

Application of data visualization in enterprise data analysis

*Kecheng Qu**

Shandong Xiehe University, 250100, JiNan,Shandong, China

Abstract. Data visualization is an indispensable part of data analysis, transforming abstract data into intuitive information through charts, images and other forms to help people better understand the laws and trends behind the data. As the volume of data continues to increase, people need to understand and analyze data more intuitively and effectively. As a result, data visualization becomes a powerful tool that can help people extract useful information from massive amounts of data and present it in an intuitive way. This paper will focus on the concept, technology and application of data visualization to discuss the importance and development trend of data visualization in the field of enterprise intelligence.

Keywords: Visualization, Data analysis, Enterprise intelligence.

1 The concept of data visualization

Data visualization refers to the use of charts, images and other visual means to present data, so that people can more intuitive, more clear understanding of the information contained in the data. Data visualization can dig deep into the data and visually present the data in the form of visual graphics. Its ability to concretize abstract data helps data users quickly and efficiently understand the information behind the data and make data-driven judgments and decisions. By transforming abstract data into an intuitive form, data visualization can help people better discover correlations, trends, and patterns between data. Data visualization can not only improve productivity, but also help people communicate and share information better. In the field of enterprise intelligence, data visualization is even more important, which can help business managers better understand the operation of the enterprise, market trends and customer needs, and provide strong support for decision-making.

Data visualization is a hot topic in the field of big data in recent years, which belongs to human-computer interaction, graphics, graphics, statistical analysis and geographic information, integrated data processing, algorithm design, software development, human-computer interaction and other knowledge and skills, through images, charts, animation and other forms show data, interpret the relationship and trend between data, and improve the efficiency of reading and understanding data. In terms of data types, the current can be visualization research has gradually focused on multidimensional data, time series data, network data and hierarchical data.^[1]

* Corresponding author: 287486820@qq.com

2 Data visualization technology and tools

Data visualization involves a variety of technologies and tools, the most common of which include chart-making tools, BI tools, and big data analysis tools. Chart-making tools such as Tableau, Power BI and others can help users easily create various types of charts such as line charts, bar charts, pie charts, etc., as well as interactive dashboards. Echarts is an open source visual chart library based on JavaScript, introducing a large number of interactive components applied to visualization,^[2-5] and becoming a key means for users to in-depth analysis and understanding of data. Big data analysis tools such as Hadoop and Spark can help users process massive amounts of structured and unstructured data and present them visually.

The continuous innovation and development of these technologies and tools provides richer and more flexible options for data visualization, making it easier for people to analyze and present data.

3 the significance of data visualization in data analysis

3.1 Provide intuitive information presentation

Data visualization can present complex data in an intuitive and understandable way, so that people can understand the information contained in the data at a glance.

3.2. Help to find hidden rules

Presenting data in the form of charts, images, etc., can help people find hidden rules and trends in data more easily, so as to provide clues for further analysis.

3.3 Facilitate decision making

Intuitive and clear data visualization results can help decision makers better understand the nature of the problem, so as to make more accurate decision plans.

4 The application and role of data visualization in the field of enterprise intelligence

In the field of enterprise intelligence, data visualization is widely used in various aspects. In terms of operation management, enterprises can use data visualization technology to monitor and analyze production, supply chain, inventory and other aspects in real time, find problems and make adjustments in time. Through the analysis of visual data, managers can find the bottlenecks and problems in the production process, formulate corresponding adjustment and improvement plans, and improve production efficiency and quality. In marketing, enterprises can use data visualization technology to conduct in-depth analysis of market trends, competitors and customer needs to provide scientific basis for marketing strategies. In terms of customer service, companies can use data visualization technology to track and analyze customer feedback, complaints and needs in real time, and respond in a timely manner. In addition, in terms of decision support, enterprises can use data visualization technology to provide intuitive and comprehensive business analysis reports to managers at all levels to help them make the right decisions.

With the development of big data technology and the increasing reliance of enterprises on data-driven decision making, data visualization, as a technology to transform complex data sets into graphical or image representations, enables decision makers to intuitively understand patterns, trends and anomalies in the data. In the field of enterprise intelligence, the application of data visualization is mainly reflected in the following aspects:

4.1 Decision support

The use of data visualization in decision support is a method of transforming complex data sets into graphical or image representations in order to more intuitively understand and analyze the data. The core of this approach is to present different dimensions and relationships of data through visual elements such as charts, maps, and dashboards to help decision makers quickly identify patterns, trends, and anomalies to make more informed decisions. In the field of business intelligence (BI) and analytics, it enables non-technical users to easily explore and understand complex data sets through interactive interfaces. For example, a sales manager can track how a product is selling by looking at a sales dashboard, which may include a bar chart, line chart, or pie chart showing key metrics such as sales, growth rate, market share, and so on. The application of data visualization is not limited to the presentation of static reports. Modern data visualization tools often feature advanced analytics capabilities such as predictive analytics, trend detection, and machine learning integration that further enrich the insights of decision makers. For example, a financial analyst might use a dynamic stock price chart that not only shows historical data, but also predicts future movements based on algorithms.

