Visualization Of COVID-19 Data Using Advanced Software Tableau For Better Understanding

Prashant[1], Research Scholar

Krishan Kumar[2], Assistant Professor

[1-2]Yaduvanshi College of Engineering and Technology, Narnaul, Mahendergarh

Abstract: It is critical to concentrate on particular tasks when dealing with COVID-19 data in Tableau, such as monitoring cases, analysing trends, and showing geographic distribution. The findings of utilizing Tableau to analyze COVID-19 data can offer important insights into a number of pandemic-related topics. All things considered, Tableau offers an excellent platform for analysing and visualizing COVID-19 data, empowering stakeholders to monitor critical metrics, take data-driven choices, and effectively address the expanding epidemic. Tableau offers a valuable tool for tracking COVID-19 variations, outbreaks, and emerging trends, which could be crucial for public health surveillance. This could entail combining data from syndromic surveillance, testing, and genetic sequencing to identify early warning indicators of resurgence and guide containment efforts. In order to assist decision-makers, public health professionals, and other stakeholders in responding to the pandemic with evidence-based choices, Tableau may provide decision support tools. To help with coordination and collaboration, this could include communication dashboards, policy effect assessments, and scenario planning tools. Tableau offers a platform for researchers, policymakers, and practitioners to share COVID-19 data, insights, and best practices, which may promote international collaboration and knowledge sharing. This is entail holding online communities, webinars, and virtual conferences with an emphasis on COVID-19 data analysis and visualization.

Keywords: COVID-19, Tableau, Data Visualization, CVC File

1. Introduction

The application of human nature to improve data processing and organizational effectiveness is known as data visualization. The depiction of data or information in a graph, chart, or other visual format is known as data visualization. We can handle more complex information and improve memory with the aid of visualization [1]. It uses visuals to convey the relationships between the facts. This is significant since it makes it easier to spot trends and patterns. As big data grows in popularity, we will need to be able to analyze ever-bigger data sets. Predictive analysis, for example, is made simpler by machine learning and can result in useful presentation visuals [2].

However, knowledge of data visualization is essential for professionals in other fields, not just data scientists and analysts. It is need to visualize data, whether work in marketing, finance, technology, design, or any other field. The significance of data visualization is demonstrated by this fact. Large datasets are distilled into visual graphics with the primary objective of making complex relationships within the data easily understood [3]. It is frequently used synonymously with phrases like statistical graphics, information visualization, and information graphics. A vast field encompassing numerous fields is data visualization. The interdisciplinary character of the visualization field is precisely what gives it so much energy and opportunity. Tableau is capable of producing a wide variety of visualizations to demonstrate insights and present data in an interactive manner. It has capabilities that let you go down into the data and see the impact in an

understandable visual style for everyone [3]. Tableau also has cloud support and real-time data analytics capabilities [3–7]. Here, we go over the benefits, installation, and several versions of Tableau. We'll examine how tableau differs from spreadsheet programs like Microsoft Excel.

Tableau is the most robust, secure, and adaptable end-to-end analytical platform for our data obtained through collaboration. It also gives people access to more data power [7]. The only business intelligence platform that transforms data into an insight that motivates action is Tableau, which was created for individuals but scaled for enterprises. Millions of rows of data may be easily managed with Tableau. The abundance of data allows for the creation of many visualizations without compromising dashboard speed [4]. Additionally, Tableau has an option that allows users to create two live connections to separate data sources, such as SQL and other databases. Tableau offers a variety of visualization options that significantly impact the user experience [8]. Finally, Tableau is incredibly simple to understand; even someone without any coding experience can pick it up quickly [7, 8].

This work has been divide into five section. In section one, introduction has been introduced about the work. In section two, related study has been discussed about the work. In section three, discussed methodology and dataset used in the proposed work. In section four, result has been discussed in brief. In section five, conclusion has been discussed.

