Data Visualization Using Google Data Studio

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Abstract

Executives seldom have the time to pore through information pages to figure out how their company is doing. As a result, sales data visualization is required to describe sales success for executives swiftly. Google Data Studio is a data visualization application that is an easy-to-use tool for presenting complicated data sets engagingly and understandably. You can view your data using Google Data Studio without knowing how to write. The service is cloud-based, accessible from anywhere, is free, and allows you to share reports with anybody you choose.

Keywords: Data Visualization, Google Data Studio, Cloud Computing.

1. Introduction

1.1 Background

When data gets too complicated to comprehend, data visualization is the solution for converting complex data into a graphical style that makes it easier to comprehend your business. Data visualization has become an essential aspect of running a business and a growing part of day-to-day life management.

Visualizing data is both an art and a science. Data visualization is a broad phrase that refers to any endeavor to put data in a visual context to assist people in grasping its meaning. The data's economic worth has now shifted. Data enables firms to make smarter, "real-time" choices, fostering business acceleration. Organizations may use data to see patterns due to Big Data storage.

The best and only approach to view your data at first is to use Excel's features. You will begin with a practical spreadsheet, carefully and methodically producing simpler visuals to aid in delivering the message or understanding business patterns. However, it is presently progressing.

The greater the speed with which data must be shown, the greater the hurdles. Data visualization requires good visuals and beautiful displays, integration with data sources, and sharing information quickly.

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"The future of data visualization, according to James D Miller's book "Introduction to Big Data Visualization" (James D Miller, 2017), 2015, Towler: The field of data visualization is entering a new epoch. Emerging intelligence sources, theoretical breakthroughs, and multidimensional imaging improvements are altering the potential value of analytics and insight, with visualization playing a significant part."

The authors investigated the usage of Google Data Studio as a data-breasted visualize tool/program to address some of the problems above in this study. Google Data Studio is a cloud-based software that is an easy-to-use tool for presenting complicated data sets clearly and entertainingly. Anyone can use Google Data Studio, and it can be utilized anywhere. It was released as part of the Analytics 360 Suite in May 2016. Data Studio is currently in beta, but it offers a lot of third-party connectors and functionality.

1.2 Problem Formula
The author attempts to summarize the formulation of the problem based on the backdrop of the study described above:
1. How can I use Google Data Studio to visualize sales data?
2. How to use Google Data Studio to combine data sources
3. Use Google Data Studio to exchange data with your coworkers/partners.

1.3 Research objectives
The purpose of this research is:
1. Using Google Data Studio, create a sales data visualization.
2. Connect data sources to Google Data Studio.
3. Distribute the report to others.

1.4 Scope
The scope of this research is:
1. The study was represented by a sample of sales data collected by the researchers.
2. Researchers focused their research on Google Data Studio capabilities and used Google Sheet as a data source.

2. Discussion
2.1 History of Visualization data
Data visualization was predominantly used in maps before the 17th century, exhibiting markers of land, cities, highways, and resources. Better immunization is required as the need for more precise mapping, and physical measurement grows.

A Flemish astronomer named Michael Florent van Langren created the first visual depiction of statistical data in 1644. The so-called "golden period" of statistical charts occurred in the second part of the nineteenth century. The 1854 map of the London cholera epidemic known as John Snow's map and Charles Minard's 1869 map showing the number of men in the Russian army combined with the army's location (guided by the X-axis) and the extreme cold temperatures (shown at points) when cold weather took a fatal toll are two well-known examples of visually data from that era.

The expanding tendency toward statistical visualization met a snag in the early twentieth century. Also, consider this period a modern dark age for data visualization.
Statisticians are becoming more concerned with precise figures and believe that the visuals are too incorrect.

2.2 Computer Graphics

Graphics are the most efficient way to trace data and are a vital aspect of a presentation since they transmit information exceptionally well. Data is shown via graphs.

