DATA VISUALIZATIONS IN TABLEAU

Importance of Data Visualization

1. Enhances the Understanding of Data
2. Provides a Clear and Intuitive way to comprehend the Information
3. **Simplifies Complex data** (Large Datasets and Databases are Overwhelming)
4. **Higher Retention Rate** (Offers a Snapshot of the entire data, making it easier to remember in memory along with being Easily Understandable)
5. **Increases Data Engagement** (Visualizations have a higher Engagement Factor compared to Tabular or Textual Data)
6. Humans are naturally more inclined to process visual information better, which leads to conveying of insights much more effectively.

About

Tableau By Salesforce Helps us with this Visualization using its Interactive Dashboards, Graphically Attractive Displays, and Data Interpretation from Various Sources of Data including Textual Data, Files and Server operated Databases.

Measures are Quantitative Values that have Numeric Data whereas Qualitative Values such as Names and Categories are Called Dimensions in Tableau. Dates are by default considered as Dimensions but can also be treated as Measures if Needed.

Tableau Projects are called Workbooks and within them can contain Sheets (Individual Graphs), Dashboards (Collective Graphs on a Page) and Stories (For Explaining a Concept Step-By-Step). The Workbooks are stored as .twb or .twbx files.

Products & Services

1. **Tableau Desktop**: An Offline Application to Help Create Visualizations From the comfort of your Desktop (Laptop or PC). [2 GB Offline]
2. **Tableau Prep**: An Offline Service that allows you To Clean, Filter, and Organize your Data Before Proceeding with Visualizations. []
3. **Tableau Web**: Includes Three Types of Sub-Services within namely Public, Cloud and Server as described below. All these services require Internet Access to Work With.
    a. **Tableau Public**: It is a free platform designed for individuals to create and share interactive data visualizations publicly. Essentially a free version of Tableau Desktop available online, it is primarily used to deploy and share workbooks or storyboards with others, including non-Tableau users, via links or embeddings, as the work is hosted on cloud servers. This service is particularly beneficial for students and individuals looking to share assignments and explore the product.
    b. **Tableau Server**: It is an on-premises or cloud-hosted solution that enables organizations to host Tableau on their own servers or private cloud infrastructure. Unlike Tableau Public, it uses an on-site server for deployment, providing enhanced security and confidentiality. This method offers better performance and is primarily used by large scale corporations for collaborating with employees and sharing work with clients.
    c. **Tableau Cloud**: Tableau Cloud (formerly Tableau Online) is a fully-hosted SaaS that enables organizations to publish, share, and collaborate on dashboards without the need to manage hardware or software. It allows deployment of workbooks (dashboards) remotely, facilitating easy sharing and collaboration with colleagues, with access levels categorized for Creators, Explorers, and Viewers. As part of Tableau Web, it eliminates the hassle of downloading software and can be accessed remotely on low-resource machines, seamlessly working alongside Tableau Desktop. Tableau Cloud is particularly advantageous for team collaboration within a company, offering various access levels to accommodate different roles and needs.

[**Note**: Simpler Cleaning can be Done with Tableau Desktop Itself, but More complex and Detailed ones are better done on Tableau Prep]

Advantages

1. Smooth and Sharable Interactive and Appealing Dashboards.
2. Simple, Easy and Fast Creation Visualizations in a matter of Minutes.
3. Incorporation of Data from a Variety of Data Sources including Static and Live ones, allowing for Real Time Dashboards and Updates to be Visible.
4. Ability to Automatically Interpret, Clean and Organize Data and Later on Generate Analytics including Time Series Predictions, Tend Identification [Up to some Extent only though].
5. Ability To Perform Data Manipulation, and Simple Analytics such as Statistics, Relationships with Just a Click or By Entering a Custom Formula if Needed.

Disadvantages

1. Lack of 3D Visualizations for More Complex Spatial Data Such as AI-based LLM Architectures and ML-based Neural Networks
2. Lack of Design & Styling Option (Complex Features Like Grid and Alignment Not Available)
3. Difficult To Incorporate Images, Videos and Symbols.
4. Lack of Ability to Generate Automatic (Detailed Report with Explanations – How ? What ? Cause ? Reason ? Action ?) and Static (Export to PDF and Other Formats) Reports & Analytics are not Generated To its Best Ability.

Best Use Case

It is Best to Be Used with a Report Software or Service for Analytics such as Power BI from Microsoft, which can be responsible for Generating Reports and Analytics without much efforts, while the Tableau Desktop or Web Software would be responsible for Generating Visualizations and If needed for Data Cleaning and Structuring as well.

Tableau Web Authoring Feature Allows us To Use and Incorporate These Tableau Visualizations in our Web Apps such as Power BI Software if Needed.

Example: Power BI can Identify Anomalies and Patterns Automatically, alongside with using AI to write summaries of Data Obtained, while Tableau offers easier creation and more Interactive Dashboards for Viewing.

Learnings

1. **Tableau Services**: Understood and learnt to work with Various Tableau Services and Products mentioned above.
2. **Data Source:** Importing Data (Static or Live) From various Sources including Files and Servers.
3. **Data Formation**: Cleaning, Formatting, Structuring and Organizing the Dataset with applying Joins, Unions and Relationships within multiple Tables.
4. **Creations**: Creation of Various Visualizations, and making Analysis from them.
5. **Details**: Requirements for creation of Graphs alongside applying Filters, Calculation Formulae and Statistics, Sorts, etcetera to achieve the desired Results.
6. **AI Tools**: Use of Tools such as the Data Interpreter and Summarizers, and Models to obtain even faster results and Outputs.
7. **Presentations**: Creation of Interactive Dashboards and Stories along with Styling (Labels, Details, Colors, ToolTips, Size, Notes, etc.) to suit different Needs.
8. **Saving Work Spaces**: Exporting and Sharing Workbooks and Data through Different Means (Pdfs, .twbx, Live Server Links, Deployments, Web Authoring, etc.)