2. Related Study and Tableau Architecture

The names in the data source you have chosen provide the basis for the item names. They are renaming items in Tableau so that they are more appropriate for our target audience [3]. Number, Date & time, Date, String, and Boolean are the five categories of data elements that Tableau offers. By default, Tableau uses the data source information and data type rules to determine the best match for a given data item when it connects to our data [2-4]. The basic architecture of Tableau Architecture is shown in Figure 1.
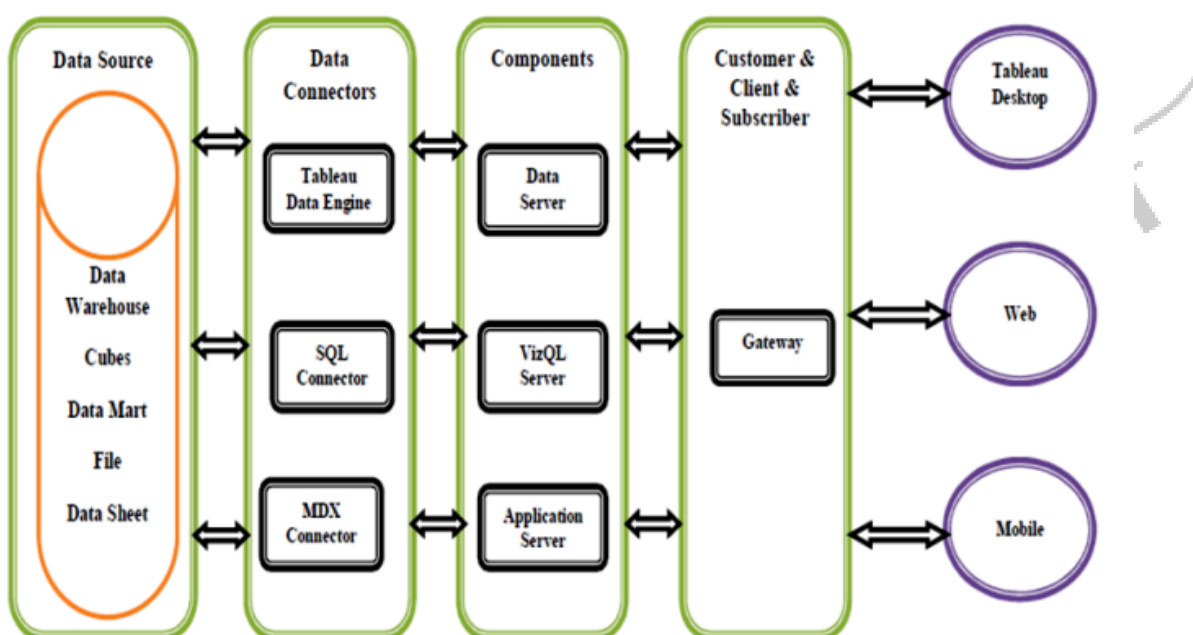