Since Rene Descartes invented cartesian coordinate systems, X and Y axis graphics in the 17th century, computing technology has been especially advantageous to graphics. That did not happen because the visual aspect was not prioritized when the computer was initially established, but graphics technology has advanced much since then.

The data translation into a visual or tabular format so that the data's qualities and relationships among data items or attributes may be examined and presented is known as visualization. Data may be processed and shown dynamically, in real-time, and accessible to everyone, everywhere, and anytime, but visualization techniques are not used in information systems or web-based applications with database connections. Its goal is to increase data consumption.

2.3 Google Cloud Platform

Google Cloud Platform is a Google Cloud Computing service product that consists of four types of services, all of which seek to establish a project based on Cloud Computing / Internet Computing that can be used worldwide.

Google Cloud Platform offers four things:
1. Data Security: Using Google Cloud Platform services provides us with highly safe data security, a critical consideration when developing an Internet-based business.
2. Flexible: We can access the data we save on Google Cloud from wherever we are and get what we need. Only allow access to the internet.
3. CentralizedData: To develop a large-scale service, centralized storage is required, especially if the service's customers are many.
4. Saving Costs: When it comes to long-term investment, the Google Cloud service can help us save money on the system infrastructure to construct an app for our company.

There are four types of Google Cloud Platform services:
1. Google AppEngine
   Google AppEngine is a service provided by Google that allows you to build and execute web-based apps.
2. Google BigQuery
   This Google service is ideal for analyzing enormous amounts of data till the size approaches Terabytes or Petabytes. It simply takes a couple of seconds. This service is ideal for enterprise-level applications.
3. Google Compute Engine
   Google Compute Engine is a feed that you may subscribe to. You can fully control the Linux machine you construct on top of Google's servers using the cloud services supplied by Google to assist you in establishing a cloud server.
4. Google Cloud Storage
One of them is Google Cloud Storage. Google’s service solutions are geared toward developers as a large-scale data storage medium. This service makes it simple to set up a file-sharing, video-sharing, or photo-sharing service without worrying about setting up server infrastructure.

2.4 Google Data Studio

As part of the Google Analytics 360 Suite, Google announced Data Studio 360, a new data visualization tool for businesses, in March 2016. A few months later, Google Data Studio, the free version, was introduced. The Google Performance Summit took place in May of 2016. Initially, the free version was only accessible in the United States. In March 2017, Google Data Studio will be "accessible internationally" to more countries and free for everyone with no report limits.

Google Data Studio is a free collaborative data visualization tool that works well with other Google products such as Google Analytics 360 Suite, DoubleClick Campaign Manager, Google AdWords, Google BigQuery, YouTube, Google Sheets, etc. The solution uses Google Cloud Storage (GCS), Google account/authentication, and Google Docs to provide superior security, authentication, and sharing features.

Google Data Studio allows users to:
1. Connected to the data source,
2. Make calculations, dashboards, and special reports,
3. Share and collaborate with others.

Instead of beginning from scratch, users can utilize the product's templates and sample report galleries (created by the community). Some of them have much aesthetic appeal.

Based on the author's observations from In various sources, there are four main strengths of Google Data Studio:
1. Price (Free)
2. Integrated with Google Platform
3. Cloud-based
4. Provides a sample report for the user to start.

2.5 Cloud Computing

Cloud Computing is known in Indonesia as cloud computing, is a technology that makes the internet a data and application management center, where computer users are given access rights (login). The application of cloud computing is now carried out by some of the world's leading IT companies.

There are three service models in cloud computing, (1) Software as a Service (SaaS), (2) Platform as a Service (PaaS), and (3) Infrastructure as a Service (IaaS).

SaaS is a service for using application programs that have been provided by the service provider Micros, managing the platform and infrastructure values that run the application.
PaaS is a service for using the provided platform – developers focus on the applications they build without thinking about maintaining the platform. IaaS is a service to use the infrastructure that has been provided.

In cloud computing, there are four deployment models: public cloud, private cloud, hybrid cloud, and community cloud. The usage of a public cloud is similar to that of shared hosting, in which several users use a single server.