The application of data visualization in decision support has greatly improved the efficiency and effect of data analysis, which enables decision makers to make more accurate judgments based on intuitive and easy-to-understand visual information, thus taking an advantage in the highly competitive business environment. As technology advances and data volumes continue to grow, data visualization will become increasingly important as a key component of future decision support systems.

4.2 Data Analysis

Data visualization plays a crucial role in the field of data analysis. It is a technique that transforms complex data sets into graphical or image representations so that people can more intuitively understand and interpret patterns, trends, and insights in the data. By using a variety of visualization tools such as charts, graphs, and maps, data analysts can communicate information more effectively and help decision makers make data-based decisions.

At the beginning of the analysis, data visualization helps analysts quickly navigate the data set and identify outliers, missing values, or potential data quality issues. This helps determine the direction and method of subsequent analysis. In the data preparation phase, visualization tools can be used to show the results of data cleansing and transformation, ensuring data accuracy and consistency. By using basic charts such as bar charts, line charts, and pie charts, data visualization can help analysts describe the basics of the data, such as distribution, central trends, and degree of dispersion. When relationships between data need to be explored, advanced charts such as scatter plots, heat maps, box plots, etc. can be used to reveal correlations, clusters, or anomalies between variables. Data visualization is especially important in reports and presentations to help analysts present complex analysis results to non-technical audiences in a clear and engaging way.

Data visualization not only enhances the efficiency and effectiveness of data analysis, but also facilitates communication and collaboration between cross-functional teams. By

translating data into a visual format, data visualization enables all involved to understand complex data relationships, enabling better business decisions and policy making.

4.3 Reporting and presentation

Data visualization is a powerful tool that plays a vital role in reporting and presentation. By transforming complex data sets into graphs, charts, and animations, data visualization helps viewers understand information more intuitively and quickly. This transformation can not only improve the readability of information, but also enhance the audience's sense of engagement and memory points.

During report production, data visualization can effectively communicate key metrics and trends, enabling viewers to see the story behind the data at a glance. For example, using a bar chart, line chart, or pie chart to present sales data, market share, or growth rate can help viewers get to the point quickly without having to dig into the details of the numbers. Such a visual presentation can attract the audience's attention more than a simple text description, and it is easier to remember.

In the presentation, the role of data visualization can not be underestimated. It can show the speaker's argument in a visual form and enhance persuasion. For example, in a business presentation, showing the growth of the company's performance or the results of market analysis through dynamic charts can make the audience more convincing, and also enhance the professionalism and authority of the presentation. In addition, data visualization can also serve as a tool for speakers to interact with the audience, increasing the interactivity and interest of the presentation by engaging the audience in the exploration of the data.

The role of data visualization in reporting and presentation is multifaceted. It not only simplifies complex information, making it easier to digest and understand, but also enhances the appeal of the information and increases audience engagement, thus making reports and presentations more effective and impactful. In today's data-driven era, mastering data visualization skills has become one of the key factors for successful reporting and presentation.

The application of data visualization in the field of enterprise intelligence greatly improves the efficiency and accuracy of data processing, helps enterprises extract valuable information from massive data, and supports enterprises' strategic decision-making and daily operations. As technology continues to advance, data visualization tools and methods will become more powerful and easy to use, driving the development of enterprise intelligence.

5 The development trend of data visualization

Data visualization, a technique for transforming complex data sets into graphical or image representations, has become a core component of modern data analytics and business intelligence. With the development of new technologies such as big data and artificial intelligence, data visualization is also constantly innovating and improving. In the future, data visualization will show the following trends. First, interactive visualizations will become mainstream. With the increasing demand of users for data analysis, interactive visualization will become the mainstream trend, and users can freely explore and analyze data according to their own needs. Modern data visualization tools increasingly emphasize interactivity with users, allowing them to explore different dimensions of data through actions such as clicking, dragging, and zooming. This increased interactivity helps users understand the data more deeply and discover potential patterns and associations in it. As an important form of data visualization, interactive charts provide users with an intuitive way to interact with data, further improving the efficiency and flexibility of data exploration and analysis. Second, virtual reality and augmented reality will be combined with data visualization. Virtual and

augmented reality technologies will bring a more immersive experience to data visualization, enabling users to understand and analyze data more intuitively. Furthermore, natural language processing and data visualization will converge. In the future, natural language processing technology will be combined with data visualization, enabling users to interact with charts via voice or text and get the information they need.

Data visualization plays a crucial role in the field of enterprise intelligence, and its development prospect is very broad. With the continuous innovation and development of technology, it is believed that data visualization will bring more surprises and opportunities for enterprise intelligence.

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