Figure 1 the Tableau Architecture

Tableau is a tool for creating data visualizations. It allows us to plot our data, connect to practically any database, and obtain insights that help us comprehend the data correctly. Tableau gives you and other key decision-makers the ability to discover patterns in data, such as pandemic behaviour, and compare the outcomes of machine learning algorithms and Tableau visualizations. It is use Tableau to create dashboards, models, interactive visualizations, and to analyze our data thoroughly. We are reviewing Tableau's history and current state of the art in this effort. In the end, connecting to and extracting data from various sites is Tableau's primary responsibility [3–5]. Information has been gathered from any platform via it. The basic background of Tableau software is shown in Figure 2.
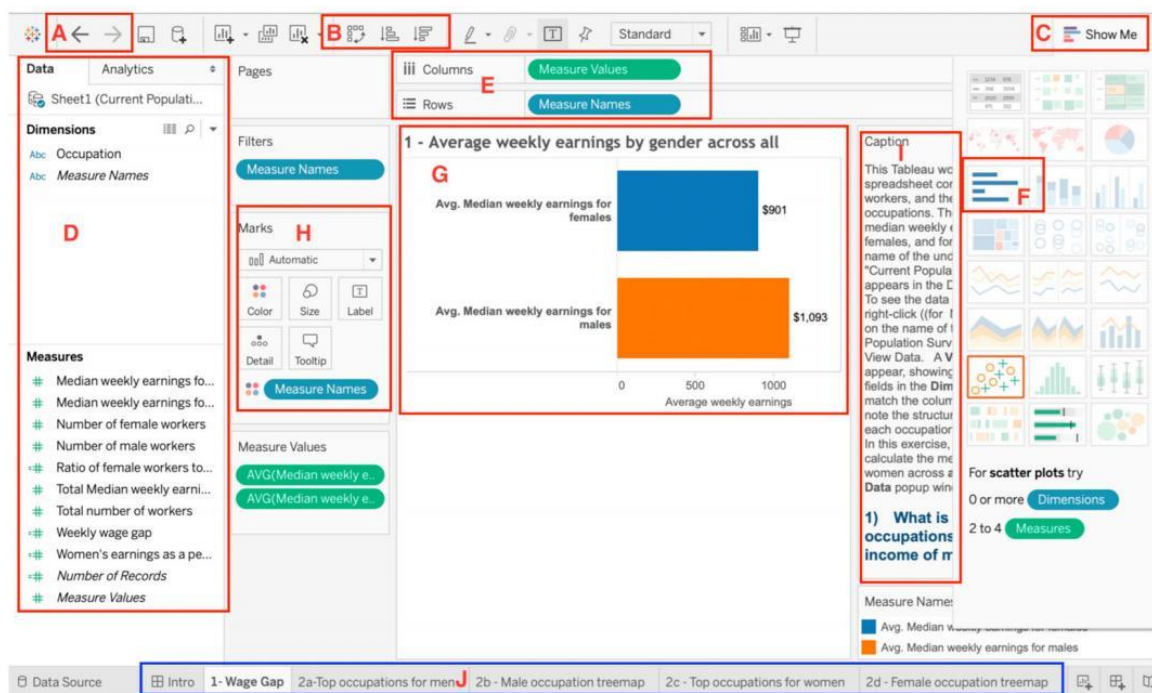
Figure 2. The basic background of Tableau software

3. Dataset and Implantation Detail
3.1. COVID-19 Dataset

Acquire a COVID-19 dataset from a reputable source, such as research facilities, government health organizations (like the CDC and WHO), or data repositories (like Kaggle). Make that the dataset is in a Tableau-compatible format (such as CSV, Excel, or database). As necessary, clean up and prepare the data, taking care of problems like outliers, incorrect formatting, and missing numbers. The Kaggle COVID-19 dataset has been used for this research. Implementing Tableau involves several steps, from installation to data connection, visualization creation, and deployment.

3.2. Installation

Visit the Tableau website to download Tableau Public or Desktop. Proceed with the installation wizard by running the installer. Activate your license for Tableau if necessary.

Open Tableau Desktop. Choose the proper connector (such as Excel, SQL Server, and Salesforce) to establish a connection with your data source or sources. Configure the connection settings and supply the required authentication credentials.

3.3. Data Preparation

After connecting, use Tableau's Data Source page to prepare your data. Complete data cleaning duties, such as removing unnecessary information, dealing with missing numbers, and fixing problems with the quality of the data. Construct calculated columns or fields to extract fresh information from your data. If required, combine data from several sources.

3.4. Visualization Creation

Click the Worksheet tab to begin creating visualizations after you have prepared your data. You can create visualizations by dragging and dropping fields from the Data pane into the Rows, Columns, or Marks card. The Show Me panel or the Marks card allow you to select the suitable visualization type (such as a map, bar chart, or line chart). Format axes, colors, labels, tooltips, and other features to add personalization to your visualizations. By adding parameters, actions, and filters, you can make the data more interactive and let consumers analyze it in real time.

