



SNS COLLEGE OF ENGINEERING

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Accredited by NAAC-UGC with 'A' Grade

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

19AD504 – DATA VISUALIZATION

UNIT –I

INTRODUCTION TO DATA VISUALIZATION

1.1 DATA VISUALIZATION

- Data visualisation is the process of displaying data using popular images like infographics, charts, and even animations.
- These informational visual representations convey intricate data relationships and data-driven insights in a way that is simple to comprehend.
- Dashboards are a common term for data visualisation in the business world.
- Data visualization is the process of representing data visually to aid understanding, analysis, and communication.
- It involves creating graphical or visual representations of data, typically using charts, graphs, maps, or interactive visual elements.
- The goal of data visualization is to present complex information in a visually appealing and understandable format, enabling users to grasp patterns, relationships, and insights more easily.
- The three basic purposes of data visualisation are exploration, monitoring, and explanation. Most visualisations concentrate on a single objective, while some can cover more than one of them.

To explore :

- A data visualisation that is focused on exploration and quick iteration might be helpful when consumers are seeking for an open-ended tool that aids them in discovering patterns and insights in data.



- Tools used for exploration should be tightly integrated with those used for data collection (extract), cleaning (transform), and curation (load).

To monitor :

- A data visualisation that is specifically designed for monitoring is the ideal when consumers need to check on the performance of anything.
- Dashboards and other monitoring tools should emphasise leading indicators and display data that is relevant to practical, immediate actions.

To explain :

- When users want to go beyond the “what” of a problem and dig into the “why,” a data visualization focused on explanation is ideal.
- Explanatory visualizations are often hand-crafted to help a broad audience understand a complex subject, and usually are not able to be automated.

To create effective data visualizations, it's essential to consider the following principles :

1. **Understand the audience :**
 - Tailor the visualizations to the target audience's background, knowledge, and objectives. Ensure that the visuals are appropriate for their level of understanding and communicate the intended message.
2. **Choose the right visual representation :**
 - Select the appropriate chart or graph type that best represents the data and supports the message you want to convey. Common types include bar charts, line charts, scatter plots, pie charts, and maps.
3. **Simplify and declutter :**
 - Keep the visualizations simple and avoid overwhelming the audience with unnecessary complexity. Remove any non-essential elements and focus on the key information you want to communicate.
4. **Use appropriate scales and labels :**
 - Ensure that axes, labels, and legends are clearly defined and labeled accurately. Choose appropriate scales and units to prevent misleading interpretations.
5. **Enhance with interactivity :**
 - Utilize interactive elements, such as tooltips, filters, and drill-down features, to allow users to explore and interact with the data. This can provide deeper insights and a more engaging experience.
6. **Maintain consistency :**

- Use consistent colors, fonts, and styles throughout your visualizations to create a cohesive and unified look. Consistency helps users understand the information more easily and reduces confusion.

7. **Tell a compelling story :**

- Structure your visualizations in a logical sequence that guides the audience through the data. Highlight the key insights and draw attention to the main takeaways to effectively convey your message.

DATA VISUALIZING TOOLS :

- ❖ There are numerous tools available for creating data visualizations, ranging from general-purpose tools like Microsoft Excel, Tableau, and Google Data Studio to programming libraries such as Python's Matplotlib, Seaborn, Plotly, and R.
- ❖ The choice of tool depends on factors like data complexity, interactivity requirements, and personal preferences in terms of programming skills and desired level of customization.