived. It is necessary to explain what you did, how you did it and why you did it, without leaving aside all the available visualization resources, so that attention is directed and the reader is involved in the result. To apply this technique we must follow some basic steps:

- Understand the context. Ask the right questions to fully understand the problem.
- Choose a suitable visual presentation. It can be any visual element; the important thing is that it represents your result well.
- Eliminate saturation. Focus your attention where you want it. Use the pre-attentive elements with discretion and seek the reader's attention for the most relevant information.
- Think like a designer. Use the techniques of "Design Thinking", mainly empathic thinking to understand the problem and the best way to present it.
- Finally, tell a story. For that, it may be necessary to present the context, compare the before and after, justify the choices and decisions, and so on[5].

There are different visualization tools which are used to get the clear insights from the data. They give pictorial insights through graphs and charts and this is very useful for making correct decisions.

V. NEED FOR DATA VISUALIZATION

Companies are increasingly using new technologies, such as Machine Learning, to collect large amounts of data. Being able to do this quickly and efficiently is very advantageous, but it also opens up the need to understand and explain this information in a way that makes sense for the business. Thus, the results of complex algorithms are much easier to understand through visual representations, rather than lines and lines of texts and numbers. Therefore, the better you can visually convey information about your business, the more advantages you will be able to derive from it. Here are some benefits of data visualization for companies:

- **Rapid absorption of information:** By using visual elements, information about your business is presented in a much more organized and clear way. With that, the process of interpreting this data and finding patterns and trends becomes much easier and faster.
- **Facilitates decision making:** By identifying patterns and trends through data visualization, you'll be able to easily define what your company's next steps should be. This way, you will spend less time and energy on this data analysis and decision making process. In addition, it is possible to have a broader view of the business and make more assertive decisions.
- **Connections:** Data visualization does not only help in identifying patterns and trends. It also helps you find important connections to solve your company's problems.
- **More engaging presentation:** A presentation with visual elements also has the advantage of being much more engaging. This makes it much easier to keep people interested when you are exposing results and insights.
- **Greater sharing:** Sharing data analysis is also much more practical with visual elements. As it is easier to understand the information through these tools, it is possible to share the results with all employees so that everyone understands[4].

VI. CONCLUSION AND FUTURE WORK

As inferred from this review, data visualization shows that the journey is as important as the final result. It is common for this phase to be done only at the end of a project, when deadlines are already short. But we must fight against this tendency and dedicate the necessary and sufficient time to create a good visualization, taking care not to sabotage the result and to value all the other steps. One should remember that visualization should be a simple and quick way to convey concepts universally. In fact, the more data we have, the more important it becomes to be able to visualize this data, distilling this immense and varied volume into useful information. Visualization techniques are now extremely important for generating value from the concept of big data. After all, big data is not just a concept about data, but how we can extract insights and intelligence from it. Visualization is the master key to this.

REFERENCES

1. Lowe, J. and Matthee, M., 2020, April. Requirements of Data Visualisation Tools to Analyse Big Data: A Structured Literature Review. In *Conference on e-Business, e-Services and e-Society* (pp. 469-480). Springer, Cham.
2. Ali, S.M., Gupta, N., Nayak, G.K. and Lenka, R.K., 2016, December. Big data visualization: Tools and challenges. In *2016 2nd International Conference on Contemporary Computing and Informatics (IC3I)* (pp. 656-660). IEEE.
3. Bikakis, N., 2018. Big data visualization tools. *arXiv preprint arXiv:1801.08336*.
4. Conner, C., Samuel, J., Kretinin, A., Samuel, Y. and Nadeau, L., 2020. A picture for the words! textual visualization in big data analytics. *arXiv preprint arXiv:2005.07849*.
5. Po, L., Bikakis, N., Desimoni, F. and Papastefanatos, G., 2020. Linked Data Visualization: Techniques, Tools, and Big Data. *Synthesis Lectures on Semantic Web: Theory and Technology*, 10(1), pp.1-157.
6. Raghav, R.S., Pothula, S., Vengattaraman, T. and Ponnurangam, D., 2016, October. A survey of data visualization tools for analyzing large volume of data in big data platform. In *2016 International Conference on Communication and Electronics Systems (ICCES)* (pp. 1-6). IEEE.
7. Drucker, S., Big Data Visualization and Analytics: Future Research Challenges and Emerging Applications—Part.
8. Andrienko, G., Andrienko, N., Drucker, S., Fekete, J.D., Fisher, D., Idreos, S., Kraska, T., Li, G., Ma, K.L., Mackinlay, J. and Oulasvirta, A., 2020, March. Big Data Visualization and Analytics: Future Research Challenges and Emerging Applications. In *BigVis 2020: Big Data Visual Exploration and Analytics*.
9. Perkhofner, L., Walchshofer, C. and Hofer, P., 2020. Does design matter when visualizing Big Data? An empirical study to investigate the effect of visualization type and interaction use. *Journal of Management Control*, pp.1-41.
10. Hwang, G.J., Chu, H.C. and Yin, C., 2017. Objectives, methodologies and research issues of learning analytics.
11. Ifenthaler, D. and Erlandson, B.E., 2016. Learning with data: Visualization to support teaching, learning, and assessment.



INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor:
7.488

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 9940 572 462  6381 907 438  ijircce@gmail.com



www.ijircce.com

Scan to save the contact details