3.5. Performance Optimization

Create extracts, which are compiled snapshots of your data, to maximize the performance of your Tableau workbooks. To cut down on the quantity of data being processed, use context and data source filters. Rendering speed can be increased by streamlining computations and utilizing effective visualization strategies.
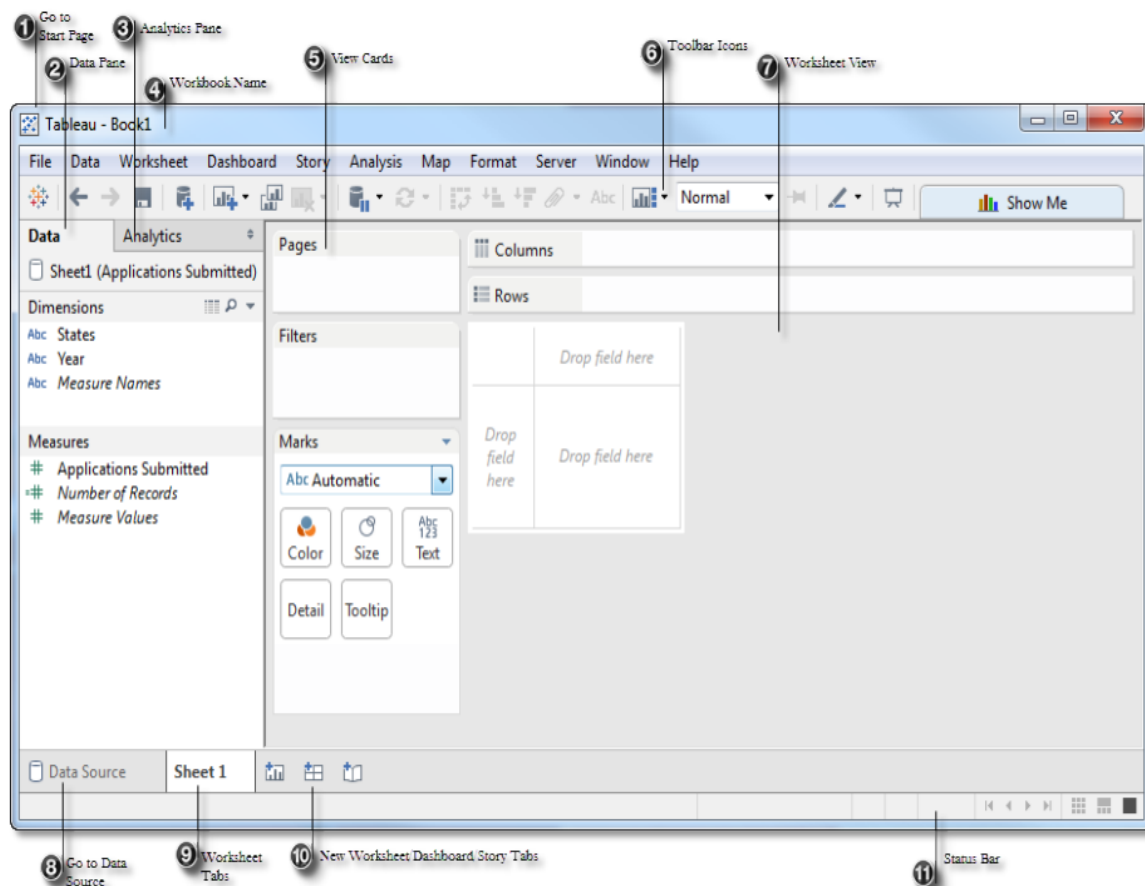
Figure 3.2. Overview of Tableau

4. Results and Statistical Analysis of COVID19 Data using Tableau

One of the earliest companies to realize that data would be essential to enabling people to see and comprehend what was happening was Tableau. Without delay, our group got to work creating the first of several tracker dashboards that would assist show the extent of the outbreak. In order to provide individuals and organizations with free access to the tracker dashboard, it introduced the COVID-19 Data Hub in March 2020.

