QUALITATIVE DATA ANALYSIS, ITS IMPORTANCE, TYPES, METHODS, TECHNIQUES IN RESEARCH PROJECTS

E.A. Anikeev[1], H.M. Firoz [1]

[1]Voronezh State University of Forestry and Technologies named after G.F. Morozov

Abstract. Data analysis plays a pivotal role in modern decision-making processes across various domains. This article concentrated on defining and understanding what data analysis is. Then, why is data analysis important? To present, the types of data analysis. This article highlights the concept of data analysis and data preparation. Afterward, talk about different types of data analysis methods and techniques in research projects. As well as, discussed the programming languages of data analysis. Finally, described on qualitative data analysis to get familiar with the data analysis preparation and strategies in this concept.

Keywords: Data Analysis, Data Analysis Types, Data Analysis Methods, Descriptive Analysis, Data Analysis Process, Qualitative Analysis, programming languages.

КАЧЕСТВЕННЫЙ АНАЛИЗ ДАННЫХ, ЕГО ВАЖНОСТЬ, ВИДЫ, МЕТОДЫ, ПРИЕМЫ В ИССЛЕДОВАТЕЛЬСКИХ ПРОЕКТАХ

Е.А. Аникеев[1], Х.М. Фироз[1]

[1]ФГБОУ ВО «Воронежский государственный лесотехнический университет имени Г.Ф. Морозова»

Аннотация. Анализ данных играет ключевую роль в современных процессах принятия решений в различных областях. Эта статья посвящена определению и пониманию того, что такое анализ данных. В таком случае, почему анализ данных важен? Рассмотрим типы анализа данных. В этой статье освещается концепция анализа данных и их подготовки. Далее мы поговорим о различных типах методов анализа данных и технических приемах в исследовательских проектах. А также обсудим языки программирования для анализа данных. Наконец, мы расскажем о качественном анализе данных, чтобы ознакомиться с подготовкой к анализу данных и стратегиями в рамках этой концепции.

Ключевые слова: Анализ данных, Типы анализа данных, Методы анализа данных, Описательный анализ, Процесс анализа данных, качественный анализ, языки программирования.

Introduction. Data are now knitted into every sector, project and function in the global economy. Without the essential factors of production, such as hard assets and human capital, much modern economic activity simply could not take place without data [1]. Data analysis provides a deeper understanding of processes, behaviors and trends. The concept of data analysis - large repositories of data that can be aggregated and analyzed to discuss patterns and make the best decisions - becomes the basis of competition and creates effective value for the global economy by reducing waste and improving the quality and quality of products. services. Data analysis allows organizations to gain insights into customer preferences, market dynamics, and operational efficiency. Data analysis helps determine what is and is not working, so you can make the changes needed to achieve your business goal.

Data analysis: Data analysis is simply the process of converting the gathered data into meaningful information. Also, data analysis is the process of systematically applying statistical or logical techniques to describe and explain, condense and recap, and evaluate data. Data analysis is the process of examining, adapting, filtering, and modeling data to help solve many problems. However, the data must be prepared before it can be used in the data analysis process.

Importance of data analysis: Data analysis plays an important role in various fields and industries today, driving decision-making processes, providing valuable insights, and enabling organizations to be more efficient and effective. Here are some key reasons highlighting the importance of data analysis [5]:

- Identify and solving problems
- Inform decisions making
- Performance assessment
- Predictive insights
- Improved efficiency
- Personalization
- Market understanding
- Adjust budgets
- Competitive advantage
- Risk management
- Innovation and research

Text analysis	Statistical analysis	Diagnostic analysis
what is happening?	waht happened?	why did it happen?

Predictive analysis	Prescriptive analysis
what is likely to happen?	what action should we take?

Figure 1 – Data analysis types

Types of data analysis: As shown in Figure 1, there are 5 main types of data analysis: Text analysis, Statistical analysis, Diagnostic analysis, Predictive analysis, Prescriptive analysis- with increasingly scary-sounding names [5]. Each one serves a different aim, so we can easily understand which makes the most sense for your situation.

Data analysis process: As shown in Figure 2, data analysis processes involve a series of some steps and methodologies to extract insights, patterns, and trends from raw data [5].

Data decision: For almost any types of project, the first step is to determine what problem you are trying to solve through data analysis. This question helps you visualize your KPIs and what types of data analysis you will conduct, so spend time identifying the question; otherwise, your analysis won't provide the actionable insights you want.

Data collection: In the second step, collect the required data from both internal & external sources. After identifying the question, you should collect the related data from various sources.

Data cleaning: Data cleansing is the process of correcting or removing invalid, corrupted, malformed, duplicate or incomplete data from a data set. If it's not clean data can be seriously misleading.