On a private cloud, there is just one (single) user. Public and private clouds may both benefit from hybrid clouds. At the same time, a community cloud may be utilized by numerous organizations with similar interests to work together in a studio.

2.6 Google Sheet

Google Spreadsheets is a web-based tool that lets users create, edit, and share spreadsheets and exchange and amend data. Ajax-based tools work with Microsoft Excel and CSV files (comma-separated values). Spreadsheets may be saved as HTML as well.

Spreadsheet functionality such as adding, removing, and sorting rows and columns are available in Google products. Multiple geographically distributed users may work on spreadsheets in real-time and talk using this application’s built-in instant messaging software. Spreadsheets may be easily uploaded from users’ desktops.

GAS is a programming language provided by Google Sheets (Google App Script). The GAS code will be run in the Google Cloud from afar. “Google App Script is a javascript language cloud scripting that allows easy job automation for all Google products and third-party services,” according to Google.

Modern cloud-based applications, such as Google Sheets, will make it easier for newcomers to use apps. We required a particular operating system (proprietary) and pricey software to begin studying. Trouble is no longer a barrier to learning; anyone with an internet connection and a Gmail account may study using a current browser. In this research, we use Google Sheet as a data source for a data visualization studio.

2.7 Database Plan

Executives seldom have the time to pore through information pages to figure out how their company is doing. As a result, sales data must be visualized for executives to swiftly summarize sales performance and receive crucial details about their firm at a glance. A dashboard is another name for this type of data display. This dashboard aims to offer a scannable perspective of a department’s performance, and it may be used for any department, such as marketing or accounting.

2.8 Chart Type

Time series, bar charts, pie charts, tables, geo maps, scorecards, scatter charts, and other charts are available in Google Data Studio. There is a separate visualization function for each chart. The chart shows one or more information axes (dimensions) and the actual values that those dimensions or metrics include.

Your data will have basket-like proportions. The name, description, or another attribute of the data is the value included in the basket. A metric is a numerical number found in your data.
Data sources include both dimensions and measurements. Dimensions and measurements will be displayed in a chart. Tooltips appear when the user hovers over the data in a bar chart.

![Yearly Coffee Consumption by Country](chart1.png)

**Figure 1. Examples of Google Bar Chart**

Time series charts help display data changes or present comparisons between numerous things.

The size of an item in a data collection is proportional to the sum of the total elements in a pie chart. The points or values for these elements are expressed as a percentage of the total data (in a loop).

![Yearly Coffee Consumption by Country](chart2.png)

**Figure 2. Examples of Pie Chart**

Google Map Chart displays a map-shaped chart using the Google Map API. The map will be marked with the data that has been owned.

![Yearly Coffee Consumption by Country](chart3.png)
2.9 Report Presentation Steps

To show data using Google Data Studio, follow these steps: (1) prepare data sources, (2) prepare data source connections using Google Data Studio, and (3) provide the appropriate graphs.

The critical thing to remember is that you should design the report's look before working on it. The simplest method to begin developing the data visualization you desire is to sketch it out on paper by hand. After completing the design, you may begin preparing the data sources. The author is now using Google Sheet as a data source.

The author gives the sales data, which includes division name, sales time, sales office name, and sales location as data dimensions. The sales office's name is the sales office's representative name. The author used sales data from 2015 to 2018 to illustrate his point. The writer can then prepare the link between the data source and Google Data Studio after finishing the data source.

Additionally, after creating the connection is accomplished, it will proceed to the last stage, which is the creation of a report. You offer the report you wish to visualize at this point. With many graphics and accessible perspectives, you may display the data visualization you desire so that you may create the report in the format you want.

3. Conclusion

Google Data Studio data visualization is an alternate tool business may use to view data. Google Data Studio supports a variety of data sources, making it easy to combine reports from a variety of sources. You may share reports using Google Data Studio without jeopardizing the confidentiality of the data you contribute.

References


Data Visualization Using...