The Global COVID-19 tracker offered vital statistics about the pandemic's spread and effects, including as fatality and hospitalization rates. Days after its debut, the Hub had received thousands of visits. Millions of users of the Global Tracker dashboard viewed the website throughout the course of the following year, viewing vital indicators almost instantly. With the help of the Tracker, decision-makers in the public and private sectors as well as members of the general public could obtain the data they needed. Additionally, users could access and download datasets for independent analysis.
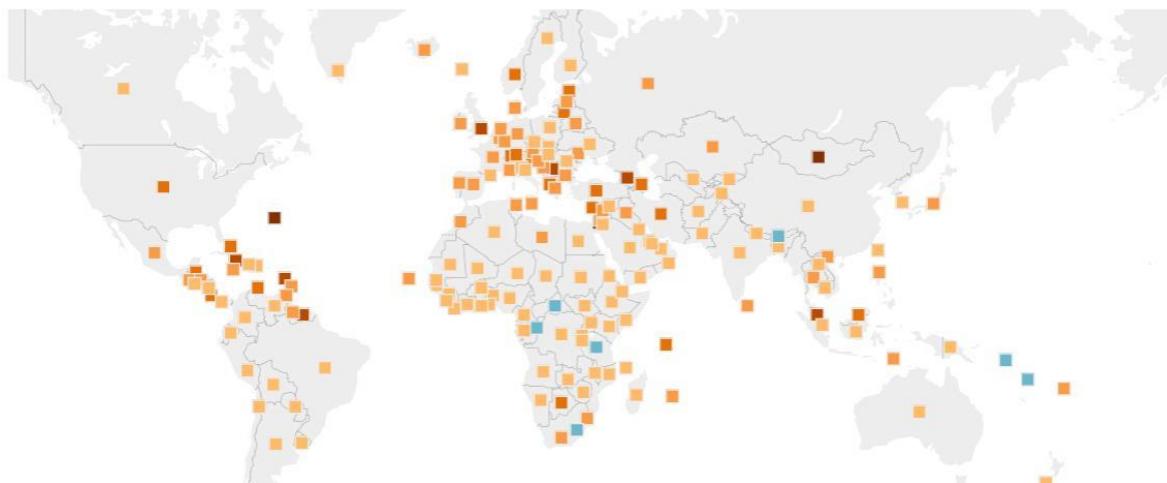

Figure 4.1- Global view of spreading COVID-19

Open Tableau Desktop and establish a connection with your COVID-19 information. Depending on the format of your dataset (e.g., Excel, CSV, and database), choose the right data connector. Select the database table or dataset file, then adjust the connection parameters, including the authentication credentials.
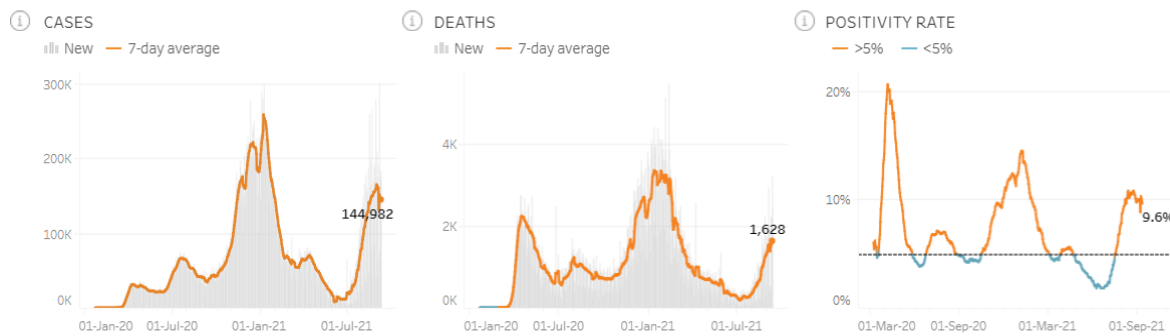