Data analysis: After your data is collected and cleaned, use one or more of the above types of data analysis to find patterns, relationships, and trends. Tools for data analysis can aid in the process and reduce the chance of human error, which is unavoidable.
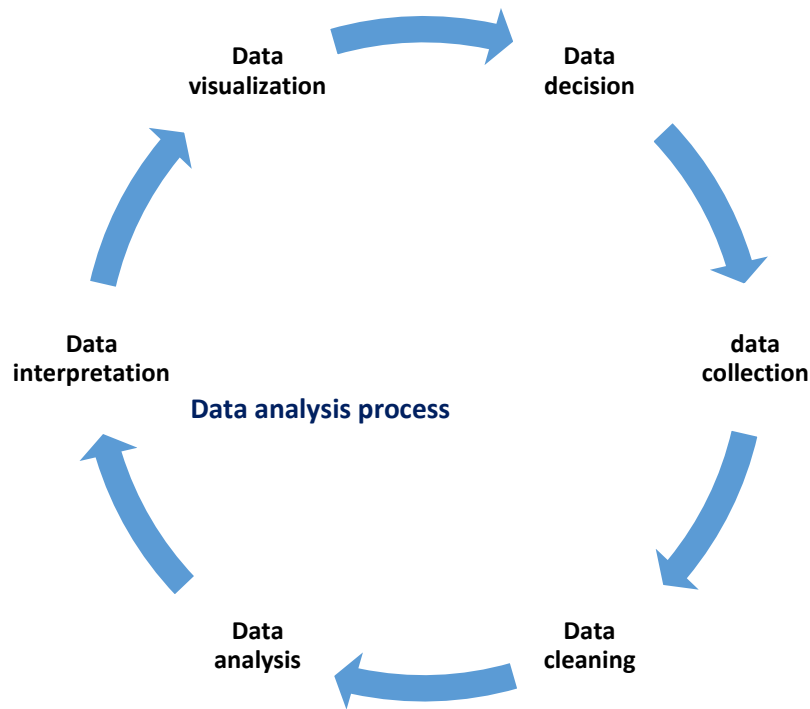
Figure 2 – Data analysis process

Data interpretation: You have to make judgments regarding your findings after doing an analysis of the data.

Data visualization: Lastly, you can use data visualization to explain your findings to stakeholders and decision makers through charts, reports, maps, and dashboards. Communicating your data in a way that field workers can comprehend and use to inform decisions beneficial.

Data analysis method & techniques in research projects: The most significant categories of data method & techniques used in research projects are covered in this section. The following six fundamental approaches can be used to categorize data analysis in general [2].

- Descriptive
- Exploratory
- Inferential
- Predictive
- Explanatory
- Mechanistic

Descriptive: Known as the least labor-intensive approach, descriptive data analysis is acknowledged as the original form od data analysis. It can handle large amounts of data as a result. In this case, a data set is performed using the data.

Exploratory: This approach defines future research or questions by examining unknown relationships and making new connections.

Inference: To draw conclusions about a larger population, inferential analysis employs a small sample. In the other words, a general theory about a subject's nature is tested using data from a sample of the subject's world. This approach makes use of cross-sectional time studies, observational data sets, and retrospective data sets.

Predictive: Predictive analytics forecasts future events based on past and present data. Additionally, it has the ability to forecast the values of one object using data from another. Although there are various forecasting models, a straightforward model with more data might work better overall. As a result, it's crucial to take into account the set of predictive data as well as the definition of measurement variables [6].

Explanation: using random experimental data sets, this analysis technique is used to ascertain the effects of one variable when another is changed.

Mechanistic: using randomized experimental data sets, this approach necessitates the greatest amount of work to pinpoint the precise variable changes that can influence other variables. Furthermore, it can be said that the mechanistic analysis is not very conclusive. Therefore, this might be the best option if you need to reduce errors and achieve high accuracy results in fields like engineering and physical sciences.

Programming Languages for data analysis: Data scientists use a number of well-liked programming languages for data analysis. Several programming languages are frequently utilized for data analysis, including the following: R, Python, SQL, Scala, Julia, MATLAB, and so forth.

Qualitative data analysis: The primary distinction between quantitative and qualitative data analysis is the researcher's significant contribution to the latter, which is based on their methods, expertise, and ability to integrate their findings. Here, common quantitative methods such as content analysis and grounded theory are reviewed.

Grounded theory: This is one method for analyzing data is textual. An inductive technique called grounded theory makes use of data to theorize about phenomena. This approach typically divides textual data into codes, relationships, and categories. An important phase in Grounded theory coding.

Content analysis: This approach analyzes text using a quantitative or quantitative approach. It is a methodical process that breaks down content analysis into multiple steps. Sampling is the first step in choosing a set od text from a large population. This procedure does not rely on chance selection; rather, a text with more pertinent information ought to be used as an illustration. Partitioning texts or applying specific guidelines is the second step. The following step uses the codes for segments. For every

code, you can use one or more codes. The most prevalent code is then determined by analyzing the others [3].

Conclusion

An overview of the most popular methods for data analysis is given in this article. The types, procedures, and methods of data analysis- all crucial steps in the process of analyzing data-are first covered. Organizations can be more adaptable and receptive to data analytics by using data analytics to process and store this data [4]. There is discussion of the various approaches and strategies applied in the research projects. The last section goes into more detail about quantitative data analysis and its method.

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