Figure 4.2. The cases, death and positive rate simulation

To begin producing visualizations using the COVID-19 dataset, select the Worksheet tab. To create visualizations, drag and drop pertinent fields onto the Rows, Columns, or Marks card. To successfully depict COVID-19 data, select the right visualization options, such as heat maps, geographic maps, line charts, and bar charts. Make visuals that illustrate patterns over time, the geographic dispersion of instances, comparisons between various areas and nations, and other pertinent information. The testing eligibility, tracing and indexing shown in figure 4.4.
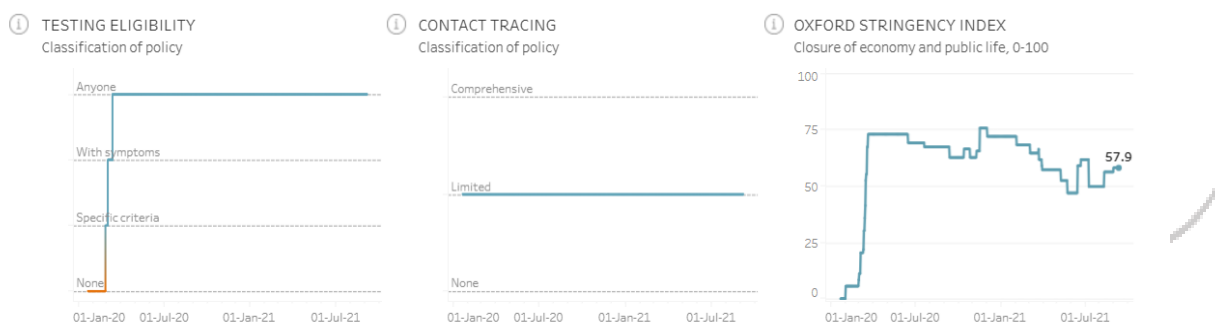

Figure 4.4. The testing eligibility, tracing and indexing

5. Conclusion

As a result, Tableau provides a strong platform for COVID-19 data analysis and visualization, helping users understand the pandemic's effects and make wise decisions. Users can better grasp the structure, trends, and patterns in the data by using Tableau to explore COVID-19 datasets. In order to successfully depict COVID-19 data, Tableau offers a variety of visualization methods, such as heat maps, geographic maps, line charts, and bar charts. These graphics assist in clearly and intuitively communicating complex information. Using trend analysis, forecasting, and comparative analysis, users may monitor the pandemic's evolution over time and across geographical areas with Tableau's analytics capabilities.

Tableau gives customers the ability to communicate their insights and visualizations via dashboards, reports, and interactive web-based apps with decision-makers, stakeholders, and the general public. Tableau enables decision-makers to take prompt, well-informed action to lessen the pandemic's effects and assist public health initiatives by presenting COVID-19 data in an interactive and visual way. To sum up, Tableau is a useful tool for comprehending, analysing, and disseminating COVID-19 data, which eventually aids in the international response to the epidemic.

References

[1] Erin Burrell Nickell: An introductory audit data analytics case study: Using Microsoft Power BI and Benford's Law to detect accounting irregularities (2023)

[2] Yasmine Fittouhi: The composition tableau and reconstruction of the canonical Weierstrass section for parabolic adjoint action in type A (2023)

[3] Harcharanjit Singh Mahinder Singh: The impact of business intelligence, big data analytics capability, and green knowledge management on sustainability performance (2023)

[4] Sergio Di Martino: A visual-based toolkit to support mobility data analytics (2023)

[5] [WHO portal, https://www.who.int/emergencies/diseases/novel-coronavirus, Last accessed on 11/03/2024].

[6] Janvrin DJ, Raschke RL and Dilla WN. (2014). Making sense of complex data using interactive data visualization. J Account Educ, 32(4), 31-48.

[7] L Wang, G Wang and CA Alexander.(2015). "Big data and visualization: methods challenges and technology progress", Digital Technologies, 1(1), 33-38.

[8] Sas, "Data Visualization Techniques" (2013). White Pap., 2-16